

**HEIGHTS SEWER COLLECTION IMPROVEMENTS**

**B11-26**

**CITY OF CONCORD**

**CONCORD, NEW HAMPSHIRE**

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**BIDDING/CONTRACT DOCUMENTS  
AND TECHNICAL SPECIFICATIONS**

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**MARCH 2026**

**21775**

**CITY OF CONCORD**  
**CONCORD, NH**  
**BIDDING/CONTRACT DOCUMENTS**  
**AND TECHNICAL SPECIFICATIONS**  
**FOR**  
**HEIGHTS SEWER COLLECTION IMPROVEMENTS**

**B11-26**

**MARCH 2026**



**Prepared By:**

**Wright-Pierce**  
**10 Corporate Drive, Suite 206**  
**Bedford, NH 03110**  
**603-606-4420**

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City of Concord, New Hampshire  
Purchasing Division

**HEIGHTS SEWER COLLECTION IMPROVEMENTS**

**March 2026**

Prepared for, and in coordination with the

**COMMUNITY DEVELOPMENT DEPARTMENT**  
**Engineering Services Division**

**Project Manual**  
**Bidding and Contract Documents**  
**Technical Specifications**  
**Plans**

Prepared by: Wright-Pierce  
10 Corporate Drive, Suite 206  
Bedford, NH 03110

**NON-MANDATORY PRE-BID MEETING: APRIL 14, 2026 AT 10:00 AM**  
At the Community Center on Canterbury Road - 14 Canterbury Rd, Concord, NH 03301.

**BID DUE DATE/TIME: APRIL 28, 2026 NOT LATER THAN 2:00 PM**  
At the Purchasing Division, City of Concord Combined Operations and Maintenance Facility. 311 North State Street, Concord NH 03301

*City of Concord General Services*  
*Concord, New Hampshire*  
**HEIGHTS SEWER COLLECTION IMPROVEMENTS**  
**CITY OF CONCORD**  
**BIDDING REQUIREMENTS, CONTRACT DOCUMENTS**  
**AND TECHNICAL SPECIFICATIONS**  
**B 11-26**  
**March 2026**

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## **A. BIDDING REQUIREMENTS**

**ADVERTISEMENT FOR BIDS**

City of Concord, New Hampshire

B 11-26, Heights Sewer Collection Improvements

Separate sealed Bids for the construction of the Heights Sewer Collection System Improvements. This project includes replacement of approximately 6,000 LF of existing gravity sewer in Grover Street, Pembroke Road and Branch Turnpike; approximately 3,000 LF of new force main in Branch Turnpike and Loudon Road; stormwater upgrades; sidewalk replacement; and roadway upgrades.

Bids will be received by The City of Concord Purchasing Division  
at the office of Combined Operations & Maintenance Facility  
311 North State Street, Concord, New Hampshire 03301

until 2:00 PM local time on April 28, 2026, at which time the Bids received will be publicly opened and read aloud.

1. Completion time for the project will be calculated as calendar days from the date specified in the "Notice to Proceed" as follows:

|             |                                           |
|-------------|-------------------------------------------|
| <u>700*</u> | calendar days for substantial completion. |
| <u>730*</u> | calendar days for final completion.       |

\*Completion dates are inclusive of the winter shutdown period.

Liquidated damages will be in the amount of **\$2,000** for each calendar day of delay from the date established for substantial completion, and **\$2,000** for each calendar day of delay from the date established for final completion.

2. Each General Bid shall be accompanied by a Bid Security in the amount of **10%** of the Total Bid Price.
3. The successful Bidder must furnish within 10 calendar days after the Notice of Award the required number of copies of the Signed Agreement, 100% Performance and Payment Bonds, and begin execution of this contract within 10 calendar days following the Notice to Proceed.

Any contract or contracts awarded under this Advertisement for Bids are expected to be funded in whole or in part by:

- State Aid Grant (SAG) from the NH Department of Environmental Services (NHDES)

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Neither the State of New Hampshire nor any of its departments, agencies, or employees is or will be a party to this contract. The word “agency” in the contract documents refers to the DES and all other involved funding agencies.

5. The successful Bidder on this work is required to comply with the President's Executive Order No. 11246 entitled "Equal Employment Opportunity" as amended by Executive Order 11375, and amendments or supplements thereto, and as supplemented in Department of Labor Regulations (41 CFR Part 60). The requirements for Bidders and contractors under this order are explained in the Information for Bidders.
6. No Bidder may withdraw a Bid within 60 days after the actual date of opening thereof. Once the lowest qualified Bidder is identified, the Lowest qualified Bidder shall not withdraw their Bid Alternate 3 until October 1, 2026. It is anticipated the City will not be able to award the Bid Alternate 3 work at the time of the bid opening.
7. A non-mandatory pre-Bid conference will be held at 10 AM on April 14, 2026 at the Community Center on Canterbury Road - 14 Canterbury Rd, Concord, NH 03101.  
Attendance and participation is encouraged.

Bids may be issued only by the City’s Purchasing Manager, or their designee, to authorized firms and are not transferable unless authorized by the Purchasing Manager, or their designee. Plans and specifications will only be available, at no charge, in PDF format on the City’s website ([www.concordnh.gov/Purchasing](http://www.concordnh.gov/Purchasing)) and secure FTP site at:

<https://ftp.concordnh.gov>,

**Account:** *vendor*, **Password:** *Concord1*.

To be considered a responsive Bidder, the Contractor shall have obtained at least one set of Bidding Documents from the Issuing Office. The Bid will not be awarded to a Bidder unless a record for obtaining at least one set of Bidding Documents exists in the Issuing Office. Bid documents obtained through third parties are not guaranteed. Only registered bidders will receive addenda.

The City of Concord reserves the right to reject any or all Bids, to waive any technical or legal deficiencies, and to accept any Bid that it may deem to be in the best interests of the City.

Failure to submit all information as detailed on the Bid Submission Checklist and/or submission of an unbalanced Bid are sufficient reasons to declare a Bid as non-responsive and subject to disqualification.

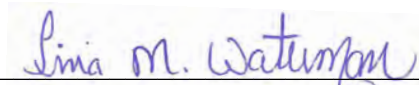
All Bids are advertised, at the City’s discretion, in various publications and are posted publicly as detailed in the following table:

| Name                | Advertising Medium                            | Address                                  | Phone/Fax                         | Email and Web Address                                                                                                                                  |
|---------------------|-----------------------------------------------|------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| City of Concord, NH | Posted on City Website and in City Hall Lobby | 311 North State Street, Concord NH 03301 | 603.230-3664<br>603.230.3656(fax) | <a href="mailto:twaterman@concordnh.gov">twaterman@concordnh.gov</a><br><a href="http://www.concordnh.gov/purchasing">www.concordnh.gov/purchasing</a> |

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|                                          |           |                                                        |                                       |                                                                                                                                                                |
|------------------------------------------|-----------|--------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Associated General Contractors           | Bid House | 48 Grandview Drive, Bow NH 03304                       | 603.225.2701<br>603.226.3859(fax)     | <a href="mailto:plansroom@agcnh.org">plansroom@agcnh.org</a><br><a href="http://www.agcnh.org">www.agcnh.org</a>                                               |
| Construction Summary of NH               | Bid House | 734 Chestnut St, Manchester NH 03104                   | 603.627.8856<br>603.627.4524(fax)     | <a href="mailto:info@constructionsummary.com">info@constructionsummary.com</a><br><a href="http://www.constructionsummary.com">www.constructionsummary.com</a> |
| Bid Ocean                                | Bid House | PO Box 40445, Grand Junction, CO 81501                 | 866.347.9657<br>877.356.9704(fax)     | <a href="mailto:bids@bidocean.com">bids@bidocean.com</a><br><a href="http://www.bidocean.com">www.bidocean.com</a>                                             |
| Dodge Data & Analytics                   | Bid House | 300 American Metro Blvd, Suite 185, Hamilton, NJ 08619 | 607.898.2053                          | <a href="mailto:dodge.bidding@construction.com">dodge.bidding@construction.com</a><br><a href="http://www.construction.com">www.construction.com</a>           |
| New England Construction News - CDC News | Bid House | 100 Radnor Rd S-102, State College, PA 16801           | 1.800.652.0008<br>1.888.285.3393(fax) | <a href="mailto:ENR.products@bnpmedia.com">ENR.products@bnpmedia.com</a><br><a href="http://www.enr.com">www.enr.com</a>                                       |

APPROVED:  
CITY OF CONCORD, NEW HAMPSHIRE



Tina M. Waterman, Purchasing Manager

Date: 3/18/26

END OF SECTION



## INFORMATION FOR BIDDERS

Bids will be received by The City of Concord, New Hampshire – Purchasing Division  
(herein called the "Owner"), at Combined Operations & Maintenance Facility  
until April 28, 2026 at 2:00 PM and then at said office publicly opened and read aloud.

Each Bid must be submitted in a sealed envelope, addressed to:

*The Purchasing Division, Combined Operations & Maintenance Facility  
311 North State Street, Concord, New Hampshire 03301*

Each sealed envelope containing a Bid must be plainly marked on the outside as Bid

for **Sealed Bid B 11-26, Heights Sewer Collection Improvements**

and the envelope should bear on the outside the Bidder's name, address, and license number if applicable and the name of the project for which the Bid is submitted. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed to the Owner at

*Purchasing Division, Combined Operations & Maintenance Facility  
311 North State Street, Concord, New Hampshire 03301*

All Bids must be made on the required Bid form. All blank spaces for Bid prices must be filled in, in ink or typewritten, and the Bid form must be fully completed and executed when submitted. Only one copy of the Bid form is required. Bids shall be submitted on the forms provided and must be signed by the Bidder or the Bidder's authorized representative. The person signing the Bid shall initial any corrections to entries made on the Bid forms.

Bidders must quote on all items appearing on the Bid forms unless specific directions in the advertisement, on the Bid form or in the special provisions allowed for partial Bids. Failure to quote on all items may disqualify the Bid. When Bids on all items are not required, Bidders shall insert the words "no Bid" where appropriate.

Alternative Bids will be considered, unless otherwise stated, only if the alternate is: (1) Described completely, including, but not limited to, sample(s), if requested, and specifications sufficient so that a comparison to the request can be made; and (2) Submitted as part of the base Bid response, i.e. it shall not be a separate document which could be construed as a second Bid.

Any questions or inquiries must be submitted in writing, and must be received by the Purchasing Agent no later than seven (7) calendar days before the Request for Bids due date to be considered. Any changes to the Request for Bids will be provided to all Bidders of record.

The Owner may waive any informalities or minor defects or reject any and all Bids. Any Bid may be withdrawn prior to the above Scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. No Bidder may

## A-2.2

withdraw a Bid within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder. Once the lowest qualified Bidder is identified, the Lowest qualified Bidder shall not withdraw their Bid Alternate 3 until October 1, 2026. It is anticipated the City will not be able to award the Bid Alternate 3 work at the time of the bid opening.

It is the Bidder's responsibility to take all necessary measures to ensure that the Bid is received by the deadline and in accordance with the City of Concord's requirements regardless of extreme weather or other extenuating circumstances. The Bidder is required to ensure enough time is allowed for the Bid to be received. If the City of Concord's Offices are closed on the due date of a Request for Bid, the deadline will automatically change to the next business date that that municipal offices are open.

Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by examination of the site and a review of the drawings and specifications including Addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of Work or of the nature of the Work to be done.

The Owner shall provide to Bidders prior to Bidding, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The Bidder shall not divulge, discuss or compare this Bid with other Bidders and shall not collude with any other Bidder or parties to a Bid whatever. (Note: No premiums, rebates or gratuities permitted either with, prior to, or after any delivery materials are allowed. Any such violation will result in the cancellation and/or return of materials, as applicable, and the removal from Bid List).

The Contract Documents contain the provisions required for the construction of the Project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve them from fulfilling any of the conditions of the contract.

Each Bid must be accompanied by a Bid Bond payable to the Owner in the amount of **ten percent (10%)** of the total amount of the Bid. As soon as the Bid prices have been compared, the Owner will return the Bonds of all except the three lowest responsive Bidders. When the Agreement is executed, the bonds of the two remaining unsuccessful Bidders will be returned. The Bid Bond of the successful Bidder will be retained until the Payment Bond and Performance Bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a Bid Bond.

A Performance Bond and a Payment Bond, each in the amount of 100 percent of the Contract Price, with a corporate surety approved by the Owner, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign Bid Bonds or Payment Bonds and Performance Bonds must file with each Bond a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date when Notice of

Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement and Bond forms. In case of failure of the Bidder to execute the Agreement, the Owner may at his option consider the Bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

The Owner within ten (10) days of receipt of acceptable Payment Bond, Performance Bond and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may by Written Notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the ten (10) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Owner may make such investigations as Owner deems necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.

A conditional or qualified Bid will not be accepted.

Award will be made to the lowest responsive and responsible Bidder.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the contract throughout.

Each Bidder is responsible for inspecting the site and for reading and being thoroughly familiar with the Contract Documents. The failure or omission of any Bidder to complete any of the foregoing shall in no way relieve any Bidder from any obligation in respect to his Bid.

Further, the Bidder agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the General Conditions.

The low Bidder shall supply the names and addresses of major material Suppliers and Subcontractors when requested to do so by the Owner.

#### MANUFACTURERS EXPERIENCE

Wherever it may be written that an equipment manufacturer must have a specified period of experience with his product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

#### S.A.G. Project SIGN

The Contractor shall construct a sign in accordance with the Standard Detail included in these specifications. The sign shall be erected in a location selected by the Engineer or Owner in coordination with NHDES. The Contractor shall maintain the sign throughout the duration of the contract.

#### SAFETY AND HEALTH REGULATIONS

This project is subject to all of the Safety and Health Regulations (CFR 29 Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors shall comply with the requirements of these regulations.

#### NON-DISCRIMINATION IN EMPLOYMENT

Contracts for work under this proposal obligate the contractors and sub-contractors not to discriminate in employment practices.

#### STATE INSPECTION

Work performed on this project shall be subject to inspection by representatives of the NH Department of Environmental Services. Such inspection shall in no sense make the State Government a party to this contract, unless said Government is also the Owner, and will in no way interfere with the rights of either party hereunder.

Representatives of the State of New Hampshire Department of Environmental Services shall be given Right of Access to all portions of the proposed work, including but not limited to, actual work site, storage yards, offsite manufacturing and fabricating location and job records.

#### COPIES OF THE CONTRACT

There shall be multiple executed copies of the Contract to be distributed as follows:

- a) One (1) copy each to the Owner, Engineer, and Contractor.
- b) One electronic copy in PDF format to the NH Department of Environmental Services
- d) Additional copies as required for other federal or state agencies contributing to or participating in project costs.

#### NON-RESIDENT CONTRACTORS

The successful Bidder, if a corporation established under laws other than the State of New Hampshire, shall file, at the time of the execution of the contract, with the Owner, notice of the name of its resident attorney, appointed as required by the laws of the State of New Hampshire.

The successful Bidder, if not a resident of New Hampshire, and not a corporation, shall file, at the time of execution of the contract, with the Owner a written appointment of a resident of the state of New Hampshire, having an office or place of business therein, to be his true and lawful attorney upon whom all lawful processes in any actions or proceedings against them may be served; and in such writing, which shall set forth said attorney's place of residence, shall agree that any lawful process against them which is served on said attorney shall be of the same legal force and validity as if served on them and that the authority shall continue in force so long as any liability remains outstanding against them in New Hampshire.

The power of attorney shall be filed in the office of the Secretary of State if required, and copies certified by the Secretary shall be sufficient evidence thereof. Such appointment shall continue in force until revoked by an instrument in writing, designating in a like manner some other person upon whom such processes may be served, which instrument shall be filed in the manner provided herein for the original appointment.

A Non-resident Contractor shall be deemed to be:

- a) A person who is not a resident of the State of New Hampshire.
- b) Any partnership that has no member thereof resident of the State of New Hampshire.
- c) Any corporation established under laws other than those of the State of New Hampshire.

#### BIDDER'S QUALIFICATIONS

No award will be made to any Bidder who cannot meet all of the following requirements:

- A. He shall not have defaulted nor turned the work over to the bonding company on any contract within three years prior to the Bid date.
- B. He shall maintain a permanent place of business.
- C. He shall have adequate personnel and equipment to perform the work expeditiously.
- D. He shall have suitable financial status to meet obligations incidental to the work.
- E. He shall have appropriate technical experience satisfactory to the Engineer and the Division in the class of work involved.
- F. He shall be registered with the Secretary of State to transact business in New Hampshire.
- G. He shall have performed to the satisfaction of the Engineer and the Division on previous contracts of a similar nature.
- H. He shall not have failed to complete previous contracts on time, including approved time extensions.

#### WITHDRAWAL OF BIDS

Prior to Bid Opening, Bids may be withdrawn upon written request of the Bidder provided withdrawal is postmarked prior to the time set for Bid Opening. Bid documents and security of any Bidder withdrawing his Bid in accordance with the foregoing conditions will be returned.

#### ADDITIONAL REQUIREMENTS

Additional requirements specific to doing business with the City of Concord, New Hampshire are including in Section C, Special Conditions. The contractor is responsible for reviewing and being knowledgeable of these requirements.

END OF SECTION

**BID FORM**

Proposal of \_\_\_\_\_ (hereinafter called "Bidder"), organized and existing under the laws of the State of \_\_\_\_\_ doing business as \_\_\_\_\_  
(Corporation, Partnership, Individual)

To the City of Concord, New Hampshire (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all Work For the construction of B 11-26, Heights Sewer Collection Improvements in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

By submission of this Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to his own organization, that this Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to the Bid with any other Bidder or with any competitor.

Bidder hereby agrees to commence Work under this contract on or before a date to be specified in the Notice to Proceed and to complete the Project within:

700 consecutive calendar days for substantial completion.

730 consecutive calendar days for final completion.

Liquidated damages will be in the amount of \$ 2,000 for each calendar day of delay from the date established for substantial completion and \$ 2,000 for each calendar day of delay from the date established for final completion, as provided in Section 18 of the General Conditions.

Bidder acknowledges receipt of the following Addendum:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The Bidder shall state below what works of a similar character to that of the proposed contract they have performed and provide such references as will enable the Owner to judge his experience, skill, and business standing.

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, add separate sheets.

1. Name of Bidder.
2. Permanent Main Office address.
3. When organized?
4. Where incorporated?
5. Is Bidder registered with the Secretary of the State to do business in New Hampshire?
6. For how many years has your firm engaged in the contracting business under its present name? Also state names and dates of previous firm names, if any.
7. Contracts on hand. (Schedule these, showing gross amount of each contract and the approximate anticipated dates of completion.)
8. General character of work performed by your company.
9. Have you ever failed to complete any work awarded you in the Scheduled contract time, including approved time extensions? \_\_\_(Yes) \_\_\_(No).  
If so, where and why?
10. Have you ever defaulted on a contract? \_\_\_(Yes) \_\_\_(No).  
If so, where and why?
11. Have you ever had liquidated damages assessed on a contract? \_\_\_\_\_(Yes) \_\_\_\_\_(No).  
If so, where and why?
12. List the more important contracts recently executed by your company, stating approximate cost for each, and the month and year completed.
13. List your major equipment available for this contract.
14. List your key personnel such as Project Superintendent and foreman available for this contract.
15. List any subcontractors whom you would expect to use for the following (unless this work is to be done by your own organization):
  - a. Civil Engineering
  - b. Utility Installation
  - c. Other work

A-3.3

16. With what banks do you conduct business?

Do you grant the Engineer permission to contact this (these) institutions? \_\_\_\_ (Yes)  
(No)

NOTE: Bidders may be required to furnish their latest financial statement as part of the award process.

Respectfully submitted:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

Being duly sworn, deposes and says that they  
are

\_\_\_\_\_  
\_\_\_\_\_  
of \_\_\_\_\_  
(Name of Organization)

and that the answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

\_\_\_\_\_  
Notary Public

My commission expires \_\_\_\_\_

(Seal - If Bid is by Corporation)

ATTEST: \_\_\_\_\_

Bidder agrees to perform all the work described in the Contract Documents for the following unit prices or lump sum:

NOTE: Bids shall include sales tax and all other applicable taxes and fees.



**BID SCHEDULE**

Bidder: \_\_\_\_\_

Project: **B 11-26, Heights Sewer Collection Improvements**

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                            | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|--------------------------------------------------------------------------------------|------------------------|----------------------|
| 1.01     | 2,950 LF | 10-Inch Force Main<br>The Sum of \$ _____<br>_____<br>Per Linear foot                | \$ _____               | \$ _____             |
| 1.02     | 2 EA     | Combination Air/Vacuum Release Structure<br>The Sum of \$ _____<br>_____<br>Per Each | \$ _____               | \$ _____             |
| 1.03     | 2 EA     | Force Main Drain Structure<br>The Sum of \$ _____<br>_____<br>Per Each               | \$ _____               | \$ _____             |
| 1.04     | 1,500 LF | 24-Inch Gravity Sewer<br>The Sum of \$ _____<br>_____<br>Per Linear Foot             | \$ _____               | \$ _____             |
| 1.05     | 4,850 LF | 18-Inch Gravity Sewer<br>The Sum of \$ _____<br>_____<br>Per Linear Foot             | \$ _____               | \$ _____             |

A-3.5

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                                          | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|----------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 1.06     | 150 LF   | 12-Inch Gravity Sewer<br><br>The Sum of \$ _____<br>_____<br>Per Linear Foot                       | \$ _____               | \$ _____             |
| 1.07     | 50 LF    | 10-Inch Gravity Sewer<br><br>The Sum of \$ _____<br>_____<br>Per Linear Foot                       | \$ _____               | \$ _____             |
| 1.08     | 150 LF   | 8-Inch Gravity Sewer<br><br>The Sum of \$ _____<br>_____<br>Per Linear Foot                        | \$ _____               | \$ _____             |
| 1.09     | 1,950 LF | 6-Inch Sewer Service Connection<br><br>The Sum of \$ _____<br>_____<br>Per Linear Foot             | \$ _____               | \$ _____             |
| 1.10     | 350 VF   | 5-Foot Dia. Sewer Manhole<br><br>The Sum of \$ _____<br>_____<br>Per Vertical Foot                 | \$ _____               | \$ _____             |
| 1.11     | 1 LS     | Abandonment of Existing Sewer Pipe &<br>Structures<br><br>The Sum of \$ _____<br>_____<br>Lump Sum | \$ _____               | \$ _____             |

## A-3.6

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                                        | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|--------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 1.12     | 3,150 LF | Asbestos Cement Pipe Removal and Disposal<br><br>The Sum of \$ _____<br>_____<br>Per Linear Foot | \$ _____               | \$ _____             |
| 2.01     | 1 LS     | Abandon and Fill Existing Stormwater Pipe<br><br>The Sum of \$ _____<br>_____<br>Lump Sum        | \$ _____               | \$ _____             |
| 2.02     | 100 VF   | 4-Foot Dia. Catch Basin<br><br>The Sum of \$ _____<br>_____<br>Per Vertical Foot                 | \$ _____               | \$ _____             |
| 2.03     | 1 LS     | 8-Foot Dia. Infiltration Basin No.1<br><br>The Sum of \$ _____<br>_____<br>Lump Sum              | \$ _____               | \$ _____             |
| 2.04     | 1 LS     | 8-Foot Dia. Infiltration Basin No. 3<br><br>The Sum of \$ _____<br>_____<br>Lump Sum             | \$ _____               | \$ _____             |
| 2.05     | 1 LS     | 8-Foot Dia. Infiltration Basin No. 4<br><br>The Sum of \$ _____<br>_____<br>Lump Sum             | \$ _____               | \$ _____             |

## A-3.7

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|-----------------------------------------------------------|------------------------|----------------------|
| 2.06     | 1 LS     | 8-Foot Dia. Infiltration Basin No. 5                      |                        |                      |
|          |          | The Sum of \$ _____                                       |                        |                      |
|          |          | _____                                                     | \$ _____               | \$ _____             |
|          |          | Lump Sum                                                  |                        |                      |
| 2.07     | 1 LS     | 8-Foot Dia. Infiltration Basin No. 6                      |                        |                      |
|          |          | The Sum of \$ _____                                       |                        |                      |
|          |          | _____                                                     | \$ _____               | \$ _____             |
|          |          | Lump Sum                                                  |                        |                      |
| 2.08     | 1 LS     | 8-Foot Dia. Infiltration Basin No. 7                      |                        |                      |
|          |          | The Sum of \$ _____                                       |                        |                      |
|          |          | _____                                                     | \$ _____               | \$ _____             |
|          |          | Lump Sum                                                  |                        |                      |
| 2.09     | 100 VF   | 4-Foot Dia. Drain Manhole                                 |                        |                      |
|          |          | The Sum of \$ _____                                       |                        |                      |
|          |          | _____                                                     | \$ _____               | \$ _____             |
|          |          | Per Vertical Foot                                         |                        |                      |
| 2.10     | 2,400 LF | Pre-Lining Stormwater CCTV Inspection                     |                        |                      |
|          |          | The Sum of \$ _____                                       |                        |                      |
|          |          | _____                                                     | \$ _____               | \$ _____             |
|          |          | Per Linear Foot                                           |                        |                      |
| 2.11     | 600 LF*  | Stormwater Pipe Heavy Cleaning                            |                        |                      |
|          |          | The Sum of \$ _____                                       |                        |                      |
|          |          | _____                                                     | \$ _____               | \$ _____             |
|          |          | Per Linear Foot                                           |                        |                      |

## A-3.8

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                     | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|-------------------------------------------------------------------------------|------------------------|----------------------|
| 2.12     |          | NOT USED                                                                      |                        |                      |
| 2.13     | 1,200 LF | 12" Stormwater Pipe Lining<br>The Sum of \$ _____<br>_____<br>Per Linear Foot | \$ _____               | \$ _____             |
| 2.14     | 700 LF   | 15" Stormwater Pipe Lining<br>The Sum of \$ _____<br>_____<br>Per Linear Foot | \$ _____               | \$ _____             |
| 2.15     | 500 LF   | 18" Stormwater Pipe Lining<br>The Sum of \$ _____<br>_____<br>Per Linear Foot | \$ _____               | \$ _____             |
| 2.16     | 150 LF   | 12" Stormwater Pipe<br>The Sum of \$ _____<br>_____<br>Per Linear Foot        | \$ _____               | \$ _____             |
| 2.17     | 200 LF   | 15" Stormwater Pipe<br>The Sum of \$ _____<br>_____<br>Per Linear Foot        | \$ _____               | \$ _____             |

## A-3.9

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                                                               | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|-------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 2.18     | 100 LF   | 18" Stormwater Pipe<br>The Sum of \$ _____<br>_____<br>Per Linear Foot                                                  | \$ _____               | \$ _____             |
| 3.01     | 770 LF   | Curb (Granite – Remove & Reset)<br>The Sum of \$ _____<br>_____<br>Per Linear Foot                                      | \$ _____               | \$ _____             |
| 3.02     | 880 LF*  | Curb (Granite – New)<br>The Sum of \$ _____<br>_____<br>Per Linear Foot                                                 | \$ _____               | \$ _____             |
| 3.03     | 220 CY   | Sidewalk Aggregate Subbase and Base,<br>and Hardpack Gravel Driveways<br>The Sum of \$ _____<br>_____<br>Per Cubic Yard | \$ _____               | \$ _____             |
| 3.04     | 20 CY    | Concrete Aprons<br>The Sum of \$ _____<br>_____<br>Per Cubic Yard                                                       | \$ _____               | \$ _____             |
| 3.05     | 150 TONS | Final Paving – Grover St<br>The Sum of \$ _____<br>_____<br>Per Ton                                                     | \$ _____               | \$ _____             |

## A-3.10

| Item No. | Quantity   | Brief Description of Item<br>with Unit Bid Price in Words                         | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|------------|-----------------------------------------------------------------------------------|------------------------|----------------------|
| 3.06     | 280 TONS   | Final Paving – Pembroke Rd<br>The Sum of \$ _____<br>_____<br>Per Ton             | \$ _____               | \$ _____             |
| 3.07     | 900 TONS   | Final Paving – Branch Tpke<br>The Sum of \$ _____<br>_____<br>Per Ton             | \$ _____               | \$ _____             |
| 3.08     | 240 TONS   | Final Paving – Loudon Rd<br>The Sum of \$ _____<br>_____<br>Per Ton               | \$ _____               | \$ _____             |
| 3.09     | 40 TONS    | Final Paving – Steeplegate Mall Parcel<br>The Sum of \$ _____<br>_____<br>Per Ton | \$ _____               | \$ _____             |
| 3.10     | 2,600 TONS | Temporary Paving<br>The Sum of \$ _____<br>_____<br>Per Ton                       | \$ _____               | \$ _____             |
| 3.11     | 660 TONS   | Driveway/Sidewalk Paving<br>The Sum of \$ _____<br>_____<br>Per Ton               | \$ _____               | \$ _____             |

| Item No. | Quantity  | Brief Description of Item<br>with Unit Bid Price in Words                                                                              | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 3.12     | 23,800 SY | Milling (1.5-2 Inch Depth)<br><br>The Sum of \$ _____<br>_____<br>Per Square Yard                                                      | \$ _____               | \$ _____             |
| 3.13     | ALLOW     | Liquid Asphalt Adjustment<br><br>The Sum of \$ <u>One hundred forty six</u><br><u>Thousand dollars and zero cents</u><br>Per Allowance | \$ <u>146,000.00</u>   | \$ <u>146,000.00</u> |
| 4.01     | 5 EA      | Tree Removal > 6 Inch Dia.<br><br>The Sum of \$ _____<br>_____<br>Per Each                                                             | \$ _____               | \$ _____             |
| 4.02     | 1 LS      | Loam and Seed<br><br>The Sum of \$ _____<br>_____<br>Lump Sum                                                                          | \$ _____               | \$ _____             |
| 4.03     | 1 LS      | Erosion and Sedimentation Control<br><br>The Sum of \$ _____<br>_____<br>Lump Sum                                                      | \$ _____               | \$ _____             |
| 4.04     | 1 LS      | Traffic Control Plan<br><br>The Sum of \$ _____<br>_____<br>Lump Sum                                                                   | \$ _____               | \$ _____             |
| 4.05     | 1 LS      | Traffic Control<br><br>The Sum of \$ _____<br>_____<br>Lump Sum                                                                        | \$ _____               | \$ _____             |



## A-3.12

| Item No. | Quantity     | Brief Description of Item<br>with Unit Bid Price in Words                                                                             | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|--------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 4.06     | ALLOW        | Traffic Control Via Uniformed Police Officers<br><br>The Sum of \$ <u>Forty-eight thousand</u><br><u>dollars and zero cents</u>       | \$ <u>48,000.00</u>    | \$ <u>48,000.00</u>  |
|          |              | Per Allowance                                                                                                                         |                        |                      |
| 4.07     | 56 Board-Mo. | Electronic Traffic Control Message Boards<br><br>The Sum of \$ _____<br>_____                                                         | \$ _____               | \$ _____             |
|          |              | Per Board-Month                                                                                                                       |                        |                      |
| 4.08     | 50 CY*       | Trench Excavation – Ledge<br><br>The Sum of \$ _____<br>_____                                                                         | \$ _____               | \$ _____             |
|          |              | Per Cubic Yard                                                                                                                        |                        |                      |
| 4.09     | 50 CY*       | Replacement of Unsuitable Materials Above Pipe Bedding and Initial Backfill<br><br>The Sum of \$ _____<br>_____                       | \$ _____               | \$ _____             |
|          |              | Per Cubic Yard                                                                                                                        |                        |                      |
| 4.10     | 1 LS         | Contaminated Soils Plan<br><br>The Sum of \$ _____<br>_____                                                                           | \$ _____               | \$ _____             |
|          |              | Lump Sum                                                                                                                              |                        |                      |
| 4.11     | ALLOW        | Disposal of Contaminated Soils<br><br>The Sum of \$ <u>Thirty three thousand</u><br><u>seven hundred fifty dollars and zero cents</u> | \$ <u>33,750.00</u>    | \$ <u>33,750.00</u>  |
|          |              | Allowance                                                                                                                             |                        |                      |

| Item No. | Quantity | Brief Description of Item with Unit Bid Price in Words | Unit Bid In Figures | Amount In Figures |
|----------|----------|--------------------------------------------------------|---------------------|-------------------|
| 4.12     | 19 EA    | Test Pits                                              |                     |                   |
|          |          | The Sum of \$ _____                                    |                     |                   |
|          |          | _____                                                  | \$ _____            | \$ _____          |
|          |          | Per Each                                               |                     |                   |
| 4.13     | 1 EA     | Water Main and Hydrant Relocations                     |                     |                   |
|          |          | The Sum of \$ _____                                    |                     |                   |
|          |          | _____                                                  | \$ _____            | \$ _____          |
|          |          | Per Each                                               |                     |                   |
| 4.14     | 1 LS     | Mobilization/Demobilization                            |                     |                   |
|          |          | The Sum of \$ _____                                    |                     |                   |
|          |          | _____                                                  | \$ _____            | \$ _____          |
|          |          | Lump Sum                                               |                     |                   |

\* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

SUBTOTAL (BASE BID): Total of Items 1.01 through 4.14 above.

\_\_\_\_\_ (\$ \_\_\_\_\_)

\_\_\_\_\_ (use figures)

(use words)

**BID ALTERNATE NO. 1**

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                         | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|-----------------------------------------------------------------------------------|------------------------|----------------------|
| 5.01     | 2,000 LF | Pre-Lining CCTV Inspection<br>The Sum of \$ _____<br>_____<br>Per Linear Foot     | \$ _____               | \$ _____             |
| 5.02     | 100 LF*  | Sewer Pipe Heavy Cleaning<br>The Sum of \$ _____<br>_____<br>Per Linear Foot      | \$ _____               | \$ _____             |
| 5.03     |          | NOT USED                                                                          |                        |                      |
| 5.04     | 2,000 LF | 20-Inch Sewer Pipe Lining<br>The Sum of \$ _____<br>_____<br>Per Linear Foot      | \$ _____               | \$ _____             |
| 5.05     | 100 VF   | Manhole – Cementitious Liner<br>The Sum of \$ _____<br>_____<br>Per Vertical Foot | \$ _____               | \$ _____             |

\* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

SUBTOTAL (BID ALTERNATE NO. 1): Total of Items 5.01 through 5.05 above.

\_\_\_\_\_ (\$ \_\_\_\_\_)  
 \_\_\_\_\_ (use figures)  
 \_\_\_\_\_ (use words)

**BID ALTERNATE NO. 2**

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                         | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|-----------------------------------------------------------------------------------|------------------------|----------------------|
| 6.01     | 1,120 LF | Pre-Lining CCTV Inspection<br>The Sum of \$ _____<br>_____<br>Per Linear Foot     | \$ _____               | \$ _____             |
| 6.02     | 100 LF*  | Sewer Pipe Heavy Cleaning<br>The Sum of \$ _____<br>_____<br>Per Linear Foot      | \$ _____               | \$ _____             |
| 6.03     |          | NOT USED                                                                          |                        |                      |
| 6.04     | 1,120 LF | 24-Inch Sewer Pipe Lining<br>The Sum of \$ _____<br>_____<br>Per Linear Foot      | \$ _____               | \$ _____             |
| 6.05     | 130 VF   | Manhole – Cementitious Liner<br>The Sum of \$ _____<br>_____<br>Per Vertical Foot | \$ _____               | \$ _____             |

\* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

SUBTOTAL (BID ALTERNATE NO. 2): Total of Items 6.01 through 6.05 above.

\_\_\_\_\_ (\$ \_\_\_\_\_)  
 \_\_\_\_\_ (use figures)  
 \_\_\_\_\_ (use words)

**BID ALTERNATE NO. 3**

| Item No. | Quantity   | Brief Description of Item<br>with Unit Bid Price in Words                                                               | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|------------|-------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 7.01     | 150 LF     | Curb (Granite – Remove & Reset)<br>The Sum of \$ _____<br>_____<br>Per Linear Foot                                      | \$ _____               | \$ _____             |
| 7.02     | 450 LF*    | Curb (Granite – New)<br>The Sum of \$ _____<br>_____<br>Per Linear Foot                                                 | \$ _____               | \$ _____             |
| 7.03     | 150 CY     | Sidewalk Aggregate Subbase and Base,<br>and Hardpack Gravel Driveways<br>The Sum of \$ _____<br>_____<br>Per Cubic Yard | \$ _____               | \$ _____             |
| 7.04     | 50 CY      | Concrete Aprons<br>The Sum of \$ _____<br>_____<br>Per Cubic Yard                                                       | \$ _____               | \$ _____             |
| 7.05     | 1,100 TONS | Final Paving – Pembroke Rd<br>The Sum of \$ _____<br>_____<br>Per Ton                                                   | \$ _____               | \$ _____             |
| 7.06     | 400 TONS   | Driveway/Sidewalk Paving<br>The Sum of \$ _____<br>_____<br>Per Ton                                                     | \$ _____               | \$ _____             |

| Item No. | Quantity | Brief Description of Item<br>with Unit Bid Price in Words                                                               | Unit Bid<br>In Figures | Amount<br>In Figures |
|----------|----------|-------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|
| 7.07     | 7,600 SY | Milling (1.5-2 Inch Depth)<br>The Sum of \$ _____<br>_____<br>Per Square Yard                                           | \$ _____               | \$ _____             |
| 7.08     | 1 LS     | Loam and Seed<br>The Sum of \$ _____<br>_____<br>Lump Sum                                                               | \$ _____               | \$ _____             |
| 7.09     | 1 LS     | Erosion and Sedimentation Control<br>The Sum of \$ _____<br>_____<br>Lump Sum                                           | \$ _____               | \$ _____             |
| 7.10     | 1 LS     | Traffic Control<br>The Sum of \$ _____<br>_____<br>Lump Sum                                                             | \$ _____               | \$ _____             |
| 7.11     | ALLOW    | Liquid Asphalt Adjustment<br>The Sum of \$ <u>Thirty six thousand</u><br><u>Dollars and zero cents</u><br>Per Allowance | \$ <u>36,000.00</u>    | \$ <u>36,000.00</u>  |

SUBTOTAL (BID ALTERNATE NO. 3): Total of Items 7.01 through 7.11 above.

\_\_\_\_\_ (\$ \_\_\_\_\_)  
 \_\_\_\_\_ (use figures)  
 \_\_\_\_\_ (use words)

TOTAL BID (BASE BID + Bid Alternate No. 1 + Bid Alternate No. 2):

\_\_\_\_\_ (\$ \_\_\_\_\_)

\_\_\_\_\_ (use figures)

(use words)

Determination of the low Bidder shall be based on the lowest Total Bid cost as determined by the Base Bid + Bid Alternate 1 + Bid Alternate 2. See Specification 01150 Measurement and Payment for a complete description of the Bid Items.

THE UNDERSIGNED ACKNOWLEDGES:

1. THAT HE/SHE IS AN AUTHORIZED AGENT OF THE VENDOR SUBMITTING THIS BID
2. THE FIRM SUBMITTING THIS BID HAS NEVER DEFAULTED ON ANY CITY OF CONCORD, STATE OF NH OR FEDERAL GOVERNMENT CONTRACT.

COMPANY: \_\_\_\_\_

SIGNED BY: \_\_\_\_\_

PRINTED OR TYPED NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_

TOLL FREE NUMBER: \_\_\_\_\_ E-MAIL: \_\_\_\_\_

CELL PHONE NUMBER: \_\_\_\_\_

COMMUNICATIONS CONCERNING THIS BID SHALL BE ADDRESSED TO BIDDERS PRIMARY POINT OF CONTACT REPRESENTATIVE AS FOLLOWS:

NAME: \_\_\_\_\_ TITLE: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

PROVIDE PREFERRED CONTACT METHOD:

TELEPHONE NUMBER: \_\_\_\_\_

CELL PHONE NUMBER: \_\_\_\_\_ E-MAIL: \_\_\_\_\_

LENGTH OF WARRANTY PERIOD AND COVERAGE: Contractor guarantees that the work will be completed in compliance with all applicable federal, state, and local regulations pertaining to the Heights Sewer Collection Improvements and shall be warranted for a period of one year from the date of substantial completion and that the proper warranty documentation will be presented by the Contractor to the Owner.



This Bid is submitted by: \_\_\_\_\_  
A Corporation

Corporation Name: \_\_\_\_\_

State of incorporation: \_\_\_\_\_

Type: \_\_\_\_\_  
*(General Business, Professional, Service, other)*

By: \_\_\_\_\_  
*(Signature – attach evidence of authority to sign)*

Name *(typed or printed)*: \_\_\_\_\_

Title: \_\_\_\_\_

(CORPORATE SEAL)

Attest:

\_\_\_\_\_  
*(Signature of Corporate Secretary)*

Business Address: \_\_\_\_\_

Phone & Facsimile Nos: \_\_\_\_\_

Email address: \_\_\_\_\_

Date of qualification to do business as out-of-state corporation:  
\_\_\_\_\_

Notary Public Seal and Signature:

(Notary must sign and seal below)

This Bid is submitted by: \_\_\_\_\_

A Limited Liability Company (LLC)

LLC Name: \_\_\_\_\_

State of which organized: \_\_\_\_\_

By: \_\_\_\_\_

*(Signature – attach evidence of authority to sign)*

Name *(typed or printed)*: \_\_\_\_\_

Title: \_\_\_\_\_

Business Address:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone & Facsimile Nos: \_\_\_\_\_

Email address: \_\_\_\_\_

Notary Public Seal and Signature:

(Notary must sign and seal below)

This Bid is submitted by: \_\_\_\_\_

A Joint Venture

First Joint Venturer Name: \_\_\_\_\_

By: \_\_\_\_\_

*(Signature – attach evidence of authority to sign)*

Name *(typed or printed)*:

Title: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone & Facsimile Nos: \_\_\_\_\_

Email address: \_\_\_\_\_

Second Joint Venturer Name:

By: \_\_\_\_\_

*(Signature – attach evidence of authority to sign)*

Name *(typed or printed)*:

Title: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone & Facsimile Nos: \_\_\_\_\_

Email address: \_\_\_\_\_

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation and limited liability company that is a party to the joint venture should be in the manner indicated above.)

Notary Public Seal and Signature:

(Notary must sign and seal below)

This Bid is submitted by: \_\_\_\_\_

A Partnership

Partnership Name: \_\_\_\_\_

By: \_\_\_\_\_

*(Signature – attach evidence of authority to sign)*

Name *(typed or printed)*:

Title: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone & Facsimile Nos: \_\_\_\_\_

Email address: \_\_\_\_\_

Notary Public Seal and Signature:

(Notary must sign and seal below)

This Bid is submitted by: \_\_\_\_\_

An Individual

Name (*typed or printed*): \_\_\_\_\_

By: \_\_\_\_\_

*(Individual's signature)*

Doing business as: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone & Facsimile Nos: \_\_\_\_\_

Email address: \_\_\_\_\_

Notary Public Seal and Signature:

(Notary must sign and seal below)

END OF SECTION

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, \_\_\_\_\_  
\_\_\_\_\_ as Principal, and  
\_\_\_\_\_ as Surety, are hereby  
held and firmly bound unto The City of Concord, New Hampshire as Owner  
in the penal sum of \_\_\_\_\_  
for the payment of which, well and truly to be made, we hereby jointly and severally  
bind ourselves, successors and assigns.

Signed, this \_\_\_\_\_ day of \_\_\_\_\_

The Condition of the above obligation is such that whereas the Principal has submitted  
to

\_\_\_\_\_ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in  
writing, for

the B 11-26, Heights Sewer Collection Improvements  
\_\_\_\_\_  
\_\_\_\_\_

NOW, THEREFORE,

- (a) If said Bid shall be rejected, or
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (Properly completed in accordance with said Bid) and shall furnish a Bond for faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise, the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety , for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

\_\_\_\_\_  
Principal

By: \_\_\_\_\_

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

**IMPORTANT**-Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of New Hampshire.

END OF SECTION

|                                                                                                |                                                                                                                                                                                          |                                                                    |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>Form W-9</b><br>(Rev. March 2024)<br>Department of the Treasury<br>Internal Revenue Service | <b>Request for Taxpayer<br/>Identification Number and Certification</b><br>Go to <a href="http://www.irs.gov/FormW9">www.irs.gov/FormW9</a> for instructions and the latest information. | <b>Give form to the<br/>requester. Do not<br/>send to the IRS.</b> |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|

**Before you begin.** For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                  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| <b>Print or type.</b><br>See <i>Specific instructions</i> on page 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <table style="width: 100%;"> <tr> <td style="width: 70%;"> <b>1</b> Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)         </td> <td style="width: 30%;"></td> </tr> <tr> <td> <b>2</b> Business name/disregarded entity name, if different from above.         </td> <td></td> </tr> <tr> <td> <b>3a</b> Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only <b>one</b> of the following seven boxes.<br/> <input type="checkbox"/> Individual/sole proprietor    <input type="checkbox"/> C corporation    <input type="checkbox"/> S corporation    <input type="checkbox"/> Partnership    <input type="checkbox"/> Trust/estate<br/> <input type="checkbox"/> LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) _____<br/> <b>Note:</b> Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner.<br/> <input type="checkbox"/> Other (see instructions) _____         </td> <td> <b>4</b> Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):<br/><br/>           Exempt payee code (if any) _____<br/><br/>           Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any) _____<br/><br/> <i>(Applies to accounts maintained outside the United States.)</i> </td> </tr> <tr> <td> <b>3b</b> If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions _____ <input type="checkbox"/> </td> <td></td> </tr> <tr> <td> <b>5</b> Address (number, street, and apt. or suite no.). See instructions.         </td> <td rowspan="3">           Requester's name and address (optional)         </td> </tr> <tr> <td> <b>6</b> City, state, and ZIP code         </td> </tr> <tr> <td> <b>7</b> List account number(s) here (optional)         </td> </tr> </table> | <b>1</b> Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.) |  | <b>2</b> Business name/disregarded entity name, if different from above. |  | <b>3a</b> Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only <b>one</b> of the following seven boxes.<br><input type="checkbox"/> Individual/sole proprietor <input type="checkbox"/> C corporation <input type="checkbox"/> S corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate<br><input type="checkbox"/> LLC. 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| <b>1</b> Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                              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See instructions _____ <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                        |  |                                                                          |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                             |                                         |                                    |                                                 |
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See instructions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Requester's name and address (optional)                                                                                                                                                                      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| <b>6</b> City, state, and ZIP code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                  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| <b>7</b> List account number(s) here (optional)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                  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**Part I Taxpayer Identification Number (TIN)**

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

**Note:** If the account is in more than one name, see the instructions for line 1. See also *What Name and Number To Give the Requester* for guidelines on whose number to enter.

|                                                                                                          |                                                                                                                  |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Social security number</b><br><div style="border: 1px solid black; height: 20px; width: 100%;"></div> | <b>Employer identification number</b><br><div style="border: 1px solid black; height: 20px; width: 100%;"></div> |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|

**Part II Certification**

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

|                          |             |
|--------------------------|-------------|
| <b>Sign Here</b>         | <b>Date</b> |
| Signature of U.S. person |             |

**General Instructions**

Section references are to the Internal Revenue Code unless otherwise noted.

**Future developments.** For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to [www.irs.gov/FormW9](http://www.irs.gov/FormW9).

**What's New**

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

**Purpose of Form**

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

Cat. No. 10231X
Form **W-9** (Rev. 3-2024)

END OF SECTION



**CITY OF CONCORD, NEW HAMPSHIRE**

**INDEMNIFICATION AGREEMENT**

Vendor shall defend, indemnify, and hold harmless the City and its officials, agents, and employees (collectively, the “Indemnified Parties”) from and against all demands, claims, suits and actions seeking damages, penalties, attorney’s fees, costs, expenses, equitable relief, statutory relief or any other relief on account of bodily injury, death, personal injury, property damage, economic injury and any other injury or loss, (collectively, “Liabilities”) arising from or relating to this contract, unless the Indemnified Parties were solely negligent.

In addition, Vendor shall defend, indemnify and hold harmless the City for any costs, expenses and liabilities arising out of a claim, charge or determination that Vendor’s officers, employees, contractors, subcontractors or agents are employees of the City, including but not limited to claims or charges for benefits, wages, fees, penalties, withholdings, damages or taxes brought in connection with laws governing workers compensation, unemployment compensation, social security, Medicare, state or federal taxation, and/or any other similar obligation associated with an employment relationship.

The indemnification obligations set forth herein shall survive the term of the contract. Vendor must choose defense counsel acceptable to the City and obtain the City’s consent to any proposed settlement

COMPANY \_\_\_\_\_

TAXPAYER IDENTIFICATION NUMBER \_\_\_\_\_

AUTHORIZED SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE \_\_\_\_\_

E-MAIL ADDRESS \_\_\_\_\_

Failure to submit this form with your Bid may result in your Bid being rejected as unresponsive.

END OF SECTION

## QUALIFICATIONS STATEMENT

The undersigned submits answers to the following questions to enable the City of Concord to judge experience and ability in, and facilities for, the work proposed to be done. Attach additional paperwork and support documentation as needed.

1. The work, if awarded to you, will have the resident personal supervision of whom? State his/her name, title, and their special qualifications:

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2. Describe equipment you propose to furnish. (a) your own; (b) rented:

a. \_\_\_\_\_

---

---

b. \_\_\_\_\_

---

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3. How many years has your organization been in business as a contractor under the name in which you propose to execute this contract?

---

4. Has your present organization ever failed to complete any work awarded to it? If so, state when, where and why: \_\_\_\_\_

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Provide three (3) references (to include name, address, telephone number and point of contact) for contracts that you currently have or have completed with a scope of work similar to that detailed by **B 11-26**:

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END OF SECTION



## INSURANCE REQUIREMENTS

### Insurance Requirements for All Contractors

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                             |                               |                               |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                             | <b>CERTIFICATE OF LIABILITY INSURANCE</b>                                                                                                                                                                                                                                                   |                                                                                                                                                                                             | DATE (MM/DD/YYYY)             |                               |
| <p>THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.</p> <p>IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).</p> |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                             |                               |                               |
| PRODUCER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                             | CONTACT<br>NAME: _____<br>PHONE (A/C, No. Ext): _____ FAX (A/C, No.): _____<br>E-MAIL: _____<br>ADDRESS: _____<br>INSURER'S AFFORDING COVERAGE: _____ NAIC #: _____<br>INSURER A: _____<br>INSURER B: _____<br>INSURER C: _____<br>INSURER D: _____<br>INSURER E: _____<br>INSURER F: _____ |                                                                                                                                                                                             |                               |                               |
| INSURED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                             | INSURER A: _____<br>INSURER B: _____<br>INSURER C: _____<br>INSURER D: _____<br>INSURER E: _____<br>INSURER F: _____                                                                                                                                                                        |                                                                                                                                                                                             |                               |                               |
| <b>COVERAGES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                             | <b>CERTIFICATE NUMBER:</b>                                                                                                                                                                                                                                                                  |                                                                                                                                                                                             | <b>REVISION NUMBER:</b>       |                               |
| <p>THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.</p>                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                             |                               |                               |
| INSURER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TYPE OF INSURANCE                                                                                                                                                                                                                                                                                                                                                                           | ADDITIONAL INSURED                                                                                                                                                                                                                                                                          | POLICY NUMBER                                                                                                                                                                               | POLICY EFF. DATE (MM/DD/YYYY) | POLICY EXP. DATE (MM/DD/YYYY) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | COMMERCIAL GENERAL LIABILITY<br><input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR<br><input checked="" type="checkbox"/> Owners & Contractors Protective - Limit<br><input checked="" type="checkbox"/> Underground/Explosion and Collapse<br>GEN'L AGGREGATE LIMIT APPLIES PER:<br>POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC<br>OTHER: _____ | X X                                                                                                                                                                                                                                                                                         | Required                                                                                                                                                                                    |                               |                               |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | AUTOMOBILE LIABILITY<br><input type="checkbox"/> ANY AUTO<br><input type="checkbox"/> OWNED AUTOS ONLY<br><input type="checkbox"/> HIRE/AUTOS ONLY<br><input type="checkbox"/> SCHEDULED AUTOS<br><input type="checkbox"/> NONOWNED AUTOS ONLY                                                                                                                                              | X X                                                                                                                                                                                                                                                                                         | Required                                                                                                                                                                                    |                               |                               |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | UMBRELLA/LIB<br>EXCESS LIAB <input type="checkbox"/> OCCUR<br>CLAIMS-MADE <input type="checkbox"/><br>DED <input type="checkbox"/> RETENTION \$ _____                                                                                                                                                                                                                                       | X X                                                                                                                                                                                                                                                                                         | Required                                                                                                                                                                                    |                               |                               |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY<br>ANY DISCREPANCY BETWEEN EXCLUSIVE OF FOUR MEMBERS EXCLUDED<br>(Mandatory in NH)<br>If yes, detail in under DESCRIPTION OF OPERATIONS below                                                                                                                                                                                                 | N/A                                                                                                                                                                                                                                                                                         | Required                                                                                                                                                                                    |                               |                               |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Builder's Risk - All Risk completed value<br>Installation Floater (Equipment)<br>Rogers Liability                                                                                                                                                                                                                                                                                           | X                                                                                                                                                                                                                                                                                           | May be required by contract                                                                                                                                                                 |                               |                               |
| LIMITS<br>EACH OCCURRENCE \$ 1,000,000<br>DAMAGE TO RENTED PREMISES (Excluded) \$ 50,000<br>MED EXP (Any one person) \$ 5,000<br>PERSONAL & ADV INJURY \$ 1,000,000<br>GENERAL AGGREGATE \$ 2,000,000<br>PRODUCTS - COMPOUND \$ 2,000,000<br>COMBINED SINGLE LIMIT (Ex accident) \$ 1,000,000<br>BODILY INJURY (Per person) \$ _____<br>BODILY INJURY (Per accident) \$ _____<br>PROPERTY DAMAGE (Per accident) \$ _____<br>EACH OCCURRENCE \$ 1,000,000<br>AGGREGATE \$ 1,000,000<br>E.L. EACH ACCIDENT \$ 100,000<br>E.L. DISEASE - EA EMPLOYEE \$ 100,000<br>E.L. DISEASE - POLICY LIMIT \$ 500,000<br>Completed Value 750,000<br>500,000                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                             |                               |                               |
| DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)<br>The City of Concord is additional insured on a primary and non-contributory basis with respect to general, automobile and umbrella liability. Waiver of subrogation in favor of the City applies to all coverage.<br>RE: Insert Project or Work Location                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                             |                               |                               |
| <b>CERTIFICATE HOLDER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             | <b>CANCELLATION</b>                                                                                                                                                                         |                               |                               |
| City of Concord<br>41 Green St.<br>Concord, NH 03301                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             | SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.<br>AUTHORIZED REPRESENTATIVE |                               |                               |
| © 1988-2015 ACORD CORPORATION. All rights reserved.<br>ACORD 25 (2016/03) The ACORD name and logo are registered marks of ACORD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                             |                               |                               |

**The City of Concord and Wright-Pierce must be named as Additional Insured with respect to General, Automobile and Umbrella Liability**

The above listed insurance and coverage limits will be provided.

END OF SECTION

### **BID SUBMISSION CHECKLIST**

In order to be considered responsive, each prospective contractor must submit the following documents, in **one (1) original**, as part of his/her Bid:

1. \_\_\_\_\_ Bid Form
2. \_\_\_\_\_ 10% Bid Bond
3. \_\_\_\_\_ W9 Form
4. \_\_\_\_\_ City of Concord Indemnification Agreement
5. \_\_\_\_\_ Qualifications Statement
6. \_\_\_\_\_ Non-Collusive Affidavit
7. \_\_\_\_\_ General Contractor Safety Form
8. \_\_\_\_\_ Acknowledgement of City's Insurance Requirements
9. \_\_\_\_\_ Completed Bid Check List
10. \_\_\_\_\_ No Bid Questionnaire (when applicable)

The successful contractor must submit, prior to contract signing, the following documentation:

1. 100% Payment Bond
2. 100% Performance Bond
3. Insurance Certificate (Naming the City of Concord and Wright-Pierce as Additional Insured with respect to general, automobile and umbrella liability) that meets the minimum requirements for types and levels of coverage detailed by the Insurance Requirements for All Contractors.

END OF SECTION

NO-BID QUESTIONNAIRE



**City of Concord, New Hampshire**  
**FINANCE DEPARTMENT**

**Purchasing Division**

COMBINED OPERATIONS & MAINTENANCE FACILITY

311 NORTH STATE STREET

CONCORD, NEW HAMPSHIRE 03301

(603) 225-8530; FAX: (603) 230-3656; [www.concordnh.gov](http://www.concordnh.gov)

Reference: Bid 11-26

If you choose not to submit a proposal, please complete the questionnaire below and return it with your response by the proposal opening date. Your assistance in helping us to analyze no proposal rationale is very much appreciated. Thank you.

\_\_\_\_\_  
Tina M. Waterman  
Purchasing Manager

\* \* \* \* No Proposal Questionnaire \* \* \* \*

No proposal is submitted in reply to the City of Concord Request for Proposals for Bid B 11-26, Heights Sewer Collection Improvements Dated \_\_\_\_\_, for the following reasons:

- \_\_\_\_\_ Item/service not supplied by our company.
- \_\_\_\_\_ Proposal specifications (give reason(s), e.g., too restricted, not clear, etc.):
- \_\_\_\_\_ Profit margin on municipal proposals too low.
- \_\_\_\_\_ Past experience with City of Concord (give specifics, e.g., payment delay, Bid process, administrative problems, etc.)
- \_\_\_\_\_ Insufficient time allowed to prepare and respond to RFP.
- \_\_\_\_\_ Proposal requirement too large \_\_\_\_\_ or too small \_\_\_\_\_ for our company.
- \_\_\_\_\_ Priority of other business opportunities limit time/other resources available to deliver or perform according to Bid specifications.
- \_\_\_\_\_ Other reason(s), please specify:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Company Name and Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone:

(    ) \_\_\_\_\_

END OF SECTION

A-12.1  
**NON-COLLUSIVE AFFIDAVIT**

TO: City of Concord  
Purchasing Division  
Combined Operations & Maintenance Facility  
311 North State Street  
Concord, NH 03301

Date: \_\_\_\_\_

Project: Heights Sewer Collection Improvements (Bid: **B 11-26**)  
State of New Hampshire  
County of Merrimack

The undersigned being duly sworn, deposes and says that they are the sole Owner, Partner, President, Treasurer, or other duly authorized Agent or Official of:

\_\_\_\_\_  
(Name of Bidder as appearing in submitted proposal)

\_\_\_\_\_  
(Address of Bidder)

\_\_\_\_\_  
(Telephone Number of Bidder)

and certifies that of his own knowledge, said Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive Bidding in connection with this proposal. It is understood that the signing of this AFFIDAVIT is applicable to all projects for which Bids are being submitted in a multi-Bid proposal.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Signature and title of person making Affidavit)

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20

\_\_\_\_\_  
(Notary Public with Notary Seal)

END OF SECTION

## **B. CONTRACT**



B-1.1

**NOTICE OF AWARD**

Dated \_\_\_\_\_, 20 \_\_\_\_

TO: \_\_\_\_\_  
(BIDDER)

ADDRESS: \_\_\_\_\_

OWNER'S PROJECT NO: B 11-26

PROJECT: Heights Sewer Collection Improvements

OWNER'S CONTRACT NO: \_\_\_\_\_

CONTRACT FOR: \_\_\_\_\_

\_\_\_\_\_  
(Insert name of contract as it appears in the Bid Documents)

You are notified that your Bid dated \_\_\_\_\_ for the above Contract has been considered. You are the apparent successful bidder and have been awarded a contract for:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(Indicate total Work, alternates or sections of Work awarded)

The Contract Price of your contract is \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

\_\_\_\_\_ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award. The same number of sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within ten days of receiving this Notice of Award.

1. You must deliver to the Owner all of the fully executed counterparts of the Agreement including all the Contract Documents. This includes the sets of Drawings. Each of the Contract Documents must bear your signature on (the cover) (every) page.

2. You must deliver with the executed Agreement the Contract Security (Bonds) as specified in the Information for Bidders and General Conditions.

3. (List other conditions precedent).

\_\_\_\_\_  
\_\_\_\_\_

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Within ten days after receipt of acceptable performance BOND, payment BOND and agreement signed by the party to whom the Agreement was awarded, the **OWNER** will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

## ACCEPTANCE OF NOTICE

Copy to Engineer  
(Use Certified Mail, Return Receipt Requested)

21775

**AGREEMENT**

**THIS AGREEMENT**, made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ by  
 and between The City of Concord, New Hampshire, hereinafter called "**OWNER**"  
(Name of Owner)  
 and \_\_\_\_\_ doing business as (an individual,) or (a  
 partnership,) or (a corporation) hereinafter called "**CONTRACTOR**".

**WITNESSETH:** That for and in consideration of the payments and agreements hereinafter mentioned:

1. The **CONTRACTOR** will commence and complete the construction of

Heights Sewer Collection Improvements

(Project)

2. The **CONTRACTOR** will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the **PROJECT** described herein.

3. The **CONTRACTOR** will commence the work required by the **CONTRACT DOCUMENTS** within \_\_\_\_\_ calendar days after the date of the **NOTICE TO PROCEED** unless the period for completion is extended otherwise by the **CONTRACT DOCUMENTS**. Completion time for the project will be calculated as calendar days from the date specified in the **NOTICE TO PROCEED** as follows:

700 calendar days for substantial completion.  
730 calendar days for final completion.

Liquidated damages will be in the amount of \$ 2,000 for each calendar day of delay from the date established for substantial completion and \$ 2,000 for each calendar day of delay from the date established for final completion

4. The **CONTRACTOR** agrees to perform all of the **WORK** described in the **CONTRACT DOCUMENTS** and comply with the terms therein for the sum of \$ \_\_\_\_\_ or as shown in the **BID** schedule.

B-2.2

5. The term "**CONTRACT DOCUMENTS**" means and includes the following:

- A. ADVERTISEMENT FOR BIDS
- B. INFORMATION FOR BIDDERS
- C. BID FORM
- D. BID SCHEDULE
- E. BID BOND
- F. W-9 FORM
- G. INDEMNIFICATION AGREEMENT
- H. QUALIFICATIONS STATEMENT
- I. GENERAL CONTRACTOR SAFETY FORM
- J. INSURANCE REQUIREMENTS
- K. BID SUBMISSION CHECKLIST
- L. NON-COLLUSIVE AFFIDAVIT
- M. NOTICE OF AWARD
- N. AGREEMENT
- O. PAYMENT BOND
- P. PERFORMANCE BOND
- Q. CERTIFICATE OF INSURANCE
- R. NOTICE TO PROCEED
- S. CHANGE ORDER(S)
- T. CERTIFICATON OF SUBSTANTIAL COMPLETION
- U. CERTIFICATION OF FINAL COMPLETION
- V. CONTRACTOR'S AFFIDAVIT
- W. CONTRACTOR'S RELEASE
- X. GENERAL CONDITIONS
- Y. SUPPLEMENTAL GENERAL CONDITIONS
- Z. SPECIAL CONDITIONS, INCLUDING CONCORD SPECIFIC CONDITIONS
- AA. FEDERAL PROVISIONS, RULES, REGULATIONS AND FORMS
- BB. DRAWINGS prepared by:

\_\_\_\_\_

numbered \_\_\_\_\_ through \_\_\_\_\_ , and dated \_\_\_\_\_ , 20 \_\_\_\_\_

CC. SPECIFICATIONS prepared or issued by:

\_\_\_\_\_

\_\_\_\_\_ , and dated \_\_\_\_\_ , 20 \_\_\_\_\_

DD. ADDENDA:

No. \_\_\_\_\_ , dated \_\_\_\_\_ , 20 \_\_\_\_\_

B-2.3

No. \_\_\_\_\_ , dated \_\_\_\_\_ , 20 \_\_\_\_  
No. \_\_\_\_\_ , dated \_\_\_\_\_ , 20 \_\_\_\_  
No. \_\_\_\_\_ , dated \_\_\_\_\_ , 20 \_\_\_\_  
No. \_\_\_\_\_ , dated \_\_\_\_\_ , 20 \_\_\_\_

6. The **OWNER** will pay to the **CONTRACTOR** in the manner and at such times as set forth in the General Conditions such amounts as required by the **CONTRACT DOCUMENTS**. Retainage is conveyed in the Supplemental Conditions, C-2.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

**IN WITNESS WHEREOF**, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in \_\_\_\_\_ copies, each of which shall be deemed an original on the date first above written.

**OWNER:** \_\_\_\_\_ (SEAL)

ATTEST:

By: \_\_\_\_\_ Name: \_\_\_\_\_

Name: \_\_\_\_\_ Title: \_\_\_\_\_  
(Please type)

**CONTRACTOR:** \_\_\_\_\_ (SEAL)

ATTEST:

By: \_\_\_\_\_ Name: \_\_\_\_\_

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Address: \_\_\_\_\_ (SEAL)

ATTEST:

END OF SECTION

**PAYMENT BOND**

**KNOW ALL PEOPLE BY THESE PRESENTS:** that

---

(Name of Contractor)

---

(Address of Contractor)

a \_\_\_\_\_, hereinafter called Principal,  
(Corporation, Partnership or Individual)

and \_\_\_\_\_  
(Name of Surety)

---

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

City of Concord, New Hampshire

---

(Name of Owner)

41 Green Street, Concord, New Hampshire 03301

---

(Address of Owner)

hereinafter called **OWNER** and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns, in the total aggregate penal sum of \_\_\_\_\_ Dollars, (\$ \_\_\_\_\_) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION** is such that whereas, the Principal entered into a certain contract with the **OWNER**, dated the \_\_\_\_\_ day of \_\_\_\_\_

20 \_\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of:

\_\_\_\_\_

Heights Sewer Collection Improvements

---

**NOW, THEREFORE**, if the Principal shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the **WORK** provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such **WORK**, and for all labor cost incurred in such **WORK** including that be a subcontractor, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal Law; then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the subcontractors, and persons, firms, and corporations having a direct contract with the **PRINCIPAL** or its **SUBCONTRACTORS**.

B-3.2

**PROVIDED FURTHER**, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the **WORK** to be performed thereunder or the **SPECIFICATIONS** accompanying the same shall in any way affect its obligation on this **BOND**, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the **WORK** or to the **SPECIFICATIONS**.

**PROVIDED, FURTHER** that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date on which PRINCIPAL ceased work on said CONTRACT, it being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

**PROVIDED, FURTHER**, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

**PROVIDED FURTHER**, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

B-3.3

**IN WITNESS WHEREOF**, this instrument is executed in \_\_\_\_\_ counterparts, each one of  
(number)  
which shall be deemed an original, this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_ .

**ATTEST:**

By: \_\_\_\_\_

(Principal) Secretary

Principal

**(SEAL)**

**BY** \_\_\_\_\_

\_\_\_\_\_  
(Address)

By: \_\_\_\_\_

Witness as to Principal

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Surety)

**ATTEST:**

**BY** \_\_\_\_\_

Attorney - in - Fact

By: \_\_\_\_\_

Witness as to Surety

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Address)

**NOTE:** Date of **BOND** must not be prior to date of Contract.

If **CONTRACTOR** is partnership, all partners should execute BOND.

**IMPORTANT:** Surety companies executing **BONDS** must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of New Hampshire.

END OF SECTION



**PERFORMANCE BOND**

**KNOW ALL PEOPLE BY THESE PRESENTS:** that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

a \_\_\_\_\_, hereinafter called Principal,  
(Corporation, Partnership or Individual)

and \_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

City of Concord, New Hampshire

\_\_\_\_\_  
(Name of Owner)

41 Green Street, Concord, New Hampshire, 03301

\_\_\_\_\_  
(Address of Owner)

hereinafter called **OWNER**, in the total aggregate penal sum of \_\_\_\_\_  
\_\_\_\_\_ Dollars, \$ ( \_\_\_\_\_ )

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators' successors, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION** is such that whereas, the Principal entered into a certain contract with the **OWNER**, dated the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of:  
Heights Sewer Collection Improvements  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**NOW, THEREFORE**, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extension thereof which may be granted by the **OWNER**, with or without notice to the Surety and during the one year guaranty period, and if the **PRINCIPAL** shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the **OWNER** from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the **OWNER** all outlay and expense which the **OWNER** may incur in making good any default, then this obligation shall be void: otherwise to remain in full force and effect.

B-4.2

**PROVIDED, FURTHER**, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to **WORK** to be performed thereunder or the specifications accompanying same shall in any way affect its obligation on this **BOND**, and it does hereby waive notice of any such change, extension of time alteration or addition to the terms of the contract or to the **WORK** or to the specifications.

**PROVIDED, FURTHER**, that it is expressly agreed that this **BOND** shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the **PRINCIPAL** and the **SURETY** to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this **BOND** and whether referring to this **BOND**, the contract or the loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

**PROVIDED, FURTHER**, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

**IN WITNESS WHEREOF**, this instrument is executed in \_\_\_\_\_ counterparts, each one of  
(number)  
which shall be deemed an original, this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

**ATTEST:**

By: \_\_\_\_\_

(Principal) Secretary

Principal

(SEAL)

**BY** \_\_\_\_\_

(Address)

By: \_\_\_\_\_

Witness as to Principal

(Address)

Surety

**ATTEST:**

**BY** \_\_\_\_\_

Attorney - in - Fact

By \_\_\_\_\_

Witness as to Surety

(Address)

(Address)

NOTE: Date of **BOND** must not be prior to date of Contract.

If **CONTRACTOR** is Partnership, all partners should execute BOND

**IMPORTANT:** Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of New Hampshire.

END OF SECTION

B-5.1

**NOTICE TO PROCEED**

Dated \_\_\_\_\_, 20 \_\_\_\_

TO: \_\_\_\_\_  
(Insert Name of Contractor as it appears in the Bid Documents)

ADDRESS: \_\_\_\_\_

OWNER'S PROJECT NO. B 11-26

PROJECT: Heights Sewer Collection Improvements

OWNER'S CONTRACT NO. \_\_\_\_\_

CONTRACT FOR: \_\_\_\_\_

You are notified that the Contract Time under the above contract will commence to run on \_\_\_\_\_, 20 \_\_\_\_ . By that date, you are to start performing your obligations under the Contract Documents. In accordance with paragraph 3 of the Agreement, the dates of Substantial Completion and Final Completion are \_\_\_\_\_, 20 \_\_\_\_ and \_\_\_\_\_, 20 \_\_\_\_ , respectively.

Before you may start any Work at the site, paragraph 27 of the General Conditions provides that you and Owner must each deliver to the other (with copies to ENGINEER) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents. Also, before you may start any Work at the site, you must:

\_\_\_\_\_  
(add other requirements)

Copy to ENGINEER

(Use certified Mail, return Receipt Requested)

CITY OF CONCORD, NEW HAMPSHIRE

(owner)

By

\_\_\_\_\_  
(Authorized Representative)

Tina M. Waterman, Purchasing Manager

(Title)

**ACCEPTANCE OF NOTICE**

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

\_\_\_\_\_  
(Contractor)

this the \_\_\_\_\_, 20 \_\_\_\_

By: \_\_\_\_\_

Employer Identification

Number: \_\_\_\_\_

END OF SECTION

**CHANGE ORDER**

No. \_\_\_\_\_

PROJECT: \_\_\_\_\_ DATE OF ISSUANCE: \_\_\_\_\_

OWNER: City of Concord, New Hampshire

41 Green Street, Concord, New Hampshire 03301

(Address)

CONTRACTOR: \_\_\_\_\_ OWNER's Project No. \_\_\_\_\_

CONTRACT FOR: \_\_\_\_\_ ENGINEER \_\_\_\_\_

ENGINEER's Project No. \_\_\_\_\_

You are directed to make the following changes in the Contract Documents.

Description:

Purpose of Change Order:

Justification:

Attachments: (List documents supporting change)

| CHANGE IN CONTRACT PRICE                                   | CHANGE IN CONTRACT TIME                                             |
|------------------------------------------------------------|---------------------------------------------------------------------|
| Original Contract Price<br>\$ _____                        | Original Contract Time<br>_____<br>(days or date)                   |
| Previous Change Orders<br>\$ _____                         | Net change from previous Change Orders<br>_____<br>(days)           |
| Contract Price prior to this Change Order<br>\$ _____      | Contract Time prior to this Change Order<br>_____<br>(days or date) |
| Net Increase (Decrease) of this Change Order<br>\$ _____   | Net Increase (decrease) this Change Order<br>_____<br>(days)        |
| Contract Price with all approved Change Orders<br>\$ _____ | Contract Time with all Change Orders<br>_____<br>(days or date)     |

This document will become a supplement to the CONTRACT and all provisions will apply hereto. The attached Contractor's Revised Project Schedule reflects increases or decreases in Contract Time as authorized by this Change Order.

Stipulated price and time adjustment includes all costs and time associated with the above described change. Contractor waives all rights for additional time extension for said change. Contractor and Owner agree that the price(s) and time adjustment(s) stated above are equitable and acceptable to both parties.

RECOMMENDED: APPROVED: APPROVED: APPROVED:

By: \_\_\_\_\_ By: \_\_\_\_\_ By: \_\_\_\_\_ By: \_\_\_\_\_

Engineer Owner Contractor NHDES

\_\_\_\_\_  
Date Date Date Date

END OF SECTION

**WORK CHANGE DIRECTIVE**

Work Change Directive No. \_\_\_\_

PROJECT: **Heights Sewer Collection Improvements**

DATE OF ISSUANCE \_\_\_\_\_

EFFECTIVE DATE \_\_\_\_\_

OWNER City of ConcordOWNER's Contract No. **B 11-26**

CONTRACTOR \_\_\_\_\_

ENGINEER: \_\_\_\_\_

You are directed to proceed promptly with the following change(s):

Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If a claim is made that the above change(s) have affected Contract Price or Contract Times any claim for a Change Order based thereon will involve one or more of the following methods of determining the effect of the change(s).

Method of determining change in  
Contract Price:

☐ Unit Prices☐ Lump Sum☐ Other \_\_\_\_\_

Method of determining change in  
Contract Times:

☐ Contractor's records☐ Engineer's records☐ Other \_\_\_\_\_

Estimated increase (decrease) in Contract Price:  
\$ \_\_\_\_\_

Estimated increase (decrease) in Contract Times:  
Substantial Completion: \_\_\_\_\_ days  
Ready for final payment: \_\_\_\_\_ days.

If the change involves an increase, the estimated  
amount is not to be exceeded without further  
authorization.

If the change involves an increase, the estimated times  
are not to be exceeded without further authorization.

RECOMMENDED:

AUTHORIZED:

\_\_\_\_\_  
ENGINEER\_\_\_\_\_  
CITY OF CONCORD

By: \_\_\_\_\_  
(Authorized Signature)

By: \_\_\_\_\_  
(Authorized Signature)

**END OF SECTION**

**CONTRACTOR'S AFFIDAVIT**

STATE OF: New Hampshire

COUNTY OF: Merrimack

Before me, the undersigned, a \_\_\_\_\_  
(Notary Public, Justice of Peace, Alderman)  
in and for said County and State personally appeared, \_\_\_\_\_  
(Individual, Partner or duly  
authorized representative of corporate contractor) who being duly sworn according to law  
deposes and says that the cost of all the Work, and outstanding claims and indebtedness of whatever  
nature arising out of the performance of the contract between The City of Concord, New Hampshire  
(Owner)  
and \_\_\_\_\_ of \_\_\_\_\_  
(Contractor) (Address)  
dated \_\_\_\_\_ for the construction of the \_\_\_\_\_  
(Project Name)  
and necessary appurtenant installations have been paid in full.

\_\_\_\_\_  
(Individual, Partner, or duly authorized representative of corporate contractor)

\_\_\_\_\_  
(Title)

Sworn to and subscribed before me

this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Notary Public

END OF SECTION

## CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that \_\_\_\_\_ (Contractor)  
of \_\_\_\_\_ County of \_\_\_\_\_ and State of New Hampshire do hereby acknowledge that  
\_\_\_\_\_ (Contractor) has this day had, and received of and from the City of  
Concord, NH (Owner) the sum of One Dollar and other valuable considerations in full and complete  
satisfaction and payment of all sums of money owed, payable and belonging to \_\_\_\_\_  
\_\_\_\_\_ (Contractor) by means whatsoever, for on account of a Contract Agreement between  
the City of Concord, NH (Owner) and \_\_\_\_\_ (Contractor) dated \_\_\_\_\_,  
20 for \_\_\_\_\_  
NOW THEREFORE, the said \_\_\_\_\_ (Contractor) (for myself, my heirs,  
executors and administrators) (for itself, its successors and assigns) does by these presents  
remise, release, quit-claim and forever discharge the City of Concord, NH (Owner), of and from all  
claims and demands, arising from or in connection with the said contract dated \_\_\_\_\_  
and of and from all, and all manner of action and actions, cause and causes of action and actions,  
suits debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specialties,  
covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions,  
claims and demand, whatsoever in law or equity, or otherwise, against City of Concord, NH  
(Owner) its successors and assigns, which (I, my heirs, executors, or administrators) (it, its  
successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators)  
(it, its successors and assigns) hereafter can, shall or may have, for, upon or by reason of any  
matter, cause or thing whatsoever; from the beginning of recorded time to the date of these  
presents.

B-9.2

IN WITNESS WHEREOF, \_\_\_\_\_

\_\_\_\_\_ (Contractor) has caused these presents to be duly executed this

\_\_\_ day of \_\_\_\_\_ 20\_\_.

Signed, Sealed and Delivered in the presence of:

\_\_\_\_\_  
(Individual – Contractor) (seal)

\_\_\_\_\_  
(Partnership – Contractor) (seal)

(seal) \_\_\_\_\_ By \_\_\_\_\_  
(Partner)

Attested:

\_\_\_\_\_  
(Corporation)

\_\_\_\_\_  
(Secretary) By \_\_\_\_\_  
(President or Vice President)

(Corp. Seal)

END OF SECTION



A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within \_\_\_\_ calendar days of the above date of Substantial Completion.

B-9.4

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

The following documents are attached to and made a part of this Certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on \_\_\_\_\_, 20 \_\_\_\_

\_\_\_\_\_  
(Engineer)

By: \_\_\_\_\_

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20 \_\_\_\_

\_\_\_\_\_  
(Contractor)

By: \_\_\_\_\_

OWNER accepts this Certificate of Substantial Completion  
on \_\_\_\_\_, 20 \_\_\_\_

\_\_\_\_\_  
(Owner)

By: \_\_\_\_\_

END OF SECTION

## CERTIFICATE OF FINAL COMPLETION

(Page 1 of 2)

OWNER'S CONTRACT NO.: **B 11-26** ENGINEER' PROJECT NO.: \_\_\_\_\_  
AGREEMENT DATE: \_\_\_\_\_

CONTRACT TITLE: **Heights Sewer Collection Improvements**

FINAL COMPLETION DATE PER AGREEMENT AND CHANGE ORDERS: \_\_\_\_\_  
ACTUAL DATE OF FINAL COMPLETION: \_\_\_\_\_

### FINAL CERTIFICATION OF CONTRACTOR

I hereby certify that the Work as identified in the Final Payment Request dated \_\_\_\_\_  
\_\_\_\_\_ for the above-noted construction Contract represents full compensation for the actual  
value of work completed. Additionally, all work completed conforms to the terms of the  
Agreement and authorized changes.

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
Date

\_\_\_\_\_  
Authorized Representative's Signature

\_\_\_\_\_  
Name & Title

### FINAL CERTIFICATION OF ENGINEER

I have reviewed the Contractor's Final Payment Request dated \_\_\_\_\_ and hereby  
certify that to the best of my knowledge, the cost of the work identified on the Final Payment  
Request represents full compensation for the actual value of work completed and that the work  
has been completed in accordance with the terms of the Agreement and authorized changes.

\_\_\_\_\_  
ENGINEER

\_\_\_\_\_  
Date

\_\_\_\_\_  
Authorized Representative's Signature

\_\_\_\_\_  
Name & Title

**CERTIFICATE OF FINAL COMPLETION**

(Page 2 of 2)

FINAL ACCEPTANCE OF OWNER

I, as representative of the Owner, accept the above Final Certifications and authorize Final Payment in the amount of \$\_\_\_\_\_ and direct the Contractor's attention to the General Conditions. The guaranty for all Work completed subsequent to the date of Substantial Completion, expires \_\_\_\_\_year from the date of this Final Acceptance.

At a meeting of the Concord City Council the City of Concord has accepted the constructed project.

\_\_\_\_\_  
OWNER

\_\_\_\_\_  
Date

\_\_\_\_\_  
Authorized Representative's Signature

\_\_\_\_\_  
Name & Title

NHDES accepts this Certificate of Final Completion on \_\_\_\_\_, 20\_\_

By:

END OF SECTION

**CONSENT OF SURETY COMPANY TO FINAL PAYMENT**

OWNER'S CONTRACT NO.: **B 11-26** ENGINEER' PROJECT NO.: \_\_\_\_\_

AGREEMENT DATE: \_\_\_\_\_

BOND NUMBER: \_\_\_\_\_

CONTRACT TITLE: **Heights Sewer Collection Improvements**

To: \_\_\_\_\_ (Owner)

\_\_\_\_\_  
\_\_\_\_\_

From: \_\_\_\_\_ (Contractor)

\_\_\_\_\_  
\_\_\_\_\_

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the \_\_\_\_\_ (Surety) on the bond of \_\_\_\_\_ (Contractor) hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to the \_\_\_\_\_ (Owner) as set forth in the said Surety Company's Bond.

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Surety Company

\_\_\_\_\_  
Signature of Authorized Representative

Attest: (Seal)

\_\_\_\_\_  
Name & Title

Note: Power of Attorney should be attached in instances where same applies.

**END OF SECTION**

## APPLICATION FOR PAYMENT

## APPLICATION AND CERTIFICATE FOR PAYMENT

PAGE 1 OF —

TO (OWNER):

PROJECT:

APPLICATION NO.:

PERIOD TO:

FROM (CONTRACTOR):

VIA (ENGINEER):

CONTRACTOR PROJECT NO.:

OWNER PROJECT NO.:

CONTRACT FOR: **General Construction**

CONTRACT DATE:

**CONTRACTOR'S APPLICATION FOR PAYMENT**

| CHANGE ORDER SUMMARY                                     | ADDITIONS | DEDUCTIONS |
|----------------------------------------------------------|-----------|------------|
| Total Change Orders approved in previous months by Owner |           | \$ -       |
| Total Approved this Month                                | \$ -      |            |
| <b>TOTALS</b>                                            | \$ -      | \$ -       |
| <b>NET APPROVED CHANGES</b>                              | \$ -      |            |

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

State of: New Hampshire County of: Cheshire  
 Subscribed and sworn to before me this    of   , 2010

Notary Public:

My Commission expires: \_\_\_\_\_

Application is made for payment, as shown below, in connection with the Contract.

**Continuation Sheets are attached.**

|                                           |    |      |
|-------------------------------------------|----|------|
| 1. ORIGINAL CONTRACT SUM                  | \$ | 0.00 |
| 2. Net change by Change Orders            | \$ | 0.00 |
| 3. CONTRACT SUM TO DATE (LINE 1 + 2)      | \$ | 0.00 |
| 4a. TOTAL COMPLETED TO DATE               | \$ | 0.00 |
| (Total Project (Column G) on sheet 3)     |    |      |
| 4b. TOTAL STORED TO DATE                  | \$ | 0.00 |
| 4. TOTAL COMPLETED & STORED TO DATE       | \$ | 0.00 |
| 5. RETAINAGE:                             |    |      |
| a. 10% of Contract Sum                    | \$ | -    |
| Completed Total on Backup Sheet           |    |      |
| b. Additional Retainage                   | \$ | -    |
| Stored Total on Line 4b                   |    |      |
| Total Retainage (Line 5a + 5b or          |    |      |
| Total Retainage from Backup Sheets        | \$ | 0.00 |
| 6. TOTAL EARNED LESS RETAINAGE            | \$ | 0.00 |
| (Line 4 less Line 5 Total)                |    |      |
| 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT | \$ | 0.00 |
| (Line 6 from prior Certificate)           |    |      |
| 8. CURRENT PAYMENT DUE                    | \$ | 0.00 |
| 9. BALANCE TO FINISH, PLUS RETAINAGE      | \$ | 0.00 |
| (Line 3 less Line 6)                      |    |      |

**ENGINEERS CERTIFICATE FOR PAYMENT**

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, information, and belief, the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED: \_\_\_\_\_

Engineer:

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

Owner:

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

THIS CERTIFICATE IS NOT NEGOTIABLE. THE AMOUNT CERTIFIED IS PAYABLE ONLY TO THE CONTRACTOR NAMED HEREIN. ISSUANCE, PAYMENT AND ACCEPTANCE OF PAYMENT ARE WITHOUT PREJUDICE TO ALL RIGHTS OF THE OWNER OR CONTRACTOR UNDER THIS CONTRACT.

END OF SECTION

## **C. GENERAL CONDITIONS**

C-1.1

### **GENERAL CONDITIONS**

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3. Additional Instructions and Detail Drawings
4. Shop or Setting Drawings
5. Materials, Services, Facilities and Workmanship
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C-1.2

## GENERAL CONDITIONS

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## **GENERAL CONDITIONS**

1. Contract and Contract Documents. The plans, information for bidders, bids, advertisement for bids, bid payment and performance bonds, Agreements, change orders, notice to proceed, specifications and addenda, hereinafter enumerated in the Agreement, shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light on the interpretation of the provisions to which they refer.
2. Definitions.
  - 2.1 “Addenda” means written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, drawings and specifications, by additions, deletions, clarifications or corrections. Such written or graphic instruments will be issued no less than five days before the bid opening.
  - 2.2 “Bid” means the offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.
  - 2.3 “Bidder” means any person, firm or corporation submitting a bid for the work.
  - 2.4 “Bonds” means bid, performance, and payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.
  - 2.5 “Change Order” means a written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the Contract Documents or authorizing an adjustment in the Contract Price or Contract Time.
  - 2.6 “Contract Documents” means the Contract, including any advertisement for bids, information for bidders, bid, bid bond, Agreement, payment bond, performance bond, notice of award, notice to proceed, change orders, drawings, specifications and addenda.
  - 2.7 “Contract Price” means the total monies payable to the Contractor under the terms and conditions of the Contract Documents.
  - 2.8 “Contract Time” means the number of calendar days stated in the Contract Documents for the completion of the Work.
  - 2.9 “Contractor” means the person, firm or corporation with whom the Owner has executed the Agreement.
  - 2.10 “Division” means the state of New Hampshire Department of Environmental Services, Water Division.

#### C-1.4

2.11 “Drawings” mean the part of the Contract Documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the Engineer.

2.12 “Engineer” means the person, firm or corporation named as such in the contract documents.

2.13 “Field order” means a written order effecting a change in the work not relating to an adjustment in the contract price or an extension of the contract time and issued by the Engineer to the Contractor during construction.

2.14 “Notice of Award” means the written notice of the acceptance of the Bid from the Owner to the successful Bidder.

2.15 “Notice to Proceed” means the written communication issued by the Owner to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work.

2.16 “Owner” means a public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed.

2.17 “Plans” means the contract drawings or exact reproductions thereof which show the scope, character, dimensions and details of the work and which have been prepared or approved by the Engineer.

2.18 “Project” means the undertaking to be performed as provided in the Contract Documents.

2.19 “Resident Project Representative” means the authorized representative of the Owner who is assigned to the Project site or any part thereof.

2.20 “Shop Drawings” means all drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor, which illustrates how specific portions of the Work shall be fabricated or installed.

2.21 “Special conditions” means revisions or additions to these general conditions, Supplemental General Conditions or specifications applicable to an individual project.

2.22 “Specifications” means a part of the contract documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

2.23 “Subcontractor” means an individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

2.24 "Substantial Completion" means that date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.

2.25 "Supplemental General Conditions" means modifications to these general conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such documents that may be imposed by applicable State laws.

2.26 "Supplier" means any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

2.27 "Work" means all labor necessary to produce the construction required by the contract documents, and all materials and equipment incorporated or to be incorporated in the project.

2.28 "Written Notice" means any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the Work.

3. Additional Instructions and Detail Drawings. The Contractor may be furnished additional instructions and detail drawings as necessary to carry out the work included in the contract. The additional drawings and instructions thus supplied to the Contractor will coordinate with the contract documents and will be so prepared that they can be reasonably interpreted as part thereof.

4. Shop or Setting Drawings. Shop or setting drawings shall be in accordance with the following:

4.1 The Contractor shall furnish 6 copies of the manufacturer's shop drawings, specific design data as required in the detailed specifications, and technical literature covering all equipment and fabricated materials which he proposes to furnish under this contract in sufficient detail to indicate full compliance with the specifications. Shop drawings shall indicate the method of installing, the exact layout dimensions of the equipment or materials, including the location, size and details of valves, pipe connections, etc.

4.2 No equipment or materials shall be shipped until the manufacturer's shop drawings and specifications or other identifying data, assuring compliance with these specifications, are approved by the Engineer.

4.3 The Contractor shall check and verify all field measurements and shall be responsible for the prompt submission of all shop and working drawings so that there shall be no delay in the work.

4.4 Regardless of corrections made in or approval given to such drawings by the Engineer, the Contractor will nevertheless be responsible for the accuracy of such drawings and for their conformity to the plans and specifications. The Contractor shall notify the Engineer in writing of any deviations at the time he furnishes such drawings. He shall remain responsible for the accuracy of the drawings showing the deviations but not for the acceptance of the deviations from the original design shown in the plans and specification. Approval by the Engineer and the Owner of any deviation in material, workmanship or equipment proposed subsequent to approval of the shop drawings or design data, shall be requested in writing by the Contractor.

4.5 When submitted for the Engineer's review, Shop Drawings shall bear the Contractor's certification that he has reviewed, checked and approved the Shop Drawings and that they are in conformance with the requirements of the Contract Documents.

5. Materials, Services, Facilities and Workmanship shall be furnished as follows:

5.1 Except as otherwise specifically stated in the contract documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

5.2 Unless otherwise specifically provided for in the specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose.

5.3 The Contractor shall furnish to the Engineer for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required.

5.4 Materials which are specified by reference to the number or symbol of a specific standard, such as an ASTM standard, a federal specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the advertisement for bids, except as limited to type, class or grade, or modified in such reference. The standards referred to shall have full force and effect as though printed therein.

5.5 For equipment or for materials, when requested by the Engineer, the Contractor shall submit certificates of compliance from the manufacturer, certifying that the equipment or the materials comply with the requirements of the specifications or the standards.

5.6 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

5.7 Materials, supplies, and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.

6. Contractor's Title To Materials. No material, supplies, or equipment to be installed or furnished under this contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Owner free from any claims, liens, or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when formal contract is entered into for such materials.
7. Inspection and Testing of Materials shall be as follows:
  - 7.1 All materials and equipment used in the construction of the project shall be subject to inspection and testing by the Engineer in accordance with accepted standards at any and all times during manufacture or during the project construction and at any or all places where such manufacture is carried on.
  - 7.2 The Contractor shall furnish promptly upon request by the Engineer, all materials required to be tested. All tests made by the Engineer shall be performed in such manner and ahead of scheduled installation, as not to delay the work of the Contractor. When required, testing of concrete, masonry, soils, pipe and pipe materials will be made in accordance with provisions in the specifications.
  - 7.3 Material required to be tested which is delivered to the job site shall not be incorporated into the work until the tests have been completed and approval or acceptance given in writing by the Engineer.
  - 7.4 Each sample submitted by the Contractor for testing shall carry an identification label containing such information as is requested by the Engineer. It shall also include a statement that the samples are representative of the remaining materials to be used on the project.
  - 7.5 Approval of any materials shall be general only and shall not constitute a waiver of the Owner's right to demand full compliance with the contract requirements.
  - 7.6 The Engineer may, at his own discretion, undertake the inspection of materials at the source. In the event plant inspection is undertaken, the following conditions shall be met:

- a. The Engineer shall have the cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.
- b. The Engineer shall have full entry at all reasonable times to such areas as may concern the manufacture or production of the materials being furnished.
- c. If required, the Contractor shall arrange for a building for the use of the inspector; such building to be located near the plant, independent of any building used by the material producer, in which to house and use the equipment necessary to carry on the required tests. Cost for such arrangement shall be paid by the Owner as a stated allowance in the bid.
- d. Adequate safety measures shall be provided and maintained at all times.

7.7 Except as otherwise specifically stated in the contract, the costs of sampling and testing will be divided as follows:

- a. The Contractor shall furnish the Engineer, without extra cost, all samples required for testing purposes. All sampling and testing including the number and selection of samples shall be determined by the Engineer for his own information and use.
- b. When testing of materials is specified in the appropriate section of the specifications, the cost of the same shall be charged to the Owner or Contractor, as detailed in the specifications. However, costs of equipment performance tests shall be borne by the Contractor, as detailed in the appropriate section of the specifications.
- c. When the Contractor proposes a material, article or component as equal to the ones specified, reasonable tests may, or may not, be required by the Engineer. If the Engineer requires tests of a proposed equal item, the Contractor will be required to assume all costs of such testing.
- d. Any material, article or component which fails to pass tests required by the Engineer or by the specifications, will be rejected and shall be removed from the project site. However, if, upon request of the Contractor, retesting or further tests are permitted by the Engineer, the Contractor shall assume all costs related to such retesting or further tests.
- e. Neither the Owner nor the Engineer will in any way be charged for the manufacturer's costs in supplying certificates of compliance.

7.8 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness. The Contractor will then furnish the Engineer with the required certificates of inspection, testing or approval.

7.9 Inspections, tests, or approvals by the engineer or others shall not relieve the Contractor from obligations to perform the Work in accordance with the requirements of the Contract Documents.

8. “Or Equal ” Clause, Substitutions and Contractor Options.

8.1 Whenever a material, article, or piece of equipment is identified on the plans or in the specifications by reference to manufacturer's or vendor's names, trade names, catalogue numbers, etc., it is intended merely to establish a standard of quality and performance. Any material, article, or equipment of other manufacturers and vendors, which will perform satisfactorily the duties imposed by the general design, shall be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Engineer, of equal quality and function. The Engineer shall determine equality based on such information, tests, or other supporting data that may be required of the Contractor.

8.2 Upon acceptance and approval by the Engineer of an equal product, it shall remain the responsibility of the Contractor to coordinate installation of the item with all other items to be furnished to assure proper fitting together of all items. Similar responsibility applies to items which are left to the Contractor's option. Any additional cost of equal items and any additional cost incidental to the coordination and/or fitting together of such items shall be borne by the Contractor at no extra cost to the Owner.

8.3 If a specified or equal item is not available to meet the construction schedule, the Contractor may propose a substitute item of less than equal performance and quality. If this substitute is acceptable to the Engineer, any difference in purchase cost or costs incidental to the installation of such item will be negotiated between the parties to the contract.

8.4 Neither equal nor substitute items shall be installed without written approval of the Engineer.

8.5 The Contractor shall warrant that if substitutes are approved, no major changes in the function or general design of the Project will result.

9. Patents. Patent information is as follows:

9.1 The Contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the contract, including its use by the Owner, unless otherwise specifically stipulated in the contract documents.

9.2 License and/or royalty fees for the use of a process used in wastewater plant design which is authorized by the Owner for the project, must be reasonable, and paid to the holder of the patent, or his authorized licensee.

9.3 If the Contractor uses any design, device or materials in the construction methods for the project covered by patents or copyrights, he shall provide for such use by suitable agreement with the owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, that, without exception, the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract, and shall indemnify the Owner for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the construction of the work or after completion of the work.

10. Surveys. Surveys of land, property and construction shall be as follows:

10.1 The Owner will provide all land surveys and will establish and locate all property lines relating to the project.

10.2 For structures, the Engineer will establish and stake out one or more base lines as needed and will establish bench marks in and around the project site for the use of the Contractor and for the Engineer's own reference in checking the work in progress. For structures such as pipelines, the Engineer will establish the location of the pipe, manholes and other appurtenances, and will establish bench marks along the route of the pipeline at intervals for the using of the Contractor and for his own reference in checking the pipe and manhole inverts and other elevations throughout the project. The Contractor shall utilize the lines and bench marks established by the Engineer to set up whatever specific detail controls he may need for establishing location, elevation lines and grades of all structures. All this work is subject to checking, approval, and continuous surveillance by the Engineer to avoid error. The Contractor shall provide the Engineer with a qualified man or men to assist in this checking as needed and on request of the Engineer.

10.3 For construction other than pipelines and appurtenances in roadways and cross country, the Contractor shall be responsible for the location and setting lines and grades. The Contractor shall establish the location for pump station and wastewater treatment facility structures, associated yard piping including electrical conduits, internal piping and all equipment. Base lines and benchmarks for setting of the lines and grades for the above shall be provided by the Engineer.

10.4 Protection of stakes. The Contractor shall protect and preserve all of the established baseline stakes, bench marks, or other controls placed by the Engineer. Any of these items destroyed or lost through fault of the Contractor will be replaced by the Engineer at the Contractor's expense



11. Contractor's Obligations are as follows: The Contractor shall and in good workmanlike manner, do and perform all work and furnish and pay for all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract, within the time stated in the proposal in accordance with the plans and drawings covered by this contract, and any and all supplemental plans and drawings, in accordance with the directions of the Engineer as given from time to time during the progress of the work, whether or not he considers the direction in accordance with the terms of the contract. He shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the contract documents, and shall do, carry on and complete the entire work to the satisfaction of the Engineer and Owner.

Contractor shall carry on the work and adhere to the progress schedule during all disputes, disagreements or unresolved claims with the Owner. No work shall be delayed or postponed pending the resolution of any disputes, disagreements, or claims except as the Owner and Contractor may otherwise agree in writing.

12. Weather Conditions. In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor and his Subcontractors shall protect their work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or material shall have been damaged or injured by reason of failure on the part of the Contractor or any of his Subcontractors to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.
13. Protection of Work and Property shall be provided as follows:

13.1 The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this contract. He shall at all times safely guard and protect his own work, and that of adjacent property, from damage. The Contractor shall replace or make good any such damage, loss or injury unless caused directly by errors contained in the contract, or by the Owner, or his authorized representatives. The Contractor will notify owners of adjacent utilities when prosecution of the Work may affect them.

13.2 The Contractor shall take all necessary precautions for the safety of employees on the work site, and shall comply with all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of the workmen and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, trenches and other excavations, and falling materials, and he shall designate a responsible member of his organization on the work, whose duty shall be the prevention of accidents. The name and position of any person so designated shall be reported to the

Engineer by the Contractor. The person so designated shall be available by phone during nonworking hours.

13.3 In case of emergency which threatens loss or injury of property, and/or safety of life, the Contractor is allowed to act without previous instructions from the Engineer. He shall notify the Engineer immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted in writing to the Engineer for approval.

13.4 When the Contractor has not taken action but has notified the Engineer of an emergency threatening injury to persons or damage to the work or any adjoining property, he shall act as instructed or authorized by the Engineer.

13.5 The intention is not to relieve the Contractor from acting, but to provide for consultations between Engineer and Contractor in an emergency which permits time for such consultations.

13.6 The amount of reimbursement claimed by the Contractor on account of any emergency action shall be determined in the manner provided in Article 17 (extra work and change orders) of the general conditions.

14. Inspection of work for conformance with plans and specifications.

14.1 For purposes of inspection and for any other purpose, the Owner, the Engineer, and agents and employees of the Division or of any funding agency may enter upon the work and the premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefore. The Engineer shall be furnished with every facility for ascertaining that the work is in accordance with the requirements and intention of this contract, even to the extent of uncovering or taking down portions of finished work.

14.2 During construction and on its completion, all work shall conform to the location, lines, levels and grades indicated on the drawings or established on the site by the Engineer and shall be built in a workmanlike manner, in accordance with the drawings and specifications and the supplementary directions given from time to time by the Engineer. In no case shall any work which exceeds the requirements of the drawings and specifications be paid for as extra work unless ordered in writing by the Engineer.

14.3 Unauthorized work and work not conforming to plans and specifications shall be handled as follows:

- a. Work considered by the Engineer to be outside of or different from the plans and specifications and done without instruction by the Engineer, or in wrong location, or done without proper lines or levels, may be ordered by the Engineer to be uncovered or dismantled.

b. Work done in the absence of the Engineer or his agent may be ordered by the Engineer to be uncovered or dismantled.

c. Should the work thus exposed or examined prove satisfactory, the uncovering or dismantling and the replacement of material and rebuilding of the work shall be considered as "Extra Work" to be processed in accordance with article 17.

d. Should the work thus exposed or examined prove to be unsatisfactory the uncovering or dismantling and the replacement of material and rebuilding of the work shall be at the expense of the Contractor.

15. Reports, Records and Data shall be furnished as follows: The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as are required by the Contract Documents or as the Owner, Division or any funding agency may request concerning work performed or to be performed under this contract.

16. Superintendence by Contractor shall be furnished as follows: At the site of the work, the Contractor shall employ a competent construction superintendent or foreman who shall have full authority to act for the Contractor. The superintendent or foreman shall have been designated in writing by the Contractor as the Contractor's representative at the site. It is understood that such representative shall be acceptable to the Engineer and shall be the one who can be continued in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll. Such representative shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

17. Extra Work and Change Orders shall be processed as follows:

17.1 The Engineer may at any time by written order and without notice to the sureties require the performance of such extra work or changes in the work as may be found necessary. The amount of compensation to be paid to the Contractor for any extra work so ordered shall be made in accordance with one or more of the following methods in the order of precedence listed below:

a. A price based on unit prices previously approved; or

b. A lump sum price agreed upon between the parties and stipulated in the order for the extra work;

c. A price determined by adding 15 percent to the "reasonable cost" of the extra work performed, such "reasonable cost" to be determined by the Engineer in accordance with the following paragraph.

17.2 The Engineer shall include the reasonable cost to the Contractor of all materials used, of all labor, both common and skilled, of foreman, trucks, and the fair-market rental rate for all machinery and equipment for the period employed directly on the work. The reasonable cost for extra work shall include the cost to the Contractor of any additional

insurance that may be required covering public liability for injury to persons and property, the cost of workmen's compensation insurance, federal social security, and any other costs based on payrolls, and required by law. The cost of extra work shall not include any cost or rental of small tools, buildings, or any portion of the time of the Contractor, his project supervisor or his superintendent, as assessed upon the amount of extra work, these items being considered covered by the 15 percent added to the reasonable cost. The reasonable cost for extra work shall also include the premium cost, if any, for additional bonds and insurance required because of the changes in the work.

17.3 In the case of extra work, which is done by Subcontractors under the specific contract, or otherwise if so approved by the Engineer, the 15 percent added to the reasonable cost of the work will be allowed only to the Subcontractor. On such work an additional percentage of the reasonable cost (before addition of the 15 percent) will be paid to the Contractor for his work in directing the operations of the Subcontractor, for administrative supervision, and for any overhead costs. Such percentage shall be in accordance with the following schedule: reasonable cost up to and including \$50,000— 10 percent; next \$50,000 to and including \$100,000—7½ percent; greater than \$100,000—5 percent.

17.4 The Engineer may authorize minor changes or alterations in the work not involving extra cost and not inconsistent with the overall intent of the contract documents. These shall be accomplished by a written field order. However, if the Contractor believes that any minor change or alteration authorized by the Engineer entitles him to an increase in the contract price, he may make a claim therefore as provided in article 21.

18. Time For Completion and Liquidated Damages. The following paragraphs address time for completion and liquidated damages:

18.1 It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are Essential Conditions of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed."

18.2 The Contractor agrees that said work shall be pursued regularly, diligently and continuously at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

18.3 If the Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this contract, to pay to the Owner the amount specified in the contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the contract for completing the work.

18.4 The liquidated damages amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. Said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be deducted from time to time by the owner from current periodical payments.

18.5 It is further agreed that "time is of the essence" of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall "be of the essence". Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; provided, further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in the completion of the work is due to:

- a. A preference, priority or allocation order duly issued by the government;
- b. An unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather;
- c. Any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article:

18.6 The Contractor shall promptly notify the Owner in writing of the causes of the delay. The Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of his decision in the matter.

19. Defective Work. Defective work shall be processed as follows:

19.1 The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the contract and without expense to the Owner and shall bear the expense of making good all work of other Contractors which was destroyed or damaged by such removal or replacement.

19.2 All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such condemned work and materials within 10 days after receipt of written notice, the Owner may remove them and store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within 10 days time thereafter, the Owner may, upon 10 days written notice, sell such materials at auction or at private sale and shall pay to the Contractor any net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

20. Differing Site Conditions. Claims for differing site conditions shall be processed as follows:

20.1 The Contractor shall promptly and before such conditions are disturbed, notify the Engineer in writing of:

- a. Subsurface or latent physical conditions at the site differing materially from those indicated in this contract; or,
- b. Unknown physical conditions at the site, differing materially from those ordinarily encountered and generally recognized as inherent in the type of work provided for in this contract.

20.2 The Engineer shall promptly investigate the conditions. If he finds that conditions differ materially and will cause an increase or decrease in the Contractor's cost or the time required to perform any part of the work under this contract whether or not changed as a result of such conditions, the Engineer shall make an equitable adjustment and modify the contract in writing.

20.3 No claim of the Contractor under this clause shall be allowed unless the Contractor has given proper notice as required in paragraph 20.1 of this clause.

20.4 No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

21. Claims For Extra Cost. Claims for extra cost shall be processed as follows:

21.1 No claim for extra work or cost shall be allowed unless the same was done pursuant to a written order by the Engineer, approved by the Owner and the claim presented for payment with the first estimate after the changed or extra work is done. When work is performed under the terms of article 17, the Contractor shall furnish satisfactory bills, payrolls and vouchers covering all items of cost when requested by the Owner and shall allow the Owner access to accounts relating thereto.

21.2 If the Contractor claims that any instructions by drawings or similar documents issued after the date of the contract involve extra cost under the contract, he shall give the Engineer written notice after the receipt of such instruction and before proceeding to execute the work, except in an emergency which threatens life or property, then the procedure shall be as provided for under article 17, "Extra Work & Change Orders." No claim shall be valid unless so made.

22. Right of Owner to Terminate Contract:

22.1 In the event that any of the provisions of this contract are violated by the Contractor, or by any of his Subcontractors, the Owner may serve written notice upon the Contractor and the surety of its intention to terminate the contract, and unless within 10 days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement for correction be made, the contract shall, upon the expiration of said 10 days cease and terminate. In the event of any such termination, the Owner shall immediately serve notice thereof upon the surety and the Contractor and the surety shall have the right to take over and perform the contract; provided, however, that if the surety does not commence performance thereof within 10 days from the date of the mailing to such surety of notice of termination, the Owner may take over the work and prosecute the same to completion by contract or by force account for the account and at the expense of the Contractor and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the site of the work and necessary therefore.

22.2 If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or should fail, except in cases for which extensions of time are provided, to supply enough skilled workmen or materials, or if he should fail to make payments to Subcontractors or for material or labor, so as to affect the progress of the work, or be guilty of a violation of the contract, then the Owner, upon the written notice of the Engineer that sufficient cause exists to justify such action may, without prejudice to any other right or remedy and after giving the Contractor and his surety 7 days' written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools, equipment and other facilities installed on the work and paid for by the Owner, and finish the work by whatever method he may deem expedient. In the case of termination of this contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies at the expense of the Contractor. If such expense exceeds such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be approved by the Engineer.

22.3 Where the contract has been terminated by the Owner, said termination shall not affect or terminate any of the rights of the Owner as against the Contractor or his surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the Owner due the Contractor under the terms of the contract, shall not release the Contractor or his surety from liability for his default.

22.4 After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other remedy, elect to abandon the Project and terminate the Contract. In such case the Contractor shall be paid for all Work executed and any expense sustained plus reasonable profit.

22.5 If through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after it is submitted, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Owner and the Engineer terminate the Contract and recover from the Owner payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days written notice to the Owner and the Engineer stop the Work until paid all amounts then due, in which event and upon resumption of the Work Change Orders shall be issued for adjusting the Contract Price or Extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.

22.6 If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of failure of the Owner or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Owner or Engineer.

23. Construction Schedule and Periodic Estimates shall provide for the following:

23.1 Before starting the work or upon request by the Engineer during its progress, the Contractor shall submit to the Engineer a work plan showing construction methods and the various steps he intends to take in completing the work.

23.2 Before the first partial payment is made, the Contractor shall prepare and submit to the Engineer:

- a. A written schedule fixing the dates for submission of drawings; and
- b. A written schedule fixing the respective dates for the start and completion of segments of the work. Each such schedule shall be subject to review and change during the progress of the work.
- c. Respective dates for submission of Shop Drawings and for the beginning of manufacture, the testing, and the installation of materials, supplies, and equipment.
- d. A schedule of payments that the Contractor anticipates will be earned during the course of the Work.

24. Payments to Contractor. Payments to the Contractor shall be made as follows:

24.1 Progress payments. The Owner will once each month make a progress payment to the Contractor on the basis of an estimate of the total amount of work done to the time of the estimate and its value as prepared by the Contractor and approved by the Engineer.

24.2 Retainage by Owner. The Owner will retain a portion of the progress payment, each month, in accordance with the following procedures:

- a. The Owner will establish an escrow account in the bank of the Owner's choosing. The account will be established such that interest on the principal will be paid to the Contractor. The principal will be the accumulated retainage paid into the account by the Owner. The principal will be held by the bank, available only to the Owner, until termination of the contract.
- b. Until the work is 50% complete, as determined by the Engineer, retainage shall be 10% of the monthly payments claimed. The computed amount of retainage will be deposited in the escrow account established above.
- c. After the work is 50% complete and provided the Contractor has satisfied the Engineer in quality and timeliness of the work and provided further that there is no specific cause for withholding additional retainage no further amount will be withheld. The escrow account will remain at the same balance throughout the remainder of the project, unless drawn upon by the Owner in accordance with articles 19, 22, and 58.



d. Upon substantial or final completion (as defined in article 25), the amount of retainage will be reduced to 2% of the total Contract Price plus an additional retainage based on the Engineer's estimate of the fair value of the punch list items and the cost of completing and/or correcting such items of work, with specified amounts for each incomplete or defective item of work. As these items are completed or corrected, they shall be paid for out of the retainage until the entire project is declared completed (See article 25). The final 2% retainage shall be held during the one-year warranty period and released only after the Owner has accepted the project.

24.3 In reviewing monthly estimates for payments of the value of work done, the Engineer may accept in the estimate, prior to subtracting the retainage, the delivered cost of certain equipment and nonperishable material which have been delivered to the site or off-site location and which are properly stored and protected from damage. With the estimate, the Contractor shall submit to the Engineer invoices as evidence that the material has been delivered to the site. Prior to submitting the next monthly estimate, the Contractor shall provide the Engineer with paid invoices or other evidence that the materials have been paid for. If the Contractor fails to submit such evidence, the Engineer may then subtract the value of such materials or equipment for which the Owner has previously paid, from the next monthly estimate. The type of equipment and material eligible for payment prior to being incorporated in the work will be at the Engineer's discretion. Material and equipment made specifically for the subject job will be eligible for payment.

24.4 All material and work for which partial payments have been made shall thereupon become the sole property of the Owner. This provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or for the restoration of any damaged work, or as a waiver of the right of the Owner to require compliance with all of the terms of the contract.

24.5 Owner's right to withhold payments and make application. The Contractor agrees that he will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts, equipment, power, tools and all supplies, including commissary, incurred in the furtherance of the performance of this contract. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all claims of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails to do so, then the Owner may, upon written notice to the Contractor either pay unpaid bills of which the Owner has written notice directly, or withhold from the Contractor's unpaid compensation a sum of money to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged. Payment to the Contractor shall then be resumed in accordance with the terms of this contract but in no event shall the above provisions be construed to impose any obligations upon the Owner to either the Contractor or his surety or any third party. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and any payment so made by the Owner shall be considered as payment made under contract by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

24.6 If the Owner fails to make payment forty-five (45) days after approval by the Engineer, in addition to other remedies available to the Contractor, there shall be added to each such payment interest at an annual rate of 10% commencing on the first day after said payment is due and continuing until the payment is received by the Contractor.

25. Acceptance and Final Payment provisions shall be as follows:

25.1 Substantial completion and payment.

a. Substantial completion shall be that point, as certified by the Engineer, at which the contract has been completed to the extent that the Owner may occupy and/or make use of the work performed for the purposes for which it was intended. Upon substantial completion there may be minor items, such as seeding, landscaping, etc., yet to be completed or items of work to be corrected.

b. Upon receipt of written notice from the Contractor that the work is substantially complete, the Engineer shall promptly make an inspection, and when he finds the work complies with the terms of the contract and the contract is substantially completed, he will issue a signed and dated certificate, and a list of all items to be completed or corrected, stating that the work required by this contract has been substantially completed and is accepted by him.

c. Upon substantial completion, the entire balance due and payable to the Contractor less 2 percent of the Contract Price, and less a retention based on the Engineer's estimate of the fair value for the cost of completing or correcting listed items of work with specified amounts for each incomplete or defective item of work shall be made.

d. The general guarantee period for the work shall begin on the date certified by the Engineer that the work is substantially completed.

25.2 Final completion shall be that point at which all work has been completed and all defective work has been corrected. Unless the Engineer has issued a certificate of substantial completion, the general guarantee period shall begin upon certification by the Engineer of final completion.

25.3 At the end of the general guarantee period for the entire contract which has been certified finally completed or substantially completed, the Owner, through the Engineer, shall make a guarantee inspection of all or portions of the work. When it is found that the work is satisfactory and that no work has become defective under the terms of the contract, the Owner will accept the entire project and make final payment, including the reimbursement of monies retained pursuant to the guarantee period.

25.4 If the guarantee inspection discloses any work as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the guarantee inspection, provided the work has been satisfactorily completed.

25.5 Before issuance of final payment, the Contractor shall certify in writing to the Engineer that all payrolls, material bills, and other indebtedness connected with the work have been paid or otherwise satisfied; except that in case of disputed indebtedness or liens, if the contract does not include a payment bond, the Contractor may submit in lieu of certification of payment a surety bond in the amount of the disputed indebtedness or

liens, guaranteeing payment of all such disputed amounts, including all related costs and interest in connection with said disputed indebtedness or liens which the Owner may be compelled to pay upon adjudication.

25.6 If upon substantial completion, full completion is delayed through no fault of the Contractor, and the Engineer so certifies, the Owner may, upon certificate of the Engineer, and without termination of the contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

25.7 The acceptance by the Contractor of final payment shall release the Owner from all claims and all liability to the Contractor for all things relating to this work and for every act and neglect of the Owner and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations of the performance and payment bond under this contract.

26. Payments by Contractor. The Contractor shall pay the costs:

26.1 For all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered;

26.2 For all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools and equipment are delivered at the site of the work and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools and equipment are incorporated or used; and

26.3 To each of his Subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his Subcontractors to the extent of each Subcontractor's interest therein.

27. Insurance. The Contractor and any Subcontractor shall obtain all the insurance required under this article and such insurance shall be approved by the Owner.

27.1 The Contractor and all Subcontractors shall procure and shall maintain during the life of this contract workmen's compensation insurance as required by applicable state law. The Contractor shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance.

Limits of Liability: \$100,000 each accident;  
\$500,000 disease - policy limit;  
\$100,000 disease - each employee.

27.2 The Contractor shall procure and shall maintain during the life of this contract Commercial General liability insurance to include contractual liability, explosion, collapse and underground coverages.

Limits of liability: \$1,000,000 each occurrence bodily injury and property damage;  
\$2,000,000 general aggregate - include per project aggregate endorsement;  
\$2,000,000 products/completed operations aggregate.

If blasting or demolition or both is required by the contract, the Contractor or Subcontractor shall obtain the respective coverage and shall furnish the Engineer a certificate of insurance evidencing the required coverages prior to commencement of any operations involving blasting or demolition or both.

27.3 The Contractor shall procure and shall maintain during the life of this contract comprehensive automobile liability insurance to include all motor vehicles including owned, hired, borrowed and non-owned vehicles.

Limits of liability: \$1,000,000 combined single limit for  
bodily injury and property damage.

27.4 The Contractor shall either:

a. Require each of his Subcontractors to procure and to maintain during the life of his subcontract commercial general liability insurance and comprehensive automobile liability insurance of the type and in the amounts specified in articles 27.2 and 27.3; or

b. Insure the activities of his Subcontractors in his policy.

27.5 The required insurance shall provide adequate protection for the Contractor and his Subcontractors, respectively, against damage claims which may arise from work under this contract, whether such work be by the insured or by anyone employed by him and also against any of the special hazards which may be encountered in the performance of this contract.

27.6 The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Such insurance shall not be canceled or materially altered, except after 10 days written notice has been received by the Owner.

27.7 For builder's risk insurance (fire and extended coverage) and until the work is completed and accepted by the Owner, the Contractor is required to maintain builder's risk type insurance on a 100 percent completed value basis on the insurable portion of the work for the benefit of the Owner, the Contractor, and Subcontractors as their interests may appear.

27.8 The Contractor shall take out and furnish to the Owner and maintain during the life of this contract, complete Owner's protective liability insurance.

Limits of Liability: \$1,000,000 each occurrence;  
\$2,000,000 aggregate.

28. Contract Security. The Contractor shall within ten (10) days after the receipt of the Notice of Award furnish the Owner with a performance bond and a payment bond in penal sums equal to the amount of the contract price conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the Work provided by the contract Documents. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact business in the state in which the Work is to be performed

and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these Bonds shall be borne by the Contractor.

29. Additional or Substitute Bond. If at any time a surety on any such Bond is declared as bankrupt or loses its right to do business in the state in which the Work is to be performed, or is removed from the list of Surety Companies accepted on Federal Bonds, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished such an acceptable bond to the Owner.
30. Assignments. The Contractor shall not assign the whole or any part of this contract or any monies due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any monies due or to become due under this contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in this contract.
31. Mutual Responsibility of Contractors. If, through acts of neglect on the part of the Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the work site, the Contractor agrees to settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractors will so settle. If such other Contractor or Subcontractors shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against any such claim.
32. Subcontracting. When subcontracting, the Contractor:
  - 32.1 May utilize the services of specialty Subcontractors on those parts of the work which, under usual contracting practices, are performed by specialty Subcontractors.
  - 32.2 Shall be as fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
  - 32.3 Shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind Subcontractors to the Contractor by the terms of the contract documents insofar as applicable to the work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract documents.
  - 32.4 Shall not create any contractual relation between any Subcontractor and the Owner.
  - 32.5 Shall not award Work to Subcontractor(s), in excess of fifty percent (50%) of the Contract Price, without prior written approval of the Owner.

33. Authority of the Engineer. In performing his duties, the Engineer or his representative shall:

33.1 Have the authority to suspend the work in whole or in part for such periods as he may deem necessary due to the failure of the Contractor to carry out provisions of the Contract or for failure of the Contractor to suspend work in weather conditions considered by the Engineer to be unsuitable for the prosecution of the work. The Engineer shall give all orders and directions under this contract, relative to the execution of the work. The Engineer shall determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this contract and shall decide all questions which may arise in relation to the work. The Engineer's estimates and decisions shall be final and conclusive, except as otherwise provided. In case any question shall arise between the parties hereto relative to said contract or specifications, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this contract affected to any extent by such question. The Engineer shall decide the meaning and intent of any portion of the specifications and of any plans or drawings where the same may be found unclear. Any differences or conflicts in regard to their work which may arise between the Contractor under this contract and other Contractors performing work for the Owner shall be adjusted and determined by the Engineer.

a. The purpose of the above article is not in any way to relieve the Contractor of his responsibilities for the safety of workmen or general public in the execution of the work. Attention is drawn to Article 13 of these Conditions which refers to the safety obligations of the Contractor.

b. The Engineer, acting on behalf of the Owner, has the authority to enforce corrective action for work not in accordance with the specifications.

c. In addition, the Engineer, acting on behalf of the Owner, is to ensure that the work is in accordance with the Contract documents. He is not held responsible, however, for the methods of construction, sequences, schedules and procedures in the execution of the work. The Engineer does have the opportunity under 33.1 to reject the method of construction, work plan schedule, procedures, as he thinks appropriate.

33.2 Appoint assistants and representatives as he desires, and they shall be granted full access to the work under the contract. They have the authority to give directions pertaining to the work, to approve or reject materials, to suspend any work that is being improperly performed, to make measurements of quantities, to keep records of costs, and otherwise represent the Engineer in all matters except as provided below. The Contractor may, however, appeal from their decision to the Engineer himself, but any work done pending its resolution is at the Contractor's own risk. Except as permitted and instructed by the Engineer, the assistants and representatives are not authorized to revoke, alter, enlarge, relax, or release any requirements of these specifications, nor to issue instructions contrary to the plans and specifications. They are not authorized to act as superintendents or foremen for the Contractor, or to interfere with the management of the work by the Contractor. Any advice which the assistants or representatives of the Engineer may give the Contractor shall not be construed as binding the Engineer or the Owner in any way, nor as releasing the Contractor from the fulfillment of the terms of the contract. All transactions between the Contractor and the representatives of the Engineer which are liable to protest or where payments are involved shall be made in writing.

34. Stated Allowances. The Contractor shall include in his proposal for costs of materials not shown in his bid under “cash allowances” or “allowed materials,” any cash allowances stated in the supplemental general conditions or other contract documents. The Contractor shall purchase the “allowed materials” as directed by the Owner on the basis of the lowest and best bid of at least 3 competitive bids. If the actual price for purchasing the “allowed materials” is more or less than the “cash allowance,” the contract price shall be adjusted accordingly. The adjustment in contract price shall be made on the basis of the purchase price without additional charges for overhead, profit, insurance or any other incidental expenses. The cost of installation of the “allowed materials” shall be included in the applicable sections of the contract specifications covering this work.
35. Use of Premises, Removal of Debris, Sanitary Conditions. In the use of premises or removal of debris, the Contractor expressly undertakes at his own expense: to take every precaution against injuries to persons or damage to property; to maintain sanitary conditions; to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not interfere with the progress of his work or the work of any other Contractors; to place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work; to clean up frequently all refuse, rubbish, scrap materials and debris caused by his operations, to the end that at all times the site of the work shall present an orderly and workmanlike appearance; before final payment to remove all surplus material falsework, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in an orderly condition; to effect all cutting, fitting or patching of his work required to make the same conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other Contractor; to provide and maintain in a sanitary condition such toilet accommodations for the use of his employees as may be necessary to comply with the requirements of the state and local boards of health, or of other bodies or authorities having jurisdiction.
36. Quantities of Estimate. Wherever the estimated quantities of work to be done and materials to be furnished under this contract are shown in any of the documents including the proposal, they are given for use in comparing bids and the right is specifically reserved except as herein otherwise specifically limited, to increase or decrease them as may be deemed reasonably necessary by the Owner to complete the work contemplated by this contract, and such increase or decrease shall in no way invalidate this contract, nor shall any such increase or decrease give cause for claims or liability for damages. Such increases or decreases shall not exceed 25 percent of the estimated quantities of work. An increase or decrease in quantities for subsurface materials (e.g. ledge, unsuitable backfill), which overrun or underrun by 25% or more of the bid quantity may be the basis for a contract price adjustment, at the rate of a negotiated adjusted unit rate. Negotiated unit price rates shall be equitable and shall take into account but not be limited to the following factors; bid unit rate, distribution of rates and bid balance, and the scope of work as affected by the changed quantities. Claims for extra work resulting from changed quantities shall be processed under article 21.
37. Lands and Rights-of-Way. Acquisition and usage of lands and rights-of-way shall be as follows:

- 37.1 Prior to issuing the Notice to Proceed, the Owner shall legally obtain all lands and rights-of-way necessary for carrying out and completing the work to be performed under this contract.
- 37.2 The Contractor shall not (except after written consent from the Owner) enter or occupy with men, tools, materials, or equipment, any land outside the rights-of-way or property of the Owner. A copy of the written consent shall be given to the Engineer.
- 37.3 The Owner shall provide to the Contractor information which delineates and describes the lands owned and the rights-of-way acquired.
- 37.4 The Contractor shall provide at its own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.
38. General Guarantee. With reference to warranties, neither the final certificate of payment nor any provision in the contract documents, nor partial or entire occupancy of the premises by the Owner, shall constitute an acceptance of work not done in accordance with the contract documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which appear within the warranty period one year or longer if required by the contract, from the certified date of completion or substantial completion of the work. The Owner will give notice of observed defects within two working days of their discovery.
39. Errors and Inconsistencies. With reference to errors and inconsistency in contract documents, any provisions in any of the contract documents which may be in conflict with the paragraphs in these general conditions shall be subject to the following order of precedence for interpretation:
- 39.1 Drawings will govern technical specifications.
- 39.2 General conditions will govern drawings and technical specifications.
- 39.3 Supplemental general conditions will govern general conditions, drawings and technical specifications.
- 39.4 Special conditions will govern supplemental general conditions, general conditions, drawings and technical specifications.
- 39.5 The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, he shall notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.
- 39.6 Figure dimensions on Drawings shall govern over general drawings.
40. Notice and Service Thereof. Any notice to the Contractor from the Owner relative to any part of this contract will be in writing and will be considered delivered and the service completed, when said notice is mailed, by certified registered mail, to the Contractor at



his last given address or delivered in person to the Contractor or his authorized representative on the work.

41. Required Provisions Deemed Inserted. Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not correctly inserted (example; miswording, etc.), then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

42. Protection of Lives and Health. The work under this contract is subject to the safety and health regulations (CRF 29, part 1926, and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of these regulations.

43. OSHA Construction Safety Program.

43.1 Pursuant to NHRSA 277:5-a, the Contractor shall provide an Occupational Health and Safety Administration (OSHA) 10-hour construction safety program for its on-site employees. All employees are required to complete the program prior to beginning work. The training program shall utilize an OSHA-approved curriculum. Graduates shall receive a card from OSHA certifying the successful completion of the training program.

43.2 Any employee required to complete the OSHA 10-hour construction safety program, and who cannot within 15 days provide documentation of completion of such program, shall be subject to removal from the job site.

44. Equal Employment Opportunity. Under equal employment opportunity requirements and during the performance of this contract the Contractor agrees to the following:

44.1 The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, national origin, or sex. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

44.2 The Contractor will in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment, without regard to race, creed, color, national origin, or sex.

44.3 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the labor union or worker's representative of the Contractor's commitment under section 202 of executive order no. 11246 of September 24, 1965, and 11375 of October, 13, 1967, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

44.4 The Contractor will comply with all provisions of executive orders no. 11246 and 11375.

44.5 The Contractor will furnish all information and reports required by executive orders no. 11246 and 11375.

44.6 In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part by the Owner or the Department of Labor and the Contractor may be declared ineligible for further government contracts or federally-assisted construction, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the Department of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

44.7 A breach of this article may be grounds for termination of this contract and for debarment as provided in 29 CFR 5.6.

45. Interest of Federal, State or Local Officials. No federal, state or local official shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

46. Other Prohibited Interests. No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, Engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, Engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

47. Use and Occupancy Prior to Acceptance. Use and occupancy of a portion or unit of the project, upon completion of that portion or unit, and before substantial completion of the project, shall be a condition of this contract with the following provisions:

47.1 The Owner will make his request for use or occupancy to the Contractor in writing.

47.2 There must be no significant interference with the Contractor's work or performance of duties under the contract.

47.3 The Engineer, upon request of the Owner and agreement by the Contractor, will make an inspection of the complete part of the work to confirm its status of completion.

47.4 Consent of the surety and endorsement of the insurance carrier must be obtained prior to use and/or occupancy by the Owner. Also, prior to occupancy, the Owner will secure the required insurance coverage on the building.

47.5 The Owner will have the right to exclude the Contractor from the subject portion of the project after the date of occupancy but will allow the Contractor reasonable access to complete or correct items.

47.6 The warranty period shall begin upon substantial completion.

48. Suspension of Work. The Owner may, at any time and without cause, suspend the work or any portion thereof for a period of not more than 90 days by notice in writing to the Contractor and the Engineer. The Owner shall fix the date on which work shall be resumed. The Contractor will be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to any suspension if he makes a claim therefore as provided in articles 17 and 21.
49. [Reserved]
50. [Reserved]
51. [Reserved]
52. Project Sign Furnish and erect a sign at the project site to identify the project and to indicate that the State Government is participating in the development of the project. Place the sign in a prominent location as directed by the Engineer. Do not place or allow the placement of other advertising signboards at the project site or along rights-of-way furnished for the project work. **See Section 01580 for details of construction.**
53. [Reserved]
54. Public Convenience and Traffic Control requirements:
  - 54.1 The Contractor shall at all times so conduct his work as to assure minimal obstruction to traffic. The safety and convenience of the general public and the residents along the work site route and the protection of property shall be provided for by the Contractor. The Contractor shall be responsible for timely notification to local residents before causing any interruptions of their access.
  - 54.2 Fire hydrants and water holes for fire protection on or adjacent to the work site shall be kept accessible to fire apparatus at all times, and no obstructions shall be placed within 10 feet of any such facility. No footways, gutters, drain inlets, or portions of highways adjoining the work site shall be obstructed. In the event that all or part of a roadway is officially closed to traffic during construction, the Contractor shall provide and maintain safe and adequate traffic accessibility, satisfactory to the Engineer, for residences and businesses along and adjacent to the roadway so closed.
  - 54.3 When the maintenance of traffic is considered by the Engineer to be minimal, the contract may not show this work as a pay item. In such cases, the Contractor shall bear all expense of maintaining traffic over the sections of road undergoing improvement and of constructing and maintaining such approaches, crossings, intersections, and other features as may be necessary, without direct reimbursement.
55. Pre-Construction Conference. The Contractor shall not commence work until a pre-construction conference has been held at which representatives of the Contractor, Engineer, Division and Owner are present. The pre-construction conference shall be scheduled by the Engineer.
56. Maintenance During Construction.
  - 56.1 The Contractor shall maintain the work during construction and until it is accepted by the Owner. This maintenance shall be continuous and effective work prosecuted day by day, with adequate equipment and forces, to the end that roads or structures are kept in satisfactory condition at all times.

56.2 All cost of maintenance during construction and before the work is accepted by the Owner shall be included in the unit prices bid on the various pay items and the Contractor shall not be paid an additional amount for such maintenance.

56.3 If the Contractor, at any time, fails to comply with the provisions above, the Engineer may direct the Contractor to do so. If the Contractor fails to remedy unsatisfactory maintenance within the time specified by the Engineer, the Engineer may immediately cause the project to be maintained and the entire cost of this maintenance will be deducted from money to become due the Contractor on this contract.

57. Cooperation with Utilities.

57.1 The Owner will notify all utility companies, all pipe line owners, or other parties affected, and have all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.

57.2 Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners of such utilities at their expense, except as may otherwise be provided for in the special conditions or as noted on the plans.

57.3 It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans and as evident on the site, and that no additional compensation will be allowed for any delays, inconvenience, damage sustained by him due to any interference from such utility appurtenances or the operation of moving them.

57.4 The Contractor shall cooperate with the Owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangements may be reduced to a minimum, and that services rendered by those parties will be minimal.

57.5 In the event of interruption to a water or utility service as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with said authority in the restoration of services. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority. If any utility service is interrupted for more than 4 hours, the Contractor shall make provisions for temporary service at his own expense until service is resumed.

58. Work Performed at Night and on Sundays and Holidays shall comply with the following:

58.1 No work will be permitted at night or on Sundays or holidays except as approved in writing by the Engineer, and provided such work is not in violation of a local ordinance. When working at night, the Contractor shall provide flood lighting sufficient to insure the same quality of workmanship and the same conditions regarding safety as would be achieved in daylight.

58.2 Whenever Memorial Day or Fourth-of-July is observed on a Friday or a Monday and during the weekend of Labor Day, the Contractor may be required to suspend work for the 3 calendar days. Prior to the close of work, the work site shall be placed in a condition acceptable to the Engineer for the comfort and safety of the traveling public. An arrangement shall be made for responsible personnel acceptable to the Engineer to maintain the project in the above conditions.

59. Laws to be Observed. With reference to laws that shall be observed:

59.1 The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations, and all orders and decrees of tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work. He shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the state and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by himself or his employees.

59.2 Indemnification

The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the Work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employees of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by disability benefit or other employee benefit acts.

The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

60. Permits. Permits to be obtained by the Contractor shall be in accordance with the following:

60.1 Permits and licenses of a temporary nature necessary for the prosecution of the work shall be obtained and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the Owner. Permits may include:

- a. New Hampshire Department of Environmental Services Shoreland Permit by Notification (PBN).
- b. Other permits, as required by State and Local laws and ordinances.
- c. Notice of intent for coverage under EPA's General NPDES Permit for construction dewatering activities.

61. Control of Pollution due to construction shall comply with the following:

61.1 During construction, the Contractor shall take precautions sufficient to avoid the leaching or runoff of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride and any other polluting materials which are unsightly or which may be harmful to humans, fish, or other life, into groundwaters and surface waters of the State.

61.2 In waters used for public water supply or used for trout, salmon, or other game or forage fish spawning or nursery, control measures must be adequate to assure that turbidity in the receiving water will be increased not more than 10 standard turbidity units (s.t.u.) in the absence of other more restrictive locally-established limitations, unless otherwise permitted by the Division. In no case shall the classification for the surface water be violated.

61.3 In water used for other purposes, the turbidity must not exceed 25 s.t.u. unless otherwise permitted by the Division.

62. Use of Explosives.

62.1 When the use of explosives is necessary for the prosecution of the Work, exercise the utmost care not to endanger life or property. The Contractor shall be responsible for any and all damage resulting from the use of explosives.

62.2 Store all explosives in a secure manner, in compliance with all State and local laws and ordinances, and legally mark all such storage places. Storage shall be limited to such quantity as may be needed for the work underway.

62.3 Designate as a "Blasting Area" all sites where electric blasting caps are located and where explosive charges are being placed. Mark all blasting areas with signs as required by law. Place signs as required by law from each end of the blasting area and leave in place while the above conditions prevail. Immediately remove signs after blasting operations or the storage of caps is over.

62.4 Notify each property Owner and public utility company having structures in proximity to the site of the work sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property. Such notice shall not relieve the Contractor of any of his responsibility for damage resulting from his blasting operation. Warn all persons within the danger zone of blasting operations and do not perform blasting work until the area is cleared. Provide sufficient flagmen outside the danger zone to stop all approaching traffic and pedestrians. Provide watchmen during the loading period and until charges have been exploded. Place adequate protective covering over all charges before being exploded.

63. Arbitration by Mutual Agreement.

63.1 All claims, disputes, and other matters in question arising out of, or relating to, the Contract Documents or the breach thereof, except for claims which have been waived by making an acceptance of final payment as provided in Section 25, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.

63.2 Notice of the request for arbitration shall be filed in writing with the other party to the Contract Documents and a copy shall be filed with the Engineer. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

63.3 The Contractor will carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

64. Taxes. The Contractor shall pay all sales, consumer, use, and other similar taxes required by the laws of the place where the Work is performed.

65. Separate Contracts.

65.1 The Owner reserves the right to let other contracts in connection with this Project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work and shall properly connect and coordinate the Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such Work that render it unsuitable for such proper execution and results.

65.2 The Owner may perform additional Work related to the Project or the Owner may let other contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such Contracts (or the Owner, if the Owner is performing the additional Work) reasonable opportunity for the introduction and storage of materials and equipment and the execution of the Work, and shall properly connect and coordinate the Work with theirs.

65.3 If the performance of the additional Work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice shall thereof be given to the Contractor prior to starting such additional Work. If the Contractor believes that the performance of such additional Work by the Owner or others involves it in additional expense or entitles it to an extension of the Contract Time, the Contractor may make a claim thereof as provided in Sections 17 and 18.

END OF SECTION

## SUPPLEMENTAL CONDITIONS

Supplements

The following supplements, modify, change, delete, or add to the General Conditions. Where any part of the General Conditions is modified or voided by these sections, the unaltered provisions of that part should remain in effect.

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| SC-10              | Surveys; Supplement to GC-10                                                | C-2.2           |
| SC-24              | Retainage by Owner; Supplement to GC-24                                     | C-2.2           |
| SC-27              | Insurance; Supplement to GC-27                                              | C-2.2           |
| SC-58              | Work Performed at Night and on Sundays and Holidays;<br>Supplement to GC-58 | C-2.3           |
| SC-60              | Permits                                                                     | C-2.3           |



## **SPECIAL CONDITIONS**

### **SC-10 SURVEYS (SUPPLEMENT TO GC10)**

**Add** paragraph 10.5:

As follows:

- 10.5 The Engineer's layout of structures and pipelines will be general in nature to be adjusted by the Contractor based on location of other utilities as determined by the Contractor. All adjustments shall be approved by Engineer and Owner.

### **SC-24 RETAINAGE BY OWNER**

**Delete** paragraph 24.2 in its entirety and **replace** with the following:

24.2 Retainage by Owner. The Owner will retain a portion of the progress payment, each month, in accordance with the following procedures:

1. Retainage to be kept in an escrow account established by the Owner.
2. Until the work is 50% complete, as determined by the Engineer, retainage shall be 10% of the monthly payments claimed.
3. After the work is 50% complete, and provided the Contractor has satisfied the Engineer in quality and timeliness of the work, and provided further that there is no specific cause for withholding additional retainage no further amount will be withheld, and the retained amount will remain at the same balance throughout the remainder of the project, unless drawn upon by the Owner in accordance with articles 19, 22, and 58.
4. When Change Orders are approved, retainage never to fall below 5% of the Current Contract Price.
5. Upon substantial or final completion (as defined in article 25), the amount of retainage will be reduced to 2% of the total amount due the Contractor plus an additional retainage based on the Engineer's estimate of the fair value of the punch list items and the cost of completing and/or correcting such items of work, with specified amounts for each incomplete or defective item of work. As these items are completed or corrected, they shall be paid for out of retainage until the entire project is declared completed (See article 25). The final 2% retainage shall be held during the one-year warranty period and released only after the project has been accepted by the Owner.

**Add** the following after Paragraph 24.6.

24.7 Liquid Asphalt Adjustment. Liquid asphalt pricing adjustments shall be made in accordance with the following:

All bid items in the base bid and bid alternate 3 involving hot mix asphalt (HMA) concrete containing asphalt cement will be subject to a price adjustment. The unit prices submitted on the bid form (included in Specification Section A), shall be based upon the priced furnished by the NHDOT Bureau of Materials and Research that is in effect on the date the bids for

this project are opened. The price adjustment will be based on the total percent of virgin asphalt cement in the approved mix designs. The monthly price of asphalt cement will be furnished by the NHDOT Bureau of Materials and Research on the first business day following the 14th calendar day of each month. The price adjustment will be made at the end of each month in which the work was accomplished as follows:

A contract adjustment will be made based on the following formula:

(monthly price minus the base price) X (Approved Mix Design percent of virgin asphalt cement) X (tons of pavement used)

Tons of impervious (regular) hot mix pavement used shall be calculated based the following formula:

(Square Yards of HMA accepted for payment) X (specified thickness of pavement in inches) X 0.056 tons per Square-Yard inch.)

Once the dollar value of the adjustment for a month is calculated, it will be included for payment to the Contractor in the next monthly pay estimate under the Adjustment Allowance.

The adjustments for liquid asphalt pricing will be made as a lump sum in each applicable month. The Contractor shall provide to the Engineer the Contractor's basis for the calculated adjustment when submitting his monthly pay estimate for review.

#### SC-27 INSURANCE REQUIREMENTS

**Delete** Paragraph 27 in its entirety. Insurance is defined in Section A of the documents and C-3 for Concord specific requirements.

#### SC-58 WORK PERFORMED AT NIGHT AND ON SUNDAYS AND HOLIDAYS

**Add** "Saturdays" to the Section Title and to Paragraph 58.1. **Add** the following sentence to the beginning of Paragraph:

"The Contractor's work hours shall be from 7:00 AM to 5:00 PM, Monday through Friday, unless authorized by the City of Concord. Night work hours authorized by the City of Concord shall be from 7:00PM to 6:00AM, Monday through Friday."

#### SC-60 PERMITS

**Add** the following after Paragraph 60.1.g of the General Conditions:

- h. Excavation Permit (to be obtained from the City of Concord General Services Department). Permit shall include the appropriate Traffic Control Plan, as required. Permit application and inspection fees shall be waived.
- i. NPDES Stormwater General Permit (to be obtained by NHDES).

END OF SECTION

CITY OF CONCORD SPECIFIC CONDITIONS

1.01 Definitions

**Delete** 2.3 Bidder in its entirety and replace with:

“Bidder” shall include all service providers, proposers, offerors, bidders, suppliers, vendors and contractors, and shall include their successors, transferees and assignees. Unless otherwise required by the context, “Bidder” includes any of the Bidder’s consultants, sub consultants, contractors, and subcontractors.

**Add** between 2.5 and 2.6 the following definition:

Contract shall also mean Agreement

**Delete** 2.6 Contract Documents in its entirety and replace with:

“Contract Documents” means the Contract, including all items defined in the Agreement.

1.02 Delete 40 Notice and Service Thereof and replace with:

40. Notice and Service Thereof

Any notice under this contract shall be made to the addresses and persons specified in the contract. All notices, requests, statements or payments shall be made in writing. Notices required to be in writing shall be delivered by hand delivery, overnight delivery, or email. Notice by hand delivery or overnight delivery will be deemed to have been received when delivered. Notice by e-mail will be deemed to have been received when such e-mail is transmitted, so long as a copy of such e-mail notice is delivered immediately thereafter by hand delivery, overnight delivery, unless confirmation of successful transmission is received, including by way of a reply to the e-mail by the receiving Party. A Party may change its address and contact information by providing notice of the same in accordance with the provisions of this Article.

1.03 Named Items in Bid

The name of manufacturer, trade name, or catalog number mentioned in this Request for Bid is for the purpose of designating a minimum standard of quality and type. Such references are not intended to be restrictive, although specified color, type of material and specified measurements may be mandatory. Bids will be considered for any brand which meets or exceeds the quality of the specifications listed. On all such Bids, the Bidder shall specify the product they are proposing and shall supply sufficient data to enable a comparison to be made with the particular brand or manufacturer specified. Failure to submit the above may be sufficient grounds for rejection of the Bid.

1.04 Samples

When samples are required, they must be submitted free of cost and will be returned unless otherwise specified.

Items left for demonstration purposes shall be delivered and installed free of charge and shall be removed by the Bidder at no cost to the City. Said demonstration units shall not be offered to the City as new equipment unless mutually agreed to.

1.05 Proof of Compliance Pricing

Unless otherwise stated, all prices are F.O.B.: Destination. No charge for packing or drayage will be allowed. All deliveries are to be pre-paid, C.O.D.’s will not be accepted. Each shipment

shall be identified by Purchase Order and/or Request for Bids number, commodity description and packing list. All items, packages, etc. shall have clearly identifiable external markings or tags for ease of identification.

1.06 Pricing

Unless otherwise specified all prices listed are firm for the term of the contract. All prices should include all labor, material and transportation costs, and any discounts offered. No fuel surcharges shall be allowed at any time.

1.07 Standard of Care

Bidder shall be responsible for the professional quality, technical accuracy, timely completion, and coordination of all work performed under this contract. It shall be the duty of the Bidder to assure at its own expense that all work is technically sound and in conformance with all applicable federal, state, and local laws, statutes, regulations, ordinances, orders, or other requirements.

1.08 Energy Star® Compliance

The Bidder shall provide products that earn the Energy Star® and meet the Energy Star® specifications for energy efficiency. The Bidder is encouraged to visit [www.energystar.gov](http://www.energystar.gov) for complete product specifications and updated lists of qualifying products.

1.09 Election Day Construction Policy

Unless otherwise approved by the City, all City contracts that entail any element of construction in the public right of way shall prohibit work during the hours in which Concord is holding a primary, general or special election as determined by the Concord City Clerk. A copy of the complete Election Day Construction Policy can be viewed on-line at [www.concordnh.gov/Purchasing](http://www.concordnh.gov/Purchasing).

1.10 Prohibited Interests, Bidder

By submitting a Bid, the Bidder certifies that:

1. no officer, agent, or employee of the City who has participated in contract document negotiations on the part of the City has a pecuniary interest in the Bid;
2. no gratuities including, but not limited to, entertainment or gifts were offered or given by Bidder to any officer or employee of the City of Concord with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending or making of any determinations with respect to the performance of this contract;
3. the Bid is made in good faith without fraud, collusion, or connection of any kind with any other prospective Bidder for the same Request for Bids;
4. the Bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm; and
5. the Bidder presently has no interest and that it will not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this contract, and that no person having such an interest shall be employed in the performance of this contract.

If any prohibited interests come to the attention of Bidder at any time, a full and complete disclosure of the interest shall be immediately made in writing to the City of Concord. If City of Concord determines that a conflict exists and was not disclosed to the City of Concord, it may terminate the contract at will or for cause.

The rights and remedies of this section shall in no way be considered for be construed as a waiver of any other rights or remedies available to the City Concord under this contract or at law.

#### 1.11 Bidders Interested in More than One Bid

If more than one Bid is offered by any one party, or by any person or persons representing a party, all such Bids shall be rejected. A party who has quoted prices to a Bidder is not thereby disqualified from quoting prices to other Bidders or from submitting a direct Bid in its own behalf.

#### 1.12 Tie Bids

When identical Bids are received, with respect to price, delivery, financial resources, experience, ability to perform and quality, award may be made by a toss of coin, with the following exception: When a tie Bid exists between a local (a business establishment within City limits) Bidder and an out-of-town Bidder, preference will be given to the local Bidder. Any Bidder having a local agent who is a bona fide resident of the City is considered a local Bidder. If a tie Bid exists between two local Bidders, or two out-of-town Bidders, the decision may be made by a toss of coin.

#### 1.13 Disqualification

In the event Bidder (or any of its officers, partners, principals, or employees acting with its authority) is convicted of a crime involving a public official arising out of, or in connection with, the procurement of work to be done or payments to be made under this contract, the City of Concord may terminate the contract at will or for cause. Upon termination, Bidder shall refund to the City of Concord any profits realized under this contract, and Bidder shall be liable to the City of Concord for any costs incurred by the City of Concord in completing the work described in this contract. At the discretion of the City of Concord, these sanctions shall also be applicable to any such conviction obtained after the expiration or completion of the contract.

#### 1.14 Protests

This Section sets forth the exclusive protest remedies with respect to the Request for Bids and any award issued thereunder. Each Bidder, by submitting its Bid, expressly: (1) recognizes the limitation on its right to protest contained herein; (2) waives all other rights and remedies; and (3) agrees that the decision on any protest, as provided herein, shall be final. These provisions are included in the Request for Bids expressly in consideration for such waiver and agreement by the Bidders. Such waiver and agreement by each Bidder are also consideration to each other Bidder for making the same waiver and agreement.

All protests shall be made by filing, in-hand, or first-class mail to the City's Purchasing Manager at 311 North State Street, Concord, New Hampshire, with the protest document received on or before 5:00pm on the date due for such protest.

#### Protests Regarding the Award

Protests regarding the Notice of Award must be received by the City within seven (7) calendar days after the City's issuance of the Notice of Award. Such protest shall state the grounds for the protest and shall include all factual and legal documentation to establish the merits of the protest. The Bidder shall concurrently file a copy of the protest with the other Bidders. Other Bidders may file, by hand-delivery or first-class mail to the City's Purchasing Manager, statements in support of or in opposition to the protest within seven (7) calendar days of the filing of the detailed statement of protest. All protests regarding an award shall be resolved in accordance with the City's Contract Award Protest Policy and Procedure, which may be retrieved on-line at [www.concordnh.gov/Purchasing](http://www.concordnh.gov/Purchasing), or otherwise upon request to the City's Purchasing Manager. The City shall issue a written decision regarding the protest within thirty (30) calendar days after the protest filing. No evidentiary hearing or oral argument shall be provided except in the sole discretion of the City. The City's decision shall be final and binding on all Bidders.

#### 1.15 Cancellation of Award

The City reserves the right to cancel the award without liability to the selected Bidder, except for the return of the Bid bond at any time before a contract has been fully executed by all parties.

#### 1.16 Contract Execution

The contract shall become effective on the date the contract is signed by the City and the selected Bidder ("Effective Date"). If the selected Bidder commences any services prior to the Effective Date, all services performed by the selected Bidder prior to the Effective Date shall be performed at the sole risk of the selected Bidder, and in the event that the contract does not become effective, the City shall have no liability to the selected Bidder, including without limitation, any obligation to pay the selected Bidder for any costs incurred or services performed.

#### 1.17 Insurance

Limits to be found in Section A-9

The successful Bidder shall procure and maintain insurance, in the amounts and coverage as set forth in a Request for Bids, or otherwise required by the City, at the Bidder's sole expense, with City approved insurance companies, insuring against any and all public liability, including injuries or death to persons and damage to property, arising out of or related to the goods or Bidder's performance hereunder.

The City shall be named as an additional insured, on a primary and non-contributory basis with a waiver of subrogation in favor of the City as determined by the City, in said policy or policies, and the successful Bidder shall furnish to the City original Certificate(s) of Insurance evidencing the required coverage to be in force on the date of this Agreement and renewal Certificates of Insurance if coverage has an expiration or renewal date occurring during the term of this Agreement.

In addition to the certificate(s) of insurance, the successful Bidder shall also provide, as required by the City, an additional insured endorsement. If the policy includes a blanket additional insured endorsement or contractual additional insured coverage, the requirement for an endorsement may be fulfilled by submitting that document along with a signed declaration page referencing the blanket endorsement or policy form. The successful Bidder shall ensure that all insurance coverage maintained or procured pursuant to this agreement shall be endorsed, as required by the City, to waive subrogation against the City, however this waiver of subrogation requirement shall not apply to any policy that includes a condition that specifically prohibits

such an endorsement or voids coverage should the successful Bidder enter into such an agreement on a pre-loss basis. All certificates shall provide that the City be given thirty (30) days written notice prior to any change, substitution, or cancellation before the stated expiration date.

The City's examination of, or failure to request or demand, any evidence of insurance hereunder, shall not constitute a waiver of any requirement and the existence of any insurance shall not limit the Bidder's obligation under any provision hereof.

Except to the extent of comparable insurance acceptable to, or express waiver by the City, the Bidder shall, or shall cause any carrier engaged by the Bidder, to insure all shipments of goods for full value.

If the contract with the Bidder involves the performance of work by the Bidder's employees at property owned or leased by the City, the Bidder shall furnish such additional insurance as the City may request in respect thereof, but in any event and without such request, workers' compensation insurance and unemployment compensation insurance as required by laws of the State of New Hampshire and public and automotive liability and property damage insurance. In no event shall such employees of the Bidder be deemed to be the employees of, or under the direction or control of the City for any purpose whatsoever.

#### 1.18 Invoices

Invoices are to be submitted in duplicate upon delivery or pick-up to the user department or division. The invoice must include an itemization of all items, supplies, services, equipment or labor furnished; including unit list price, net price, extensions and total amount due (see Progress Payments below). In addition, on projects that will involve partial/progress payments and/or retainage a summary statement in the following format will be provided with each invoice:

|                                  |                  |
|----------------------------------|------------------|
| Original Contract Amount         | \$\$\$\$\$\$\$\$ |
| Plus/minus Change Orders         | \$\$\$\$\$\$\$\$ |
| Total Adjusted Contract Amount   | \$\$\$\$\$\$\$\$ |
|                                  |                  |
| Work Completed to Date           | \$\$\$\$\$\$\$\$ |
| Less Previous Invoices           | \$\$\$\$\$\$\$\$ |
| Less Retainage (if any)          | \$\$\$\$\$\$\$\$ |
| Equals: Balance due this Invoice | \$\$\$\$\$\$\$\$ |
|                                  |                  |
| Balance Remaining on Contract    | \$\$\$\$\$\$\$\$ |

**All invoices must reference a valid City of Concord Purchase Order Number.**

#### 1.19 Audit

For a period of at least three (3) years after completion of any contract, it is the responsibility of the Bidder to make available at the Bidder's place of business, upon demand, all price lists, documents, financial records and other records pertaining to purchases made and/or work performed under contract for the purposes of audit by the City of Concord.

#### 1.20 Facility Inspection & Evaluation

The City of Concord reserves the right to inspect the Bidder's facilities during operating hours to determine that the level of inventory is adequate for the City's needs. The conditions and operations of the facility shall be taken into consideration in making the award of this contract.

#### 1.21 Compliance with Laws

The Bidder shall comply with the following laws, as applicable.

##### A. City of Concord's Ordinances, Fugitive Dust and Noise Ordinances

1. All work shall be conducted in conformance with the City's Code of Ordinances, Title I, General Code including but not limited to:
  - a. Chapter 11, Public Nuisances, Article 11-3 (Fugitive Dust); and
  - b. Chapter 13, Public Health, Article 13-6 (Noise).

The City's Code of Ordinances can be viewed at [www.concordnh.gov](http://www.concordnh.gov).

##### B. Other Laws and Regulations

In addition to the laws and regulations set forth herein, the Bidder shall keep fully informed of all state and national laws and municipal ordinances and regulations in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction authority over the same. If any discrepancy or inconsistency is discovered in the plans, drawings, specifications or contract for the work in relation to any such laws, specifications or contract for the work in relation to any such laws, ordinances, regulations, orders or decrees, the Bidder shall forthwith report the same to the City's Project Manager in writing.

The Bidder shall at all times observe and comply with such laws and ordinances and shall cause all agents and employees to observe and comply with such laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the City and its officers, agents and servants against any claim or liability arising from or based on the violation of any such laws, ordinances, regulations, order or decrees, whether by the Bidder or the Bidder's employees or subcontractors.

#### 1.22 PCI-DSS, Payment Card Industry Standard Security Standard

To the extent applicable, Bidder is responsible for the security of cardholder data which Bidder possesses or otherwise stores, processes, or transmits on behalf of the City of Concord. Bidder shall abide by the rules and regulations set forth in the PCI-DSS.

#### 1.23 Bidder's Relation to the City

In the performance of the awarded contract the selected Bidder is in all respects an independent contractor and is neither an agent nor an employee of the City. Neither the selected Bidder nor any of its officers, employees, agents or members shall have authority to bind the City or receive any benefits, workers' compensation or other emoluments provided by the City to its employees.

#### 1.24 Ownership of Bids and Reports

The Bids and all materials and other documents submitted with such Bids and all supplementary materials submitted in connection with any clarification of any submitted Bid and in connection with the negotiation of any Bid with the City (collectively, "Bid Materials") shall upon submittal become the absolute property of the City and may be used by the City in connection with the Request for Bids and for such other purposes as the City may choose without engaging the Bidder and without any compensation therefore being paid to the Bidder.



The Bidders understand that in submitting its Bid Materials to the City, Bidders are delivering all such materials to the City in consideration of a potential award of a contract. Bidders in doing so agree that it has received such consideration and other good and valuable consideration sufficient to transfer all right, title and interest in and to the Bid Materials to the City who shall have and retain all copyright, trademark, other intellectual property and other intangible rights, and all ownership, right, title and interest in and to the Bid Materials.

In addition, all data, materials, plans, reports and documentation prepared pursuant to any contract between the City of Concord and the successful Bidder shall belong exclusively to the City.

#### 1.25 Anti-Trust Provision

The selected Bidder hereby agrees that it will assign to the City all cause of action that it may acquire under the anti-trust laws of the State of New Hampshire and the United States as the result of conspiracies or combination of contracts in restraint of trade which affect the price of goods or services obtained by the City under any contract if so requested by the City.

#### 1.26 Force Majeure

To the extent that the selected Bidder is prevented by Force Majeure from carrying out, in whole or part, its obligations under this contract and the selected Bidder gives notice and details of the Force Majeure to the City as soon as practicable (and in any event within five (5) business days after becoming aware of the Force Majeure event or circumstance), then the applicable deadlines in effect at the time of the Force Majeure may be extended up to (60) calendar days or as otherwise determined by the City at its sole discretion. The selected Bidder shall use commercially reasonable and diligent efforts to eliminate or avoid the Force Majeure and, thereafter, promptly and diligently resume performing its obligations under this contract. As used herein, "Force Majeure" shall mean any event or circumstance that prevents either Party from performing its obligations under this Agreement, which event or circumstance (i) is not within the reasonable control, and is not the result of the fault or negligence, of the Party claiming Force Majeure, and (ii) by the exercise of reasonable due diligence, the Party is unable to overcome or avoid or cause to be avoided. Force Majeure will not be based on economic or financial hardship. In addition, a delay or inability to perform substantially attributable to a Party's failure to timely take the actions necessary to obtain and maintain all necessary permits, a failure to satisfy contractual conditions or commitments (unless otherwise caused by an event of Force Majeure), or lack of or deficiency in funding or other resources, shall each not constitute a Force Majeure. Force Majeure shall include, without limitation, events such as: fires; floods; lightning strikes; ground sliding; and earthquakes.

#### 1.27 Access to Public Meetings

All City of Concord public meetings are accessible for persons with disabilities. Any person who feels that he or she may be unable to participate in a City of Concord public meeting due to a disability should, to the extent possible, call (603) 225-8570 at least 48 hours prior to the meeting so that a reasonable accommodation can be arranged.

For meetings held in the City Council Chambers, any person who is unable to access the upper level of the Council Chambers to address the City Council or any other public body may use the podium and/or microphone located at the lower level of the Council Chambers. Other reasonable accommodations may be available upon request.

#### 1.28 Non-Appropriations

The City of Concord's obligations to pay any amount due under a contract are contingent upon availability and continuation of funds for the purpose. The City may terminate the contract at any time, due to the non-appropriation of funds, and all future payment obligations of the City cease on the date of termination.

1.29 Exclusivity

This contract will be for the goods/services described herein; however, this contract should not be considered exclusive. As deemed necessary, the City reserves the right to obtain these goods/services from any other Bidder.

1.30 Provision Required by Law Deem Inserted

Each and every provision and clause required by law to be inserted in this Request for Bids and any subsequent contract shall be deemed to be inserted herein and this Request for Bids and contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Request for Bids and/or contract shall forthwith be physically amended to make such insertion or correction.

1.31 Severability

In the event any of the provisions of this Request for Bids or contract are held by a court of competent jurisdiction to be contrary to any state or federal law, the remaining provisions of this Request for Bids or contract will remain in full force and effect.

1.32 Choice of Law and Venue

All disagreements and disputes, if any, arising under the terms of any contract, either by law, in equity, or by arbitration, shall be resolved pursuant to the laws and procedures of the State of New Hampshire, in which State any contract shall be deemed to have been executed. No action at law, or equity, or by arbitration shall be commenced to resolve any disagreements or disputes under the terms of any contract, in any jurisdiction whatsoever other than the State of New Hampshire and Merrimack County.

The Bidder agrees that it consents to the jurisdiction of the courts of the State of New Hampshire and, as well as to the jurisdiction of all courts from which an appeal may be taken from such courts for the purpose of any suit, action or other proceeding arising out of any of their obligations hereunder or with respect to the transactions contemplated hereby, and expressly waives any and all objections it may have to venue in any such courts.

FAILURE TO ACKNOWLEDGE THIS REQUEST FOR BIDS MAY RESULT IN WITHDRAWAL FROM THE BID LIST FOR THIS COMMODITY OR SERVICE.

FAILURE TO COMPLY WITH THESE REQUIREMENTS COULD RESULT IN THE CANCELLATION OF AN ORDER OR CONTRACT.

END OF SECTION

## SECTION 01010B

### SUMMARY OF WORK

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION:

- A. Location: The Work locations include, but are not limited to, locations within the right-of-ways on the following streets and easements in the City of Concord.
  - 1. Grover Street
  - 2. Pembroke Road
  - 3. Branch Turnpike
  - 4. Loudon Road
  - 5. Steeplegate Mall Sewer Easement
- B. Work Included: The Work includes, but is not limited to, the following:
  - 1. New Storm Drain System:
    - a. Infiltration basin test pits for soil hydraulic conductivity and environmental sampling
    - b. Drain manholes, catch basins and infiltration structures, and associated piping
    - c. Removal and disposal or abandonment of existing stormwater pipe, drain manholes, catch basins and catch basin laterals
  - 2. New Sewer System:
    - a. Sewer force main
    - b. Gravity sanitary sewers
    - c. Sewer manholes
    - d. Sewer service laterals
    - e. Removal and disposal or abandonment of existing sewer or combination manholes, sewers and laterals
    - f. Existing flow management/ bypass pumping for installation of new sanitary sewer pipes, manholes and laterals
  - 3. Sewer System Rehabilitation:
    - a. Sewer pipe and manhole rehabilitation including replacement, structural lining, and grout sealing as identified herein.
    - b. Refer to the Manhole Rehabilitation Schedule and Sewer Pipe Rehabilitation Schedule for additional information.
  - 4. Storm Drain System Rehabilitation:
    - a. Storm drain pipe and manhole rehabilitation including replacement, structural lining, and grout sealing as identified herein.
    - b. Refer to the Storm Drain Manhole Rehabilitation Schedule and Storm Drain Pipe Rehabilitation Schedule for additional information.
  - 5. Testing of sanitary sewers, water mains, valves and manholes for proper installation and performance.
  - 6. All related site work including trench excavation, ledge excavation, groundwater dewatering, disposal of excess excavated materials, filter fabric,

bedding, backfill, compaction, road/drive subbase, paving, loam/seed and landscaping.

7. Other miscellaneous work shown in the Specifications for a complete and operational system.

C. Removals, Relocations and Rearrangements

1. Examine the existing site for the work of all trades which will influence the cost of the work under the bid. This work shall include removals, relocations and rearrangements which may interfere with, disturb or complicate the performance of the work under the general bid involving systems, equipment and related service lines, which shall continue to be utilized as part of the finished project. The Contractor is responsible for all coordination in this regard.
2. Provide in the bid a sufficient amount to include all removals, relocations, rearrangements and reconnections herein specified, necessary or required to provide approved operation and coordination of the combined new and existing systems and equipment.
3. Provide in the bid a sufficient amount to include all temporary facilities required to maintain flows during the construction period, including bypass pumping, temporary piping, temporary metering, etc. The cost shall include the cost for all labor, tools, equipment and materials necessary.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 MAINTAIN EXISTING WORKS

A. Continuous Operations Criteria:

1. The Contractor shall conduct operations in such a manner and sequence which shall neither result in a disruption of, nor interfere with, the functional workings of any existing utilities.
2. The Contractor shall furnish, install and operate any piping, equipment and appurtenances necessary to provide the temporary services/facilities required during construction including, but not limited to, bypass pumping, flow barriers and diversions. Temporary facilities, if required, shall have pumping capacity equal to or greater than the existing maximum capacity of the piping as determined by their size and slope.
3. The Owner will operate and maintain all existing systems and equipment not modified or impacted by the project. The Contractor shall notify and coordinate with the Owner whenever Contractor's temporary facilities or construction will interface with existing utilities.

4. The Contractor shall be responsible for the operation and maintenance of all new and temporary facilities until such time as the new facilities are accepted by the Owner.
- B. Minimize Interference
  1. The Contractor shall at all times conduct operations so as to interfere as little as possible with existing works. The Contractor shall develop a program, in cooperation with the Engineer and interested officials, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted
  2. Work of connecting with, cutting into and reconstructing existing pipes or structures shall be planned to interfere with the operation of the existing facilities for the shortest possible time and when the demands on the facilities best permit such interference. It may be necessary to work outside of normal working hours to minimize interference. Before starting work which will interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand.

### 3.2 CONSTRUCTION SEQUENCE

- A. Construction of the proposed facilities will disrupt the existing structures and operations. To maintain continuous operations, the construction must be divided into phases or sequenced appropriately.
- B. The Contractor shall submit to the Engineer for review and acceptance a complete schedule of the proposed sequence of construction operations prior to commencing any work. This schedule shall include the Contractor's plans for doing the work.
- C. The Contractor shall submit to the Engineer a written request to deviate from the above sequence with adequate supporting information to demonstrate to the Engineer that the continuity and degree of treatment will not be adversely affected.
- D. The following projects must be constructed in the following order:
  1. All Test Pits
  2. Open cut stormwater system improvements
  3. Sewer and stormwater trenchless rehabilitation
  4. Open cut gravity sewer improvements
  5. Force main installation

### 3.3 SITE ACCESS LIMITATIONS

- A. Not Used

### 3.4 SCHEDULE LIMITATIONS AND WORK RESTRICTIONS/ REQUIREMENTS

- A. Maintain Services:
  1. Maintain all existing sewer, water, and storm drain services.
- B. Night Work:
  1. All work within the roadway on Loudon Road, including CIPPL lining, shall be completed as night work.
  2. All other work shall be completed during normal working hours unless approved by the Owner.

- C. Traffic Control Plan:
  - 1. A project-specific Traffic Control Plan shall be submitted prior to the Pre-Construction Meeting (refer to Section 01570). The Traffic Control Plan shall identify traffic management requirements for each distinct component of the project.
  - 2. Contractor shall provide one lane for the passage of traffic within any work zone unless approved by the Owner.
  - 3. Contractor shall maintain access to all residences and businesses at all times.
  - 4. Contractor shall maintain access for garbage collection and mail services to all residences and businesses at all times. Contractor shall coordinate with these service providers.
  - 5. Contractor shall maintain access for bus routes, schools, day care facilities, etc. at all times. Contractor shall coordinate efforts with local school district to ensure access.
- D. Soil and Groundwater Contamination:
  - 1. Refer to Specification 02080A.
- E. Pavement Maintenance and Winter Shutdown Period:
  - 1. The Contractor shall maintain pipe trenches with compacted gravel until pavement operations can be completed.
  - 2. No excavation in paved roadways shall be allowed between November 15<sup>th</sup> and April 1<sup>st</sup> without prior waiver request approval by the Owner.
  - 3. All streets shall be paved prior to any "winter shutdown period", which is defined as November 15<sup>th</sup> to April 1<sup>st</sup> or as otherwise approved by the Owner by waiver request. Any temporary pavement placed prior to winter shutdown shall be removed during the following construction season. The substantial completion time and the contract completion dates (or days) include the noted "winter shutdown period".

END OF SECTION

| <b>MANHOLE REHABILITATION SCHEDULE</b> |                 |                             |                                                                    |                             |
|----------------------------------------|-----------------|-----------------------------|--------------------------------------------------------------------|-----------------------------|
| <b>ID</b>                              | <b>Location</b> | <b>Type</b>                 | <b>Existing<br/>Approximate<br/>Depth - Rim to<br/>Invert (FT)</b> | <b>Line<br/>Manhole (1)</b> |
| <b>BID ALTERNATE 1</b>                 |                 |                             |                                                                    |                             |
| 2498                                   | Loudon Road     | Brick                       | 11.1                                                               | X                           |
| 2497                                   | Loudon Road     | Brick                       | 9.4                                                                | X                           |
| 2496                                   | Loudon Road     | Brick                       | 8.7                                                                | X                           |
| 2495                                   | Loudon Road     | Brick                       | 9.6                                                                | X                           |
| 2494                                   | Loudon Road     | Brick                       | 10.0                                                               | X                           |
| 2493                                   | Loudon Road     | Brick                       | 11.4                                                               | X                           |
| 2486                                   | Loudon Road     | Brick                       | 12.1                                                               | X                           |
| 2475                                   | Loudon Road     | Brick                       | 19.9                                                               | X                           |
| <b>BID ALTERNATE 2</b>                 |                 |                             |                                                                    |                             |
| 2464                                   | Loudon Road     | Brick                       | 23.8                                                               | X                           |
| 2453                                   | Loudon Road     | Brick                       | 12.3                                                               | X                           |
| 2438                                   | Loudon Road     | Brick                       | 13.2                                                               | X                           |
| 2427                                   | Loudon Road     | Brick                       | 13.5                                                               | X                           |
| 4178                                   | Loudon Road     | Brick Lamphole <sup>1</sup> | N/A                                                                | No Rehab                    |
| 2418                                   | Loudon Road     | Precast                     | 13.4                                                               | No Rehab                    |
| 4234                                   | Loudon Road     | Brick Lamphole <sup>1</sup> | N/A                                                                | No Rehab                    |
| 2408                                   | Loudon Road     | Unknown                     | 14.3                                                               | X                           |
| 4232                                   | Loudon Road     | Brick Lamphole <sup>1</sup> | N/A                                                                | No Rehab                    |
| 2397                                   | Loudon Road     | Unknown                     | 14.9                                                               | X                           |
| 2387                                   | Loudon Road     | Brick                       | 16.5                                                               | X                           |

Notes:

1. Lampholes will not receive structural liner. To be lined through without reinstatement.

| SEWER PIPE REHABILITATION SCHEDULE |               |             |                    |               |                     |                    |                         |
|------------------------------------|---------------|-------------|--------------------|---------------|---------------------|--------------------|-------------------------|
| Upstream MH                        | Downstream MH | Location    | Pipe Diameter (in) | Pipe Material | Length of Pipe (ft) | Average Depth (ft) | Structural Liner (CIPP) |
| BID ALTERNATE 1                    |               |             |                    |               |                     |                    |                         |
| 2498                               | 2499          | Loudon Road | 20                 | VCP           | 124.6               | 11.8               | X                       |
| 2497                               | 2498          | Loudon Road | 20                 | VCP           | 247.9               | 10.3               | X                       |
| 2496                               | 2497          | Loudon Road | 20                 | VCP           | 299.1               | 9.1                | X                       |
| 2495                               | 2496          | Loudon Road | 20                 | VCP           | 249.2               | 9.2                | X                       |
| 2494                               | 2495          | Loudon Road | 20                 | VCP           | 97.9                | 9.8                | X                       |
| 2493                               | 2494          | Loudon Road | 20                 | VCP           | 299.5               | 10.7               | X                       |
| 2486                               | 2493          | Loudon Road | 20                 | VCP           | 349.8               | 11.8               | X                       |
| 2475                               | 2486          | Loudon Road | 20                 | VCP           | 323.5               | 16.0               | X                       |
| BID ALTERNATE 2                    |               |             |                    |               |                     |                    |                         |
| 2464                               | 2475          | Loudon Road | 24                 | VCP           | 172.0               | 21.9               | X                       |
| 2453                               | 2464          | Loudon Road | 24                 | VCP           | 148.8               | 18.1               | X                       |
| 2438                               | 2453          | Loudon Road | 24                 | VCP           | 151.7               | 12.8               | No Rehab <sup>1</sup>   |
| 2427                               | 2438          | Loudon Road | 24                 | VCP           | 270.4               | 13.4               | No Rehab <sup>1</sup>   |
| 4178                               | 2427          | Loudon Road | 24                 | VCP           | 134.7               | 13.5               | No Rehab <sup>1</sup>   |
| 2418                               | 4178          | Loudon Road | 24                 | VCP           | 135.9               | 13.5               | No Rehab <sup>1</sup>   |
| 2408                               | 2418          | Loudon Road | 24                 | VCP           | 283.2               | 13.8               | X <sup>2</sup>          |
| 2397                               | 2408          | Loudon Road | 24                 | VCP           | 285.9               | 14.7               | X <sup>2</sup>          |
| 2387                               | 2397          | Loudon Road | 24                 | VCP           | 224.7               | 15.7               | X                       |

Notes:

1. Segments identified as No Rehab have existing structural liner. No additional lining work required.
2. Line through lamphole without reinstatement.



| STORMWATER PIPE REHABILITATION SCHEDULE |               |               |                    |               |                     |                    |                         |
|-----------------------------------------|---------------|---------------|--------------------|---------------|---------------------|--------------------|-------------------------|
| Upstream MH                             | Downstream MH | Location      | Pipe Diameter (in) | Pipe Material | Length of Pipe (ft) | Average Depth (ft) | Structural Liner (CIPP) |
| BASE BID                                |               |               |                    |               |                     |                    |                         |
| DMH-8161                                | DMH-8427A     | Pembroke Road | 18                 | VCP           | 297                 | 11.7               | X                       |
| DMH-7886A                               | DMH-8161      | Pembroke Road | 18                 | VCP           | 269                 | 11.2               | X                       |
| DMH-7886                                | DMH-7886A     | Pembroke Road | 18                 | VCP           | 31                  | 10.9               | X                       |
| DMH-7703                                | DMH-7886      | Pembroke Road | 15                 | VCP           | 285                 | 10.0               | X                       |
| DMH-7543                                | DMH-7703      | Pembroke Road | 15                 | VCP           | 258                 | 10.1               | X                       |
| DMH-7543A                               | DMH-7543      | Pembroke Road | 15                 | VCP           | 22                  | 10.3               | X                       |
| DMH-7208                                | DMH-7384      | Pembroke Road | 12                 | VCP           | 282                 | 6.5                | X                       |
| DMH-6981                                | DMH-7208      | Pembroke Road | 12                 | VCP           | 294                 | 6.6                | X                       |

SECTION 01045CUTTING, CORING AND PATCHINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included - This section establishes general requirements pertaining to cutting, excavating, coring, fitting, and patching of the Work required to:
1. Make alterations to existing structures.
  2. Make the parts fit properly.
  3. Replace work not conforming to requirements of the Contract Documents.
  4. Contractor is responsible for all cutting, coring, and rough and finish patching. Contractor shall coordinate the work of any and all subcontracting trades performing the work.
  5. Contractor is responsible for reviewing with the Owner and Engineer and receiving permission to proceed prior to cutting and coring and patching.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Perform all cutting, coring, and patching in strict accordance with pertinent requirements of these Specifications, and in the event no such requirements are determined, in conformance with the Engineer's written direction.

1.4 SUBMITTALS

- A. In accordance with the requirements specified in Section 01340. Provide the following information at least 30 days prior to cutting or coring:
1. Identification and qualifications of cutting/coring subcontractor(s) including: company name, business address contact information, or if by Contractor, indicated as such.
  2. Key plan and schedule of cuts/cores indicating the: location of the cut/core, size (i.e., wall, floor, roof, etc.), equipment to be used and identification of any potential obstructions or embedded conduits and wiring.
- B. Request for the Engineer's consent to proceed:
1. Prior to cutting which affects structural safety, submit written request to the Engineer for permission to proceed with cutting.
  2. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, Contractor shall notify the Engineer and secure written permission prior to proceeding.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Materials for replacement of work shall be equal to those of adjacent construction and shall comply with the pertinent sections of these Specifications.
- B. Concrete and grout for rough patching shall be as specified in Divisions.

## PART 3 - EXECUTION

### 3.1 CONDITIONS

- A. Inspection:
  - 1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, coring, backfilling, and patching.
  - 2. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies:
  - 1. If uncovered conditions are not as anticipated, immediately notify the Engineer and secure needed directions.
  - 2. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

### 3.2 PREPARATION PRIOR TO CUTTING AND CORING

- A. Provide all required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the work.
- B. All cutting and coring shall be performed in such a manner as to limit the extent of patching.
  - 1. All holes cut through concrete and masonry walls or slabs shall be core drilled unless otherwise approved. No structural members shall be cut without approval of the Engineer and all such cutting shall be done in a manner directed by Engineer. No holes may be drilled in beams or other structural members without obtaining prior approval. All work shall be performed by mechanics skilled in this type of work.

### 3.3 CORING

- A. Coring shall be performed with an approved non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeves, equipment or mechanical seals to be installed.
- B. All equipment shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.
- C. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.
- D. Slurry or tailings resulting from coring operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.

- E. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from coring operation.

3.4 PERFORMANCE

- A. Perform all required excavating and backfilling as required under pertinent sections of these specifications. Perform cutting, coring, and demolition by methods which will prevent damage to other portions of the work and will provide proper surfaces to receive installation of repair and/or new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.
- B. Coring or cutting which exposes cut surfaces of reinforcing steel or structural steel shall be coated. Coating shall be 10 mil (dry film thickness) applied in two 5 mil (dry film thickness) coats of a single component moisture cured coal tar urethane or two part coal tar epoxy corrosion barrier. Alternately the exposed steel can be cut back two inches from the surface and a non-shrink grout applied over the steel flush to the concrete core or cut surface.
- C. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown.
- D. Finish patching shall match existing surfaces as approved.

END OF SECTION

SECTION 01050COORDINATIONPART 1 - GENERAL1.1 DESCRIPTION

- A. Contractor is required to work in close proximity to Owner's existing facilities. The Contractor, under this Contract, will be responsible for coordinating construction activities with Owner to ensure that services, facilities, and safe working conditions are maintained.
- B. Other Construction Contractors will be interfacing with this Contract and working within the work area and in the vicinity of this Contract. The Contractor, under this contract, shall act as Construction Coordinator and shall coordinate construction activities with other Contractors working for Owner.
- C. Any damage to existing structures, equipment and property, accepted equipment or structures, and property or work in progress by others; as a result of the Contractor's or their subcontractor's operations shall be made good by the Contractor at no additional cost to the Owner.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 COORDINATION WITH OTHERS

- A. City of Concord:
  - 1. Contractor shall coordinate access, egress, detours and traffic control, if required, at each site with the Concord Police Department. The Contractor shall notify Concord Police, Fire Department and Rescue Squad at least 24 hours in advance of any street closings or detours.
  - 2. The Contractor shall be responsible for coordinating and maintaining public services to all public and private properties.
  - 3. Unauthorized use of hydrants is prohibited. Should the Contractor want City water, the City will furnish a temporary meter, backflow preventer, and approved hydrant for use. A deposit is required and the Contractor will be charged for the water used. Only qualified City of Concord personnel are authorized to manipulate hydrants.
- B. Concord General Services (Public Works)
  - 1. Contractor shall be responsible for coordinating all work in the vicinity of water lines with the City. Contractor shall bear all costs for the City's inspection requirements, temporary facilities, water main adjustments and other requirements.
- C. Onyx – (Developer)
  - 1. Contractor may choose to coordinate access beyond the City's existing sewer easements near the Steeplegate Mall site with the developer.

- D. Liberty Utilities (Gas)
  - 1. Contractor shall be responsible for coordinating with Liberty Utilities for underground gas utilities encountered during construction.
- E. Consolidated Communications (Telecommunication)
  - 1. Contractor shall be responsible for coordinating with Consolidated Communications for underground telecommunication utilities encountered during construction.
- F. Unitil (Electric)
  - 1. Contractor shall be responsible for coordinating with Unitil for electrical utilities encountered during construction.
- G. Verizon:
  - 1. The Contractor shall be responsible for coordinating and providing telephone service to all construction sites, both temporary and permanent. The Contractor shall also be responsible for coordinating all work around Verizon facilities with Verizon and shall bear all costs of inspection requirements, temporary facilities relocation and all other requirements.
- H. Private Utilities:
  - 1. The Contractor shall be responsible for coordinating with all private utilities as needed to complete construction.
- I. The Contractor shall provide the Resident Project Representative and Owner a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the Owner one week notice before the start of any work. The Contractor shall daily communicate with the Resident Project Representative and Owner concerning updating the schedule, job progress, delay or early starts.
- J. Weekly coordination meetings shall be held between the Contractor, Owner, and the Resident Project Representative. This meeting shall cover the following:
  - 1. Work to be completed the following week
  - 2. Project Schedule
  - 3. Shop Drawing and O&M issues
  - 4. Outstanding RFIs and Clarifications
  - 5. Change Orders and Field Orders
  - 6. Review of Record Drawing Information
  - 7. Discussion/Resolution of any old issues
  - 8. New issues discussion
  - 9. Contractor's Safety and Health Plan Updates
- K. The Contractor shall be responsible for explicitly notifying all equipment suppliers, electrical subcontractor, and the instrumentation supplier that they are required to coordinate their work with the instrumentation supplier by providing operating sequences, input/out specifications with wiring diagrams for all equipment, and that they shall review and comment on each other's shop drawings to ensure that all interfaces are compatible.
- L. Snow Removal Coordination: The Contractor shall be responsible for all snow removal activities in construction and laydown areas onsite. Owner's operations staff will be responsible for snow removal on the main access road around the facility.

Contractor is to coordinate closely with Owner's operations staff to maintain access to all areas of the facility to facilitate normal operations.

1.4 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall have use of the premises within the limits shown on the Drawings and as defined in the General Conditions for the performance of the Work.
- B. Contractor shall coordinate delivery schedules, site access, and other construction-related activities with any other contractors that may be hired by the Owner during the course of construction.
- C. Contractor shall assume full responsibility for security of all of their, and their subcontractors, materials and equipment stored on the site.
- D. If directed by the Owner, Contractor shall move any stored items which interfere with operations of Owner.
- E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

END OF SECTION

## SECTION 01070

### ABBREVIATIONS & SYMBOLS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

A. Where any of the following abbreviations are used in these Specifications, they shall have the meaning set forth opposite each.

|            |                                                                                                      |
|------------|------------------------------------------------------------------------------------------------------|
| AASHTO     | American Association of State Highway & Transportation Officials                                     |
| AC         | Alternating Current                                                                                  |
| ACI        | American Concrete Institute                                                                          |
| ACP        | Asbestos Cement Pipe                                                                                 |
| AGA        | American Gas Association                                                                             |
| AIC        | Ampere Interrupting Capacity                                                                         |
| AGMA       | American Gear Manufacturers Association                                                              |
| AIEE(IEEE) | American Institute of Electrical Engineers (Institute of Electrical and Electronics Engineers, Inc.) |
| AISC       | American Institute of Steel Construction                                                             |
| AMP        | Ampere 125-16                                                                                        |
| Amer. Std. | American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 125 (ASA B16 11960)         |
| ANSI       | American National Standards Institute                                                                |
| API        | American Petroleum Institute                                                                         |
| ASA        | American Standards Association                                                                       |
| ASCE       | American Society of Civil Engineers                                                                  |
| ASHRAE     | American Society of Heating, Refrigerating and Air Conditioning Engineers                            |
| ASME       | American Society of Mechanical Engineers                                                             |
| ASTM       | American Society for Testing and Materials                                                           |
| AWG        | American or Brown and Sharpe Wire Gage                                                               |
| AWWA       | American Water Works Association                                                                     |
| CCTV       | Closed Circuit Television                                                                            |
| CF         | Cubic Foot                                                                                           |
| CFM        | Cubic Foot Per Minute                                                                                |
| CFS        | Cubic Foot Per Second                                                                                |
| CI         | Cast Iron                                                                                            |
| CIPP       | Cured-in-Place Pipe                                                                                  |
| CIPRA      | Cast Iron Pipe Research Association                                                                  |
| CSI        | Construction Specifications Institute                                                                |
| CY         | Cubic Yard                                                                                           |
| DC         | Direct Current                                                                                       |
| DEP        | Department of Environmental Protection                                                               |
| DI (DIP)   | Ductile Iron (Pipe)                                                                                  |
| DOT        | Department of Transportation                                                                         |
| EDR        | Equivalent Directional Radiation                                                                     |



|            |                                                                                                                        |
|------------|------------------------------------------------------------------------------------------------------------------------|
| EPA        | U.S. Environmental Protection Agency                                                                                   |
| FPS        | Feet Per Second                                                                                                        |
| FT         | Feet                                                                                                                   |
| GAL        | Gallons                                                                                                                |
| GPD        | Gallons Per Day                                                                                                        |
| GPM        | Gallons Per Minute                                                                                                     |
| HP         | Horsepower                                                                                                             |
| IBR        | Institute of Boiler and Radiator Manufacturers                                                                         |
| IN         | Inches                                                                                                                 |
| ISA        | Instrument Society of America                                                                                          |
| KVA        | Kilovolt-ampere                                                                                                        |
| KW         | Kilowatt                                                                                                               |
| LB         | Pound                                                                                                                  |
| MACP       | Manhole Assessment and Certification Program                                                                           |
| MAX        | Maximum                                                                                                                |
| MGD        | Million Gallons Per Day                                                                                                |
| MIN        | Minimum                                                                                                                |
| NACE       | National Association of Corrosion Engineers                                                                            |
| NASSCO     | National Association of Sewer Service Companies                                                                        |
| NBS        | National Bureau of Standards                                                                                           |
| NEC        | National Electrical Code, Latest Edition                                                                               |
| NEMA       | National Electrical Manufacturers Association                                                                          |
| NEWWA      | New England Water Works Association                                                                                    |
| NPT        | National Pipe Thread                                                                                                   |
| OS&Y       | Outside Screw and Yoke                                                                                                 |
| PCA        | Portland Cement Association                                                                                            |
| PPM        | Parts Per Million                                                                                                      |
| PSI        | Pounds Per Square Inch                                                                                                 |
| PSIG       | Pounds Per Square Inch Gage                                                                                            |
| PVC        | Polyvinyl Chloride                                                                                                     |
| RPM        | Revolutions Per Minute                                                                                                 |
| RUS        | Rural Utility Service                                                                                                  |
| SF         | Square Foot                                                                                                            |
| STL. W.G.  | U.S. Steel Wire, Washburn and Moen, American Steel and Wire<br>Cos., or Roebling Gage                                  |
| SY         | Square yard                                                                                                            |
| TDH        | Total Dynamic Head                                                                                                     |
| USAS       | Standards of the United States of America Standards Institute<br>(formerly American Standards Association)             |
| USS GAGE   | United States Standard Gage                                                                                            |
| VC         | Vitrified Clay                                                                                                         |
| WSP        | Working Steam Pressure                                                                                                 |
| Fed. Spec. | Federal Specifications issued by the Federal Supply Service of the<br>General Service Administration, Washington, D.C. |

END OF SECTION

SECTION 01150BMEASUREMENT AND PAYMENTPART 1 - GENERAL1.1 DESCRIPTION

- A. For lump sum items, payment shall be made to the Contractor in accordance with an accepted progress schedule and schedule of values on the basis of actual work completed.
- B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amount of materials in place, as shown by final measurements.
  - 1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
  - 2. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Resident Project Representative and determine the quantities of unit price work accomplished and/or completed during the workday.
  - 3. The Resident Project Representative will then prepare two "Daily Progress Reports" which shall be signed by both the Resident Project Representative and Contractor's Representative.
  - 4. Once each month the Resident Project Representative will prepare two "Monthly Progress Summation" forms from the month's accumulation of "Daily Progress Reports" which shall also be signed by both the Resident Project Representative and Contractor's Representative.
  - 5. These completed forms will provide the basis of the Engineer's monthly quantity estimate upon which payment will be made. Items not appearing on both the Daily Progress Reports and Monthly Progress Summation will not be included for payment. Items appearing on forms not properly signed by the Contractor will not be included for payment.
  - 6. After the work is completed and before final payment is made, the Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SCOPE OF PAYMENT

- A. Payments to the Contractor will be made for the actual quantities of the Contract items performed and accepted in accordance with the Contract Documents. Upon completion of construction, if these actual quantities show either an increase or decrease from the quantities given in the Proposal Form, the Contract Unit Prices will still prevail.

- B. The Contractor shall accept in compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer, and for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the Work as herein authorized.
- C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.4 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

- A. When alterations in the quantities of work not requiring supplemental agreements, as hereinbefore provided for, are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.5 OMITTED ITEMS

- A. Should any items contained in the bid form be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.6 PARTIAL PAYMENTS

- A. Partial payments shall be made monthly as the work progresses. Partial payments shall be made subject to the provisions of the Supplemental and General Conditions.

1.7 PAYMENT FOR MATERIAL DELIVERED

- A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used and have been delivered to the construction site, or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the General and Supplemental Conditions.
- B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of the Contract.

1.8 FINAL PAYMENT

- A. After final measurements are made by the Engineer, the Contractor will prepare a final quantity invoice of the amount of the Work performed and the value of such Work. Owner shall make final payments of the sum found due less retainages subject to provisions of the General and Supplemental Conditions.

1.9 INCIDENTAL WORK

- A. Incidental work items for which separate payment will not be made includes but is not limited to, the following items:
1. Pre-Construction photographs or videos.
  2. Project Record Documents
  3. Signs
  4. Clean-up and restoration of property.
  5. Restoration of fences and other structures.
  6. Cooperation and coordination with other Contractors and utility companies including related inspection costs, and other costs (Refer to Section 01050).
  7. Temporary support of utility poles as required for construction.
  8. Utility crossings and relocations, unless otherwise paid for.
  9. Temporary utility services to buildings, as required to maintain service during construction.
  10. Minor Items--such as relocation/resetting of sign posts, guard rails, rock wall, mail boxes, curbs, traffic loop detectors, pavement markings, etc., damaged as a result of construction activities.
  11. Removal and relocation of sign posts as shown on the plans.
  12. Trench boxes, steel and/or wood sheeting as required, including that left in place.
  13. Maintenance of all existing sewer flows and repair of existing sewer pipes.
  14. Temporary Construction Dewatering as necessary.
  15. Dust control.
  16. Quality assurance testing.
  17. Final cleaning of sewers, force mains, and storm drains.
  18. Clearing, grubbing and stripping.
  19. Removal of trees less than or equal to 6 inches in diameter at chest height.
  20. Protection of vegetation, shrubs, trees, and plantings
  21. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents.
  22. Repair and replacement of water services damaged by construction activities complete from main to service shutoff or service shutoff to house as applicable, and corresponding proper disposal of removed materials unless otherwise paid for.
  23. Repair and replacement of utility services, culverts, underdrains, rock lined drainage trenches in streets and other utilities damaged by construction activities, and corresponding proper disposal of removed materials unless otherwise paid for.
  24. Removal and disposal of out-of-service existing pipes as shown on the Drawings and as conflicting with proposed pipes and structures.
  25. Removal and disposal of out-of-service existing structures as shown on the Drawings and as conflicting with proposed pipes and structures.
  26. Temporary construction necessary for construction sequencing, and other facilities not permanently incorporated into the work.
  27. Weather protection.

28. Pipe Trench Insulation
29. Permits not otherwise paid for or provided by the Owner.
30. Visits to the project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required.
31. All excavation except the test pits specifically shown or ordered by the Engineer and rock excavation.
32. Contract administration.
33. Test pits to establish in place field soils density, groundwater conditions, or requirements for dewatering.
34. Pipe markings.
35. Temporary Field Office.
36. Earthwork (Except Ledge).
37. Test Pits for the Contractor's Benefit.
38. Disinfection cleaning and testing of installed water mains and blow offs where show on plans.
39. Temporary resetting or replacement of existing street and traffic signs and temporary traffic signals where necessary.
40. Disconnecting and reconnecting traffic signal power to accommodate the work.
41. Raising and lowering of existing frames and covers of buried utilities to grade.
42. Horizontal and vertical adjustment of existing frames, covers and grates to match final grades and curb faces.
43. Installation of all manhole internal drops as required by NHDES.
44. Removing and replacing existing SMH inverts to accommodate new and replacement pipes.
45. Removing and resetting of existing steps, guard rails, fences, walls and non-paved brick or paver walkways disturbed during construction, other than those identified on the Drawings to be replaced.
46. Protection of existing block and stone retaining walls unless otherwise identified to be removed, relocated or modified in the Drawings.
47. Cross-over channels and underdrains for sewer, storm drain and water excavation pits, and check dams for all excavated channels.
48. Installing temporary pavement markings on binder course that will not be surfaced within 14 days of installation.
49. Installing pavement markings to match existing roadway striping.
50. Installing raised pavement markers and temporary symbols on the binder course within 48 hours of installing any section of the binder course and maintaining these throughout the project duration.
51. Locating and verifying the locations of water and sewer services within the limits of work. Capping or plugging existing underground utilities as shown on the plans, and Dye testing as required to determine bulkheading and reconnection requirements.
52. Modifying, to include coring, patching and parging of existing sewer and drainage structures to accommodate new pipes as shown on plans.
53. Removal and subsequent delivery of replaced or obsolete frames, covers, grates, hydrants, curbstones, and signs to a location within the City limits designated by the Owner.

54. Removal of temporary or permanent pavement markings, prior to paving. This includes removing markings that are applied on the winter binder layer, prior to installation of the wearing course.
55. Clay (impervious material) trench dams.
56. Relocation, replacement and extension of all underground telephone, power, cable, data, gas, and all other private utility services from within the Rights of Way to the dwellings, structures or meters.
57. Completion of the Storm Water Pollution Prevention Plan as well as required inspections, monitoring, and reporting.
58. Post Completion CCTV and report of Entire Sanitary Sewer System installed under this Contract.
59. Provide temporary pavement marking paint on the streets on the binder course within two weeks of pavement installation if the wearing course will not be installed until after a winter season.
60. Provide permanent pavement marking paint on the streets .

1.10 DESCRIPTION OF PAY ITEMS

- A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
- B. Each unit or lump-sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

SEWER ITEMS

(1.01) – 10-Inch Force Main

- A. Method of Measurement: Force main pipe measured for payment shall be the number of linear feet installed measured along the center line of the pipe as laid including fittings.
- B. Basis of Payment: The contract unit price per linear foot for force main pipe shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation), dewatering, bedding, furnishing and installing pipe and fittings, making connections to new and existing manholes, installation of impervious material dams, backfill including aggregate base and subbase material, compaction, cleaning, testing, maintaining existing flows during construction of new facilities, and all else incidental thereto for which payment is not provided under other items. Payment for this work on interim requisitions shall be according to the following percentages:
  1. Force main acceptably set in place and backfilled - 90 percent.
  2. Force main successfully tested - 10 percent.

(1.02) – Combination Air/Vacuum Release Structure

- A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of Combination Air/Vacuum Release Structures installed.

- B. Basis of Payment: The contract price per each shall constitute full compensation for furnishing all labor, materials, tools, and equipment necessary for constructing the air release manholes complete, operational and satisfactorily tested, including but not limited to; sawcut, management, removal and disposal of pavement; site preparation, dewatering, excavation and backfill (except rock excavation); bedding; furnishing and installing the precast structure, frame, cover, piping and combination air/vacuum release valve within the manhole, couplings, appurtenances, fittings, pipe supports; cleaning; testing; and all else incidental thereto for which payment is not provided under other items.

(1.03) - Force Main Drain Structure

- A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of Force Main Drain Structures installed.
- B. Basis of Payment: Said per each price shall constitute full compensation for furnishing all labor, materials, tools, and equipment necessary for constructing the force main drain manholes complete, operational and satisfactorily tested, including but not limited to; sawcut, management, removal and disposal of pavement; site preparation; dewatering; excavation and backfill (except rock excavation); bedding; furnishing and installing the precast structure, frame, cover, piping and valves within the manhole; couplings; fittings; pipe supports; cleaning; testing; and all else incidental thereto for which payment is not provided under other items.

(1.04), (1.05), (1.06), (1.07) and (1.08) – 24-Inch, 18-Inch, 12-Inch, 10-Inch, and 8-Inch Gravity Sewer

- A. Method of Measurement: The quantity to be paid for under this item shall be the number of linear feet installed measured along the center line of the pipe as laid including fittings. Pipes shall be measured between centers of the manholes minus half the inside diameter of each manhole. Pipe installed into the manhole will not be measured for payment.
- B. Basis of Payment: The contract unit price per linear foot for sewer pipe shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation); removal and disposal of existing sewer pipe, structures, and appurtenances; dewatering; bedding; furnishing and installing pipe and fittings, making connections to new and existing manholes and pipe; installation of impervious material dams; backfill including aggregate base and subbase material; compaction; testing and cleaning; light cleaning prior to each CCTV inspection; post-CCTV inspection of the sewer; providing video files, database, and written logs on external hard drives; maintaining existing flows during construction of new facilities; and all else incidental thereto for which payment is not provided under other items.
- C. Payment for this work on interim requisitions shall be according to the following percentages:
  - 1. Sewer pipe acceptably set in place and backfilled - 90 percent.
  - 2. Sewer pipe successfully tested - 10 percent.

(1.09) - Sanitary Service Connections

- A. Method of Measurement: This item shall consist of installing house sanitary service leads from sanitary sewer mains to the service cleanout as shown on the Drawings and/or as determined in the field. Measurement shall be from the top of the tee or wye in the main to the clean out measured along the centerline of the pipe.
- B. Basis of Payment: The contract unit price per linear foot shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation); removal and disposal of existing sewer pipe, structures, and appurtenances; dewatering; bedding; furnishing and installing pipe, fittings, cleanouts, witness posts, and adequately capping service connection and marking location as specified and shown on the Drawings or connection to existing service; raising to final grade, connection to existing service; backfilling including aggregate base and subbase material; compaction; cleaning; testing; maintaining existing flows during construction of new facilities; and all else incidental thereto for which payment is not provided under other items.
- C. Payment for this work on interim requisitions shall be according to the following percentages:
  - 1. Service pipe acceptably set in place and backfilled - 90 percent.
  - 2. Service pipe successfully cleaned and tested - 10 percent.

(1.10) – 5-ft Dia. Sewer Manhole

- A. Method of Measurement: Sewer manholes accepted for payment shall be the actual vertical feet of structures installed and accepted complete in place, from the lowest invert to finish grade as indicated in the Contract Documents, or as directed by the Engineer.
- B. Basis of Payment: The contract unit price per vertical foot shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (except ledge excavation); removal and disposal of existing manhole, frame and cover; bedding; furnishing and installing precast concrete sections, frames, and covers; masonry materials; waterproofing; constructing inverts; new pipe connections; connections to existing sewer pipes; frame and cover adjustments to grade including masonry between frame and manhole; backfilling including aggregate base and subbase material; compaction; cleaning; testing; maintaining existing flows/temporary bypass pumping; and all else incidental thereto for which payment is not provided under other items.
- C. Inverts shall be constructed after the manhole is installed and approved.
- D. Payment for this item shall be as follows:
  - 1. Manhole acceptably set in place and backfilled - 90 percent.
  - 2. Manhole successfully cleaned and tested - 10 percent.

(1.11) – Abandonment of Existing Sewer Pipe & Structures

- A. Method of Measurement: Abandonment of sewer pipe and structures shall be paid for at the Lump Sum unit price as stated in the Bid Schedule.



- B. Basis of Payment: Payment for abandonment of existing sewer pipe and structures shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including excavation; removal and disposal of the top five feet of each structure; furnishing and installing all flowable fill; and all else incidental thereto for which payment is not provided under other items.

(1.12) - Asbestos Cement Pipe Removal and Disposal

- A. Method of Measurement: Removal and Disposal of Asbestos Cement Pipe accepted for payment shall be the actual number of linear feet of Asbestos Cement Pipe (all diameters) removed and disposed of in accordance with local, State and Federal Regulations.
- B. Basis of Payment: The Contract unit price per linear foot for Removal and Disposal of Asbestos Cement Pipe shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including excavation; handling and removing of pipe; bagging of pipe and miscellaneous friable pieces of pipe and contaminated trench materials; transporting to a licensed disposal site; disposal fees; reporting and coordination with regulatory agencies and Owner; and all else incidental thereto for which payment is not provided under other items.

STORMWATER ITEMS

(2.01) – Abandonment and Fill of Existing Stormwater Pipe

- A. Method of Measurement: Abandonment of pipe accepted for payment shall be paid for at the Lump Sum unit price as stated in the Bid Schedule.
- B. Basis of Payment: Payment for abandonment of existing stormwater pipe shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including excavation and all else incidental thereto for which payment is not provided under other items.

(2.02) – 4-ft Dia. Catch Basin

- A. Method of Measurement: Catch basins accepted for payment shall be the actual vertical feet of structures installed and accepted complete in place, from the lowest invert to finish grade as indicated in the Contract Documents, or as directed by the Engineer.
- B. Basis of Payment: The contract unit price per vertical foot shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (except ledge excavation); removal and disposal of existing basin, debris, frame and grate, pipe and appurtenances; bedding; furnishing and installing precast concrete sections and catch basin sump; new pipe connections; connections to existing pipe; trash hood, frames, and grates; masonry materials; waterproofing; frame and cover adjustments to grade including masonry between frame and manhole; backfilling including aggregate base and subbase material ; compaction; cleaning; testing; and all else incidental thereto for which payment is not provided under other items.

(2.03), (2.04), (2.05), (2.06), (2.07), and (2.08) – 8-Ft Dia. Infiltration Basins

- A. Method of Measurement: Infiltration basins accepted for payment shall be per each structure installed and accepted complete in place, based on the individual design as indicated in the Contract Documents, or as directed by the Engineer.
- B. Basis of Payment: The contract unit price per each shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including sawcut; management; removal and disposal of pavement; excavation (except ledge excavation); removal and disposal of existing pipe, structures, debris and appurtenances; bedding; furnishing and installing precast concrete sections, pipe connections, frames, and covers; masonry materials; frame and cover adjustments to grade including masonry between frame and manhole; backfilling including stone encasement and filter fabric; aggregate base and subbase material; compaction; cleaning; testing; and all else incidental thereto for which payment is not provided under other items.

(2.09) – 4-ft Dia. Drain Manhole

- A. Method of Measurement: Drain manholes accepted for payment shall be the actual vertical feet of structures installed and accepted complete in place, from the lowest invert to finish grade as indicated in the Contract Documents, or as directed by the Engineer.
- B. Basis of Payment: The contract unit price per vertical foot shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (except ledge excavation); removal and disposal of existing pipe, structures, debris and appurtenances; bedding; furnishing and installing precast concrete sections, new pipe connections, 4-foot PVC connections to existing pipe where drain manholes are being installed on existing mains, frames, and covers; masonry materials; backfilling including stone encasement, aggregate base and subbase material; frame and cover adjustments to grade including masonry between frame and manhole; compaction; cleaning; testing; and all else incidental thereto for which payment is not provided under other items.

(2.10) – Pre-Lining Stormwater CCTV Inspection

- A. Method of Measurement: CCTV inspection of pipes measured for payment shall be the number of linear feet inspected along the center line of the pipe including fittings as indicated in the Contract Documents or as pre-approved by the Engineer. Pipes shall be measured between centers of the manholes minus half the inside diameter of each manhole.
- B. Basis of Payment: The contract unit price per linear foot CCTV inspected shall be full compensation for all labor, materials, and equipment necessary to complete this work including locating the manhole; light cleaning prior to the CCTV inspection; environmental controls to safely handle, transport and dispose of waste material and wash water removed during pipe cleaning in accordance with all federal, state, and local regulations; CCTV inspecting of pipe; providing video files and photographs, database, and written logs of CCTV inspection on external solid state hard drive; maintaining existing flows/temporary bypass pumping, all else incidental thereto for

which payment is not provided under other items.

1. The City will accept disposal of sewer main and storm drain material at the Hall Street Wastewater Treatment Facility at no cost. Contractors may obtain a license with the City for disposal. Catch basin cleanings are not permitted at this location.

(2.11) – Stormwater Pipe Heavy Cleaning

- A. Method of Measurement: Heavy cleaning of pipe measured for payment shall be the number of linear feet heavy cleaned measured along the center line of the pipe including fittings as indicated in Contract Documents or as pre-approved by Engineer. Pipes shall be measured between centers of the manholes minus half the inside diameter of each manhole.
- B. Basis of Payment: The contract unit price per linear foot for sewer pipe heavy cleaned shall be full compensation for all labor, materials, and equipment necessary to complete this work including heaving cleaning of sewer; maintaining existing flows/temporary bypass pumping; environmental controls to safely handle, transport and dispose of waste material and wash water removed during pipe cleaning in accordance with all federal, state, and local regulations; all else incidental thereto for which payment is not provided under other items. Work under this bid item shall meet the definition established by NASSCO for heavy cleaning to qualify for payment.
  1. The City will accept disposal of sewer main and storm drain material at the Hall Street Wastewater Treatment Facility at no cost. Contractors may obtain a license with the City for disposal. Catch basin cleanings are not permitted at this location.

(2.12) – Not Used

(2.13), (2.14), and (2.15) – 12-Inch, 15-Inch, and 18-Inch Stormwater Pipe Lining

- A. Method of Measurement: Cured-in-place-pipe (CIPP/lining) of stormwater pipe accepted for payment shall be the actual distance in linear feet measured along the pipe lined and accepted as complete as indicated in the Contract Documents or as directed by the Engineer. Pipes shall be measured between centers of the drain manholes or catch basin structures minus half the inside diameter of each structure. Pipe CIPP/lined into the structure will not be measured for payment.
- B. Basis of Payment: CIPP/lining shall be paid for at the Contract unit price per linear foot stated in the Bid Schedule. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary to complete the work including delivering written notices to abutters prior to CIPP/lining work; light cleaning sewer prior to CIPP/lining; pre-CCTV and post CCTV inspection of the stormwater system; providing video files, database, and written logs on external solid-state hard drives; furnishing, installing, and curing CIPP/liner; sealing around CIPP/liner in drainage structures; testing; modifying and rebuilding invert in structure to complete the work; maintaining existing flows/temporary bypass pumping; all else incidental thereto for which payment is not provided under other items.
- C. Payment for this item shall be as follows:
  1. Stormwater pipe acceptably CIPP/lined – 90 percent.

2. Stormwater pipe successfully tested and post-CCTV inspected – 10 percent

(2.16), (2.17), and (2.18) – 12-Inch, 15-Inch, and 18-Inch Stormwater Pipe

- A. Method of Measurement: Stormwater pipe measured for payment under these items shall be the number of linear feet installed measured along the center line of the pipe as laid, regardless of materials of construction. Pipes shall be measured between centers of manholes or structures minus half the inside diameter of each structure. Pipe installed into the structure will not be measured for payment.
- B. Basis of Payment: The contract unit price per linear foot for stormwater pipe installed shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (excluding ledge); removal and disposal of existing pipes, structures, and appurtenances; dewatering; bedding; furnishing and installing pipe and fittings; backfill including aggregate base and subbase material; compaction; cleaning pipes and sumps; connection to existing piping and structures as required; reconstruction of structure invert masonry for pipe connections to existing structures; and all else incidental thereto for which payment is not provided under other items.

SIDEWALK & PAVING ITEMS

(3.01) and (7.01) – Curb (Granite – Remove and Reset)

- A. Method of Measurement: Removal and resetting of existing granite curbs, measured for payment shall be the actual linear footage of granite curbs as measured lengthwise along the front face of each section of curb that are removed and reset.
- B. Basis of Payment: The Contract unit price per linear foot for removal and resetting of existing granite curbs shall constitute full compensation for all labor, equipment and materials necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (excluding ledge); removing, storing and reinstalling granite curbs; subgrade preparation; placement of concrete fill and bedding; backfill; grouting; and all else incidental thereto for which payment is not provided under other items. %

(3.02) and (7.02) – Curb (Granite – New)

- A. Method of Measurement: The quantity of new granite curb measured for payment shall be the actual linear footage of granite curbs as measured lengthwise along the front face of each section of curb that is installed.
- B. Basis of Payment: The Contract unit price per linear foot for new granite curb shall constitute full compensation for all labor, equipment and materials necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (excluding ledge); subgrade preparation; placement of concrete fill and bedding; backfill; grouting; and all else incidental thereto for which payment is not provided under other items.

(3.03) and (7.03) – Sidewalk Aggregate Subbase and Base, and Hard Pack Gravel Driveways

- A. Method of Measurement: Placement of aggregate measured for payment shall be the number of cubic yards of aggregate placed for driveways and sidewalks measured and calculated within the limits indicated on the plans, complete and in place.

- B. Basis for Payment: The contract unit price per cubic yard for placement of aggregate sub base, base and hard pack gravel driveways shall constitute full compensation for all materials, labor and equipment necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (excluding ledge); transportation of existing base material to approved stockpiling sites, furnishing and transporting aggregate sub base, base and gravel to the project site; preparing subgrade; placing; grading; compaction; and all else incidental thereto for which payment is not provided under other items.

(3.04) and (7.04) - Concrete Aprons

- A. Method of Measurement: Concrete aprons measured for payment shall be the number of cubic yards of concrete installed and accepted in place.
- B. Basis of Payment: The contract unit price per cubic yard for concrete aprons shall be full compensation for all labor, materials and equipment necessary to complete this work including sawcut; management, removal and disposal of pavement; excavation (excluding ledge); forms; concrete; expansion joint material; reinforcement; detectable warning panels; screened gravel; and all other work as shown on the Drawings and all else incidental thereto for which payment is not provided under other items.

(3.05), (3.06), (3.07), (3.08), (3.09), (3.10), (3.11), (7.05) and (7.06) – Final Paving, Temporary Paving, and Driveway/Sidewalk Paving

- A. Method of Measurement:
  - 1. The quantity of bituminous concrete pavement to be paid for under this item includes:
    - a. Temporary Pavement - The number of tons of temporary pavement placed and removed at the direction of the Engineer, calculated as described below, within the payment limits of trench paving shown on the Drawings.
    - b. Final Pavement - The number of tons of final pavement placed at the direction of the Engineer, calculated as described below, within the payment limits shown on the Drawings.
    - c. Driveway/Sidewalk Pavement - The number of tons of driveway/sidewalk pavement hand-placed at the direction of the Engineer, calculated as described below, within the payment limits shown on the Drawings.
  - 2. Actual widths will be used in computing area wherever the width of pavement removed and replaced is less than the limits indicated on the Drawings.
  - 3. The conversion factor to change volume of bituminous concrete pavement measured in place to tons will be 0.056 tons per square yard per inch of thickness.
- B. Basis of Payment: Pavement shall be paid for at the Contract unit price per ton stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all materials, labor, equipment and tools necessary for the placement and removal of pavement; preparation of base material; application of tack coat; placement and grading of gravel shoulder material to back up overlay pavement; and installation of pavement markings. No additional payment will be made to the Contractor for repair

work to pavement damages caused by the Contractor.

(3.12) and (7.07) – Milling (1.5-Inch to 2-Inch depth)

- A. Method of Measurement: The quantity to mill existing pavement to be paid for under this item shall consist of the number of square yards of area mill/ground as shown on the Drawings and as authorized/directed by the Engineer. Actual pavement dimensions will be used in calculating area wherever the width and/or the length of pavement removed differs than the limits shown on the Drawings.
- B. Basis for Payment: The Contract unit price per square yard shall be full compensation for furnishing all labor, materials, tools, and equipment necessary to complete this work including grinding the existing pavement to a depth of 1.5 to 2 inches; management, removal and disposal of existing roadway materials; broom cleaning existing ground surfaces; and all else incidental thereto for which payment is not provided under other items.

(3.13) and (7.11) – Liquid Asphalt Price Adjustment

- A. Method of Measurement: Allowance to be included and carried in the bid schedule.
  - 1. Basis of Payment: The payment shall cover the potential increase in cost of materials when the pavement is placed compared to the unit bid prices in the Bid Schedule. Refer to Division 0, Section C – Special Conditions for details. Payment for this item shall be on the of changes in cost indexes. The increase in cost index must be at least 5 percent for the Contractor to receive this allowance. No mark-up will be added by the Contractor to the allowance.

COMMON ITEMS

(4.01) – Tree Removal Over 6-Inch Diameter

- A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of trees/stumps larger than 6 inches in diameter at chest height removed.
- B. Basis of Payment: Removal of trees shall be paid for at the unit price per each as stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; for complete removal of the tree and stump, backfilling the void with suitable material; grading of unpaved areas disturbed during construction; loam and seeding; and for all other work and expenses incidental thereto for which payment is not provided under other items.

(4.02) and (7.08) – Loam and Seed

- A. Method of Measurement: The quantity of loam and seed shall be paid for at the Lump Sum unit price as stated in the Bid Schedule.
- B. Basis of Payment: The lump sum price shall be full compensation for furnishing all labor, materials, and equipment required to place and grade loam; furnish and place seed, mulch, lime, fertilizer and water; assure and maintain grass growth until final acceptance by the Engineer; and for all other work including replacement of shrubs, fences, trees and mulch that are not identified to be removed and which are displaced at the convenience of the Contractor. This price shall include removal of existing pavement, sidewalk, concrete, structures and other manmade features in areas that

will be replaced with loam and seed and plantings. This price includes the stockpiling of topsoil. Areas disturbed for the Contractor's convenience shall be restored at no additional cost to the Owner.

- C. Payment for this item shall be as follows:
1. 80% at the completion of the installation and acceptance by the Engineer.
  2. 20% upon final contract completion and consistent coverage and growth of the new turf.

(4.03) and (7.09) - Erosion and Sedimentation Control

- A. Method of Measurement: Erosion and sedimentation control shall be paid for at the Lump Sum unit price as stated in the Bid Schedule.
- B. Basis of Payment: Erosion and sedimentation control shall be paid for a lump sum price stated in the Bid Schedule. Said lump sum price shall be full compensation for preparation of an Erosion and Sedimentation Control Plan; routine updates to the plan; installation, maintenance, and removal of the type and quantity of erosion control devices as required to provide erosion and sedimentation controls per best practices; and to meet NPDES General Permit and SWPPP; and all else incidental thereto for which payment is not provided under other items. The lump sum shall be paid in partial payments over the course of the project, where the percentage paid is equal to the percentage of completion of the entire Contract.

(4.04) - Traffic Control Plan

- A. Method of Measurement: Traffic control plan will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
- B. Basis of Payment: Payment for traffic control plan shall constitute full compensation for preparation of vehicular and pedestrian traffic control plans for the project area and provide routine updates to the Traffic Control Plan as needed. The lump sum shall be paid in full.

(4.05) and (7.10) - Traffic Control

- A. Method of Measurement: Traffic regulation and control will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
- B. Basis of Payment: Payment for traffic regulation and control shall constitute full compensation for all traffic regulation and control efforts and including all labor, materials, equipment, signage and supervision required to provide comprehensive and professional traffic regulation and control at all project locations. Temporary pavement markings for traffic re-routing and pedestrian safety are included in this item. This item shall include full-time and part-time dedicated certified flaggers. The lump sum shall be paid in partial payments over the course of the project, where the percentage paid is equal to the percentage of completion of the entire Contract. The final percentage shall not be paid until all clean up is complete.

(4.06) – Traffic Control via Uniformed Police Officers

- A. Method of Measurement: Allowance to be included and carried in the bid schedule.
- B. Basis of Payment: The payment shall cover the cost charged to the Contractor by the assigned Police Department for providing Uniformed Police Officers for traffic control, only in areas required by the Police Department. Excluded from this payment are any costs associated with traffic control, including flaggers. Payment for this item shall be on the basis of invoices presented by the Police Department to the Contractor for the work. No mark-up will be added by the Contractor to the invoice. No payments will be made for cancellations caused by the Contractor's coordination or means and methods.



(4.07) - Electronic Traffic Control Message Boards

- A. Method of Measurement: The electronic traffic control message boards will be paid for at the unit price per board-month as stated in the Bid Schedule. Partial weeks will be rounded up or down to the nearest ( $\frac{1}{4}$ ) board-month for measurement
- B. Basis of Payment: Electronic traffic control message boards shall constitute full compensation for each full-size, portable, trailer mounted, three-line electronic message board operating and on site during the project.

(4.08) - Trench Excavation - Ledge

- A. Method of Measurement: Ledge excavation measured for payment shall be the number of cubic yards of ledge removed during construction. This quantity shall be determined by:
  - 1. Exposing the ledge profile for measurement. Excavation and backfill of the earth overburden shall be considered incidental, and no separate payment shall be made therefore.
  - 2. Should the Contractor elect to pre-drill and blast ledge without exposing the ledge surface for measurement, ledge depths shall be determined by the Resident Project Representative at the time of drilling or, when direct drilling observation is not conducted, the ledge profile shall be measured after excavation, and 20% of the ledge volume thus measured shall be deducted due to ledge expansion caused by the blasting operation.
  - 3. The payment limit for trench width shall be between vertical planes which are a distance apart equal to the sum of 18 inches plus 1-1/3 times the nominal outside diameter of pipe which is to be installed in the trench (min. of 3 feet) and extending from the top of the ledge surface to a depth of 6 inches below the invert grade of the pipe. Where two pipes are installed in the same trench, trench ledge excavation shall be measured as the actual volume of ledge removed between vertical planes which are a distance apart equal to the sum of 3 feet plus the sum of the pipes nominal outside diameter. Where three pipes are installed in the same trench, trench ledge excavation shall be measured as the actual volume of ledge removed between vertical planes which are a distance apart equal to the sum of 4.5 feet plus the sum of the pipes nominal outside diameter.
  - 4. Ledge excavation for structures (including manholes) shall be measured as 18 inches outside the structure and extending to a depth of 6 inches below the base of the structure indicated on the Drawings.
  - 5. Rocks or boulders greater than two cubic yards volume shall be considered as ledge excavation. Volume of rocks shall be determined from their average length, width, and depth as measured by the Engineer.

- B. Basis of Payment: The contract unit price per cubic yard for ledge excavation shall be full compensation for all labor, materials, tools, and equipment necessary to complete the excavation including conducting the pre-blast survey; drilling, blasting, excavating; loading and disposing the excess or unusable material outside the work limits; vibration monitoring; suitable replacement backfill; and all else incidental thereto for which payment is not provided under other items. Not all the potential ledge locations are identified on the Drawings and ledge could be encountered anywhere within the limits of work. Such ledge, if encountered, is not considered a Differing Subsurface or Physical Condition. The unit price in the bid form shall apply to all ledge encountered and removed.

(4.09) - Replacement of Unsuitable Material Above Pipe Bedding and Initial Backfill

- A. Method of Measurement: Quantity to be paid for under this item shall be the number of cubic yards of material removed and replaced with materials from off-site as authorized by the Engineer. The payment limit for this item shall be between the top of the initial backfill layer to the bottom of the aggregate subbase layer as called out in the contract drawings, with a maximum trench width defined for the length of the excavation as directed by the Engineer.
- B. Basis of Payment: Excavated unsuitable materials shall be paid for at the unit price per cubic yard stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all labor, equipment, and tools necessary for the excavation of unsuitable material including the disposal of materials; furnishing installing and compacting replacement suitable backfill; and for all other work and expenses incidental thereto for which payment is not provided under other items.
  - 1. Material excavated that could have, in the opinion of the Engineer, remained in place through the use of adequate dewatering efforts shall be replaced by the Contractor at no additional cost to the Owner.
  - 2. Excess backfill material may be available during the Contract. This item shall be used to pay for excavation of unsuitable materials above the initial backfill layer only if no suitable backfill material previously excavated under this Contract is available.

(4.10) – Contaminated Soils Plan

- A. Method of Measurement: Contaminated plan will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
- B. Basis of Payment: Payment for contaminated soils plan shall constitute full compensation for preparation of and routine updates to a contaminated soils plan. The lump sum shall be paid in full upon approval of the submitted contaminated soils plan.

(4.11) - Disposal of Excess Contaminated Soil

- A. Method of Measurement: Allowance to be included and carried in the bid schedule.

- B. Basis of Payment: Final transport of excess contaminated soil and waste material shall be paid through a cash allowance. Said cash allowance shall be full compensation for all labor, equipment, and materials necessary to complete the work including environmental controls to safely handle the material, and disposal of the material offsite in accordance with all federal, state, and local regulations. Contractor shall take all reasonable efforts to reuse excavated soils within the project.
1. Contractor will not be paid any additional increase in quantity or costs under this item resulting from improper soil management activities that result in soil contamination. Disposal of material excavated outside of the pay limits as defined elsewhere in the Contract Documents shall be done at the Contractor's expense, at no additional cost to the Owner.
  2. Disposal of excess contaminated soils shall be paid based on the Contractor's actual costs based on actual invoices submitted plus a markup of 15% for the final transport and disposal of excess soil and waste materials. The amounts submitted will be paid from this Bid Item.

(4.12) - Test Pits

- A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of test pits performed as authorized by the Engineer.
- B. Basis of Payment: Test pit excavations shall be paid for at the unit price per each test pit as stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all labor, tools, and equipment; for sawcut and removal of pavement; excavation (except ledge excavation); dewatering; backfill including aggregate base and subbase, compaction, temporary pavement; providing the test pit result information to the Engineer and for all other work and expenses incidental thereto for which payment is not provided under other items.

(4.13) – Water Main and Hydrant Relocations

- A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of direct conflicts requiring relocation of water main or hydrant crossing.
- B. Basis of Payment: Water main and hydrant relocations shall be paid for at the unit price per each relocation as stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all labor, tools, materials, and equipment for isolation of the water line; sawcut and removal of pavement; excavation (except ledge excavation); dewatering; bedding; furnishing and installing pipe, fittings, and hydrant; backfill including aggregate base and subbase material; compaction; cleaning; testing and disinfection; connection to existing piping as required; and all else incidental thereto for which payment is not provided under other items

(4.14) – Mobilization/Demobilization

- A. Method of Measurement: Lump sum. Total of bid item shall not exceed [5%] of Total Amount of the Bid.

- B. Basis of Payment: Mobilization/demobilization costs are those costs of initiating and ending the contract. Payment for mobilization/demobilization shall be a lump sum at the price as stated in the Bid Form. Seventy-Five percent (75%) of the lump sum will be payable when the Contractor is operational on the site and the remaining 25% of the lump sum will be payable when the Contractor leaves the site following the completion of all contract work. For purposes of payment on this item, "Operational" shall mean the Contractor has provided all required and properly executed bonds and insurance certificates and the owner has approved the following: Construction Schedule, Erosion Control Plan, Pre-Blast Survey and Blasting Plan (if required), Traffic Control Plan, Project Sign (and installed), Temporary Facilities (including Engineer's Trailer), and Pre-Construction photographs/videos. "Operational" shall also mean Contractor has performed the pre-construction television sewer inspection, delivered the records of it to the Engineer and the Engineer has acknowledged the records are accurate and of use. "Operational" shall mean the temporary field office is fully functional and power, phone and internet are functioning. Only one lump sum payment divided into the two partial payments described herein shall be made to cover all mobilization/demobilization costs throughout the entire contract.

BID ALTERNATE No. 1 & 2

(5.01) and (6.01) – Pre-Lining Sewer CCTV Inspection

- A. Method of Measurement: CCTV inspection of pipes measured for payment shall be the number of linear feet inspected along the center line of the pipe including fittings as indicated in the Contract Documents or as pre-approved by the Engineer. Pipes shall be measured between centers of the manholes minus half the inside diameter of each manhole.
- B. Basis of Payment: The contract unit price per linear foot CCTV inspected shall be full compensation for all labor, materials, and equipment necessary to complete this work including locating the manhole; light cleaning prior to the CCTV inspection; environmental controls to safely handle, transport and dispose of waste material and wash water removed during pipe cleaning in accordance with all federal, state, and local regulations; CCTV inspecting of pipe; providing video files and photographs, database, and written logs of CCTV inspection on external solid state hard drive; maintaining existing flows/temporary bypass pumping, all else incidental thereto for which payment is not provided under other items.
1. The City will accept disposal of sewer main and storm drain material at the Hall Street Wastewater Treatment Facility at no cost. Contractors may obtain a license with the City for disposal. Catch basin cleanings are not permitted at this location.

(5.02) and (6.02) – Sewer Pipe Heavy Cleaning

- A. Method of Measurement: Heavy cleaning of pipe measured for payment shall be the number of linear feet heavy cleaned measured along the center line of the pipe including fittings as indicated in Contract Documents or as pre-approved by Engineer. Pipes shall be measured between centers of the manholes minus half the inside diameter of each manhole.

- B. Basis of Payment: The contract unit price per linear foot for sewer pipe heavy cleaned shall be full compensation for all labor, materials, and equipment necessary to complete this work including heaving cleaning of sewer; maintaining existing flows/temporary bypass pumping; environmental controls to safely handle, transport and dispose of waste material and wash water removed during pipe cleaning in accordance with all federal, state, and local regulations; all else incidental thereto for which payment is not provided under other items. Work under this bid item shall meet the definition established by NASSCO for heavy cleaning to qualify for payment.
1. The City will accept disposal of sewer main and storm drain material at the Hall Street Wastewater Treatment Facility at no cost. Contractors may obtain a license with the City for disposal. Catch basin cleanings are not permitted at this location.

(5.03) and (6.03) – Not Used

(5.04) and (6.04) – 20-Inch and 24-Inch Sewer Pipe Lining

- A. Method of Measurement: Cured-in-place-pipe (CIPP/lining) of sewer pipe accepted for payment shall be the actual distance in linear feet measured along the pipe lined and accepted as complete as indicated in the Contract Documents or as directed by the Engineer. Pipes shall be measured between centers of the drain manholes or catch basin structures minus half the inside diameter of each structure. Pipe CIPP/lined into the structure will not be measured for payment.
- B. Basis of Payment: CIPP/lining shall be paid for at the Contract unit price per linear foot stated in the Bid Schedule. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary to complete the work including delivering written notices to abutters prior to CIPP/lining work; light cleaning sewer prior to CIPP/lining; environmental controls to safely handle, transport and dispose of waste material and wash water removed during pipe cleaning in accordance with all federal, state, and local regulations; pre-CCTV and post CCTV inspection of the stormwater system; providing video files, database, and written logs on external solid-state hard drives; furnishing, installing, and curing CIPP/liner; sealing around CIPP/liner in drainage structures; testing; reinstating laterals; modifying and rebuilding invert in structure to complete the work; maintaining existing flows/temporary bypass pumping, all else incidental thereto for which payment is not provided under other items.
1. The City will accept disposal of sewer main and storm drain material at the Hall Street Wastewater Treatment Facility at no cost. Contractors may obtain a license with the City for disposal. Catch basin cleanings are not permitted at this location.
- C. Payment for this item shall be as follows:
1. Stormwater pipe acceptably CIPP/lined – 90 percent.
  2. Stormwater pipe successfully tested and post-CCTV inspected – 10 percent

(5.05) and (6.05) – Manhole – Cementitious Liner

- A. Method of Measurement: Cementitious lined manhole accepted for payment shall be for the actual vertical feet of structures rehabilitated with cementitious lining from the

lowest invert to bottom of the frame as indicated in the Contract Documents or as directed by the Engineer.

- B. Basis of Payment: The contract unit price per vertical foot shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including cleaning; disposal of materials removed; surface preparation; patching holes and grouting to stop running water/active infiltration sources; replacement/removal of manhole steps; furnishing and installing cementitious liner; testing; maintaining existing flows/temporary bypass pumping; and all else incidental thereto for which payment is not provided under other items.

END OF SECTION

SECTION 01200  
PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.4 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda.
- B. Meeting Summary: The Engineer will compile summaries of each project meeting and will furnish a copy to the Contractor. The Contractor may make and distribute such other copies as they wish.

PART 2 - PRODUCTS  
(Not Applicable)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. Except as noted below for Preconstruction Meeting, project meetings will be held monthly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

- A. Meetings will be held at the job site in the Engineers' field office, unless the Owner and/or Engineer determine that virtual meetings are applicable and appropriate for any reason (e.g., Safety and Health Plan, etc.).

3.3 PRECONSTRUCTION MEETING

- A. Preconstruction meeting will be scheduled within twenty days after the Effective Date of the Agreement, but before the Contractor starts work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance.
- B. Minimum agenda: Distribute data on, and discuss:
  - 1. Identification of key project personnel for Owner, Engineer, Contractor, funding/regulatory Agencies.
  - 2. Responsibilities of Owner, Engineer, Resident Project Representative, Contractor.
  - 3. Channels and procedures for communications.
  - 4. Construction schedule, including sequence of critical work.
  - 5. Easements, permits.
  - 6. Contract Documents, including distribution of required copies of original documents and revisions.
  - 7. Processing of Shop Drawings and other data submitted to the Engineer for review.
  - 8. Processing of field decisions and Change Orders.
  - 9. Rules and regulations governing performance of the Work, including funding/regulatory Agency requirements.
  - 10. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

3.4 PROJECT MEETINGS

- A. Attendance: To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work. The Superintendent shall attend. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.
- B. Minimum agenda:
  - 1. Review, revise as necessary, and approved summaries of previous meeting.
  - 2. Review progress of the Work since last meeting, including status of submittals for approval.
  - 3. Review schedule of work to be accomplished prior to next meeting.
  - 4. Discuss monthly partial payment request.
  - 5. Review status of change order requests and Work Directive Changes.
  - 6. Identify problems which impede planned progress.
  - 7. Develop corrective measures and procedures to regain planned schedule.
  - 8. Complete other current business.

END OF SECTION



SECTION 01310CONSTRUCTION SCHEDULESPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Within ten (10) days after the effective date of the Agreement between Owner and Contractor submit to the Engineer an estimated progress schedule as specified herein.
- B. Form of Schedules:
  - 1. Narrative: Completely describe the construction methods to be employed.
  - 2. Network Analysis System:
    - a. Provide a separate horizontal schedule line for each trade or operation and show concurrent and preceding activities.
    - b. Present in chronological order the beginning of each trade or operation showing duration and float time.
    - c. Scale: Identify key dates and allow space for updating and revision.
  - 3. Mathematical Analysis:
    - a. A mathematical analysis shall accompany the network diagram. A computer printout will be acceptable.
    - b. Information shall be included on activity numbers, duration, early start, late start, etc. and float times.
- C. Content of Schedules:
  - 1. Provide complete sequence of construction by activity:
    - a. Shop Drawings, Project Data and Samples:
      - i. Submittal dates.
      - ii. Dates reviewed copies will be required.
    - b. Decision dates for:
      - i. Products specified by allowances.
      - ii. Selection of finishes.
    - c. Estimated product procurement and delivery dates.
    - d. Dates for beginning and completion of each element of construction.
  - 2. Identify work of separate phases and logically grouped activities.
  - 3. Show the projected percentage of completion for each item of work as of the first day of each month.
  - 4. Provide separate sub-schedules, if requested by the Engineer, showing submittals, review times, procurement schedules, and delivery dates.
  - 5. Schedule sheets shall be printed in color on 11"x17" paper, unless a smaller size paper is allowed by the Engineer.
- D. Updating:
  - 1. Show all work activities including those already complete.
  - 2. Show all changes occurring since previous submission.
  - 3. Indicate progress of each activity, show completion dates.

4. Include:
  - a. Major changes in scope.
  - b. Activities modified since previous updating.
  - c. Revised projections due to changes.
  - d. Other identifiable changes.
5. Provide narrative report, including:
  - a. Discussion of problem areas, including current and anticipated delay factors.
  - b. Corrective action taken or proposed.
  - c. Description of revisions that may affect schedules.
  - d. Description of activities to be performed in the next 6-week period.
  - e. Updated list of key shop drawings, project data and samples to be submitted in the next 6-week period.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS

- A. Submit updated schedules with each progress payment request.
- B. Submit 1 copy initial and updated schedules to the Engineer.

END OF SECTION

SECTION 01320SAFETY AND HEALTH PLANPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work, as outlined herein and in the General and Special Conditions of the Contract Documents. Within 10 days after the effective date of the Agreement between Owner and Contractor, submit to the Engineer a Safety and Health Plan as specified herein. Refer to submittals section below.
2. Contractor shall comply with all applicable Laws and Regulations related to the safety of persons or property, or for the protection of persons or property from damage, injury, illness, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
3. Contractor shall designate a qualified and experienced safety representative (OSHA defined "Competent Person") at the site whose duties and responsibilities shall be the prevention of accidents and maintaining and supervising of safety precautions and programs, including a "Job Hazards Analysis".
4. The Contractor shall be solely responsible to provide all labor, equipment, and utilities sufficient to ensure no construction noise, particulates, or odors, are allowed to accumulate to levels which adversely affect health or work in, or near the construction area.

## B. Content of Safety and Health Plan:

1. Prepare complete safety and health plan in accordance with the requirements of CFR Title 29 Part 1926 - Safety and Health Regulations for Construction.
  - a. Provide documentation that Contractor's hazardous communication program is up to date.
  - b. Provide documentation that Contractor's safety training is up to date.
  - c. Prepare a project specific Safety and Health Plan addressing construction safety and protection, including but not limited to excavations, fall protection, egress, as well as provisions for construction in hazardous environmental conditions, confined space entry, electrically-classified spaces, chemical storage/handling, biological hazards, etc., at the project site.
2. Safety provisions for confined space entry shall follow the requirements of CFR Title 29 Part 1926, Subpart AA – Confined Spaces in Construction and will be incorporated into the Safety and Health Plan.

## C. Updating:

1. Contractor shall be responsible for updating the Safety and Health Plan as appropriate throughout the course of the construction period.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS

- A. Submit the Contractor's site-specific Safety and Health Plan to the Engineer, in accordance with Section 01340. Submit hardcopy submittals, if required.
- B. Submit updated Safety and Health Plans as necessary during the course of the project.
- C. The Safety and Health Plan is provided “for information only” to inform the Owner, Engineer and Resident Project Representative of the project specific safety program requirements; however, if the Safety and Health Plan incomplete (e.g., missing elements relevant to the project work), inadequate (e.g., outdated qualifications) or not project-specific, it will be returned “revise and resubmit”. Delays related to an incomplete Safety and Health Plan are the responsibility of the Contractor.
- D. The Contractor will overview the plan with the Owner (and staff), Engineer (and Resident Project Representative) prior to work beginning at the project site, and subsequently when/if the safety plan is updated.
- E. Contractor's most current Safety and Health Plan shall be available at the construction site throughout the construction project.

1.4 ON-SITE COORDINATION MEETINGS

- A. Contractor shall review key aspects of Safety and Health Plan at the Pre-Construction Meeting, and subsequent on-site safety informational meeting.
- B. Contractor shall report to Engineer and Owner at each progress meeting concerning compliance with the Safety and Health Plan for the most recent construction period and new considerations and requirements for the upcoming period.
- C. Contractor shall hold weekly on-site coordination meetings with Resident Project Representative and Owner to ensure that Owner's staff is aware of key Safety and Health Plan requirements of the current phase of construction.

1.5 OWNER’S CONFINED SPACE ENTRY PROGRAM INFORMATION

- A. A copy of the Owner’s Confined Space Entry Program is available for viewing at the facility and is not included herein.

END OF SECTION

SECTION 01340SUBMITTALSPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.

## B. General Submittals Requirements: This project shall utilize:

1. Submittals – Electronic via Email/FTP with Hard Copy for Record
  - a. The Contractor shall submit to the Engineer an electronic submittal of shop drawings and O&M Manuals in portable document format (PDF) transmitted via Engineer's email or File Transfer Protocol (FTP) site. The Engineer shall return an electronic PDF of the submittal review comments to the Contractor for distribution to subcontractors, suppliers and manufacturers. The electronic submittals shall serve as the electronic record of the project.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SHOP DRAWINGS

- A. Shop Drawings are required for each and every element of the work.
- B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, their subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.
- C. The Contractor shall provide a completed Contractor Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.
  1. Each shop drawing submittal shall include a complete copy of the relevant specification section markup up to reflect "compliance" or "deviation" on an item-by-item basis.
- D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal. An exception to this

requirement are shop drawings for reinforcing steel, miscellaneous metals and structural steel, which shall be submitted separately for each structure unless otherwise permitted by the Engineer.

- E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.
- F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.
- G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.
- H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from their subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.
- I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by their subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to confirm that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.
- J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.
- K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, Contractor shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.
- L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined

by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two submission limit.

- M. Shop Drawings that include drawings or other material that is illegible or too small may be returned without review.

#### 1.4 SAMPLES

- A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available. Submittals of "samples" shall be documented through the electronic submittal process by including a photograph of the item(s) and indicating the date the sample was mailed and/or delivered.

#### 1.5 SUBMISSION REQUIREMENTS

- A. Accompany submittals with a transmittal cover sheet, containing:
  - 1. Date.
  - 2. Project title and number.
  - 3. Contractor's name and address.
  - 4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
    - a. Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).
    - b. Under limited situations when additional different pieces of equipment are submitted under the same specification section, those submittals shall be numbered sequentially (e.g. 05500-01, 05500-02, 05500-03, etc.).
    - c. Resubmittals shall include an alphabetic suffix after the corresponding sequential number (e.g., 16000-01A).
    - d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters "OM", another dash, and then a sequential number beginning with 01 (e.g. 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g. 16000-OM-01A).
  - 5. Notification of deviations from Contract Documents.
  - 6. Other pertinent data.
- B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
  - 1. Project name
  - 2. Specification Section and sequential number with alphabet suffix for resubmittal
  - 3. Description
  - 4. Identification of deviations from Contract Documents.
  - 5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.

6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
7. Where specified, manufacturer's guarantee.
- C. Additional Requirements for Electronic Submittals:
  1. Each individual shop drawing or O&M submittal shall be contained in one PDF.
  2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
  3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
  4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
  5. The electronic PDF shall be configured such that is fully searchable.
  6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
  7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
  8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

#### 1.6 RESUBMISSION REQUIREMENTS

- A. Revise initial submittals as required and resubmit as specified for initial submittal.
- B. Indicate on submittals any changes which have been made other than those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer. If relabeling of individual pieces or assemblies has taken place, the labels from the previous submittal shall be indicated to assist in comparing the original and resubmitted shop drawing.
- C. All resubmittals shall include a summary of the previous submittal review comments with the vendors' written response as to how the previous comments were addressed.

#### 1.7 ENGINEER'S REVIEW

- A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
- B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
  1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.



2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the Contractor, unless otherwise notified in writing prior to execution of the relevant work.
3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of all review comments. Resubmittal from the Contractor shall address each review comment and include supplemental information, as necessary.
4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted, but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter which identifies all changes made to the submittal, indicates how each review comment has been addressed and indicates where to find the information in the resubmittal.
5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
6. For Information Only (Status 5 on shop drawing log). The shop drawing review was for information only.
7. In Review (Status 6 on shop drawing log). The shop drawing is currently under review.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: \_\_\_\_\_ CONTRACTOR'S PROJ. NO: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_ ENGINEER'S PROJ. NO: \_\_\_\_\_

ENGINEER: \_\_\_\_\_

SHOP  
DRAWING  
NUMBER:SPECIFICATION SECTION  
OR DRAWING NO:SEQUENTIAL NUMBER  
(& ALPHA SUFFIX FOR  
RESUBMITTAL)

DESCRIPTION: \_\_\_\_\_

MANUFACTURER: \_\_\_\_\_

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

☐ NO DEVIATIONS

or

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS:

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By: \_\_\_\_\_

Contractor

By: \_\_\_\_\_

Manufacturer

Date: \_\_\_\_\_ Date: \_\_\_\_\_

a Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.

b Required on all submittals

c When required by specifications Page \_\_\_\_ of \_\_\_\_

General Contractor's Stamp

END OF SECTION

SECTION 01380CONSTRUCTION PHOTOGRAPHSPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Pre-Construction Record: Contractor shall take digital photographs and video to obtain a visual record of the project area prior to beginning any work at the project site.
2. Notify Engineer at least three (3) working days prior to photographing or videoing the project area so Engineer may, at their option, observe.

1.2 QUALITY

- A. Pre-Construction Record: Quality shall be such that the condition of existing pavement, curbing, driveway entrances, sidewalks, walls, doors, equipment, piping, etc. can be readily determined. Pre-construction record photographs and videos shall be taken by the Contractor with the Engineer or RPR present.
- B. Electronic files shall be high resolution digital images in \*.jpeg format and shall not be compressed or downsized. Electronic files shall not be less 2MB in size

1.3 SUBMITTALS

## A. Pre-Construction Record:

1. Submit pre-construction photographs/videos in accordance with Section 01340 prior to initiating any work on-site.
- B. The quality of the photos and video are subject to approval by the Engineer.
  - C. Photographs and videos taken for the project and submitted are released to the Owner and Engineer for reproduction and use for records retention, governmental, commercial, and marketing purposes.

END OF SECTION

SECTION 01400  
QUALITY CONTROL

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Manufacturer's Instructions.
- D. Manufacturer's Certificates.
- E. Manufacturer's Field Services.
- F. Testing Laboratory Services.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY CONTROL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.4 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.5 MANUFACTURERS' INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

1.6 MANUFACTURERS' CERTIFICATES

- A. When required by individual Specifications Section, submit manufacturer's certificate that products meet or exceed specified requirements.

1.7 TESTING LABORATORY SERVICES

- A. Owner will employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services wherever an Independent Testing Laboratory is required by individual specification sections.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.

- C. Reports will present observations and test results and indicate compliance or non-compliance with specified standards and with Contract Documents. Independent Testing Laboratory will submit one copy of each report directly to each of the following: Engineer, Resident Project Representative, Contractor. Reports will be submitted within 5 days of obtaining test results. If test results indicate deficiencies, Independent Testing Laboratory shall telephone or email results to Engineer, Resident Project Representative and Contractor within 24 hours.
- D. Contractor shall cooperate with Independent Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
- E. Contractor shall coordinate all testing work and shall concurrently notify Engineer and Independent Testing Laboratory at least 24 hours prior to performing work requiring testing services.
- F. If scheduled tests or sampling cannot be performed because the work is not ready as scheduled, testing costs associated with the delay will be determined by Engineer and invoiced by Owner to Contractor. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. If adequate notice is not provided, Contractor shall suspend work on that portion of the Project until testing can be performed. Such suspension will not be grounds for a claim against the Owner for delay, nor will it be an acceptable basis for an extension of time.
- G. Payment for Independent Testing Laboratory services shall be as follows:
  - 1. General: Where testing is the Owner's responsibility, payment will be made as stated below unless other requirements are given in Specification Sections. Testing which is the responsibility of the Contractor will be considered an incidental item unless otherwise indicated in Section 01150, Measurement and Payment.
  - 2. Initial Testing: Owner will pay for initial tests.
  - 3. Retesting: Costs of retesting due to non-compliance will be initially paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price via Change Order.
  - 4. Contractor's Convenience Testing: Inspections and tests performed for Contractor's convenience will be paid for by Contractor.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

END OF SECTION

SECTION 01515TEMPORARY BYPASS PUMPING SYSTEMSPART 1 - GENERAL1.1 DESCRIPTION

- A. The Contractor shall design, furnish, install, test, operate, maintain and remove temporary bypass pumping system(s) in order to divert sewage flow around the work area. Temporary bypass pumping system(s) shall be fully automated and able to reliably convey the full range of wastewater flows, as scheduled herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. All system components specified herein shall be furnished by a Supplier who regularly engages in temporary bypass pumping systems. Supplier shall have a minimum of 15 years of experience with temporary bypass pumping systems. Supplier shall provide at least 5 references of project of a similar size and complexity as this project that have been performed within the past 5 years within New England.
- B. Supplier shall have sufficient equipment and spare parts inventory to perform normal rentals, including this project, and maintain at least 100% reserve equipment for this project for immediate delivery. Supplier shall have sufficient service personnel to provide service calls within 4 hours, 24 hours per day, 7 days per week.
- C. Temporary bypass pumping systems shall be:
  - 1. Xylem Dewatering Solutions, Bozrah, CT;
  - 2. Baker Corp, Oxford, Massachusetts;
  - 3. or equal.
- D. A qualified representative of the Supplier shall inspect the installation and supervise the startup and testing of the temporary bypass pumping system.
- E. The temporary bypass pumping system shall meet all applicable local, state and federal requirements.
- F. The temporary bypass pumping system shall be designed by a Professional Engineer licensed to practice in the State of New Hampshire. Compliance with this requirement shall be demonstrated via a signed and sealed submittal package, as specified herein.

1.4 SUBMITTALS

- A. In accordance with the requirements of Section 01340.
  - 1. Qualifications information
  - 2. Proposed schedule, sequence of construction, duration of activities and description of sewer control methods to be utilized for each element of the project.

3. Coordination Drawings showing detailed layout of equipment, pumps, suction piping, discharge piping, fittings, valves, supports, materials, temporary enclosure and temporary odor control provided under this section.
  4. List of duty equipment, pumps, piping, fittings, valves, and materials to be utilized by the Contactor for the temporary bypass pumping system.
  5. List of standby equipment and spare parts available on-site and off-site in order to ensure uninterrupted operation of the bypass pumping system in the event of a utility power failure.
  6. Fuel consumption rate at full speed duty and standby pumping.
  7. Fuel storage tank and secondary containment provision, including Spill Prevention Control and Countermeasure (SPCC) Plan, if applicable.
  8. Catalog cut sheets/ technical data for equipment and appurtenances.
  9. Performance curves for wastewater bypass pumps and suction lift, static head, headloss, and total dynamic head (TDH) calculations.
  10. Description of maintenance procedures to be utilized.
  11. Description of controls and alarm equipment to be utilized. Sample alarm log.
  12. Names of individuals responsible for on-call response, 24 hours per day, 7 days per week. Call list for alarm response.
- B. No construction related activities requiring the need for bypass pumping operations shall begin until the related project submittals are reviewed and all provisions of the work have been fully coordinated with the Owner, Agency, Engineer and any other parties having jurisdiction for the proposed work activities.

## PART 2 - PRODUCTS

### 2.1 WASTEWATER BYPASS PUMPING SYSTEM

- A. Pumping Equipment:
1. Temporary bypass pumping system(s) shall designed to maintain existing or proposed flow capacity.
  2. The temporary bypass pumping system shall be able to convey the flow:
    - a. with the largest available pump off-line; and
    - b. without utility power.
  3. Each pump shall be a skid-mounted unit. The pump system may utilize available on-site manholes, junction/splitter structures, and/or tankage for suction and discharge, as appropriate.
  4. The pumps shall be centrifugal trash pumps suitable for handling raw, unscreened sewage with solids up to 3 inches in diameter, and capable of running completely dry for extended periods of time without damage. Pumps shall be capable of static suction lifts to 28 vertical feet, at sea level.
  5. The pump priming system shall be fully automatic, needing no form of adjustment or manual addition of water. The priming system shall be capable of priming the pump from a completely dry casing.
  6. All pumps shall be critically silenced to less than 68 decibels at 25 feet.
  7. Contractor shall provide appropriately sized portable spill guard containment dikes to contain leaks resulting from the pumping system, from the fuel storage tanks(s) and/or from the pumps and process piping within 5 feet of the system.
- B. Piping



1. Suction piping and discharge piping shall be constructed of:
    - a. Rigid galvanized steel pipe with ball and socket joints, Bauer HK Quick Coupling Piping or equal.
    - b. Fused HDPE piping
    - c. Connection to existing piping shall be made equivalent materials.
  2. Aluminum "irrigation" type piping or glued PVC pipe shall not be allowed.
- C. Controls and Alarms
1. The pump set shall be furnished with a weather-proof automatic control system consisting of floats and/or transducer level controls.
  2. The controller shall start/stop the pumps based on signals from high and low level floats or a transducer. The controller shall be capable of automatically varying the pump speed to match varying flow conditions and maintain a constant suction level, if scheduled herein.
  3. The controller shall annunciate and log all alarm conditions including but not limited to high upstream water level, duty pump failure, utility power loss and standby pump failure. The alarm log shall include the type of alarm, time of alarm, time alarm acknowledged, and time alarm condition cleared. Annunciation shall be via teledialer, two-way radio, cellular telephone, or equivalent.

### PART 3 - EXECUTION

#### 3.1 COORDINATION OF WORK

- A. Provide all labor and equipment necessary to coordinate work of this section and maintain communications.
- B. Notify all personnel, including but not limited to Owner, Engineer and Utility Companies, seven days in advance of any temporary bypass pumping work. The Owner will identify personnel to be notified in addition to those identified by the Contractor.
- C. Contractor shall coordinate temporary bypass pumping operations with the Owner and Engineer on a daily basis.

#### 3.2 PERFORMANCE:

- A. General
  1. The Contractor shall install and test all sewer flow control methods to the satisfaction of the Owner and Engineer prior to proceeding with the Work.
  2. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.
  3. Any temporary pumps, piping, fuel storage, or other appurtenances associated with the temporary pumping system shall be either located above the 100-year flood elevation or protected against flotation or other damage which would be caused by a flood event.
- B. The temporary bypass pumping system shall be furnished, installed, tested, operated, maintained and removed as follows:
  1. The Contractor shall furnish, install, and test temporary bypass pumping system and discharge pipelines.

## TEMPORARY BYPASS PUMPING SYSTEMS

2. The Contractor shall test and debug all systems and verify that all necessary equipment, materials, spare parts, and labor are available on-site prior to operation of the system and prior to the demolition of any part of the existing pumping station facilities.
  3. The Contractor shall operate and maintain the system until the new Work is completed, demonstration tested and accepted by the Owner and Engineer. Contractor shall coordinate with the Owner on a daily basis.
  4. Contractor shall be responsible for making regulatory reporting notifications for any release of wastewater or fuel to the environment. Contractor shall provide copies of notifications to the Owner and Engineer.
  5. The Contractor shall anticipate that the Owner will require 7 calendar days of operation on the new, permanent Work following satisfactory completion of demonstration testing prior to beginning disassembly of the temporary bypass pumping system.
  6. Upon receipt of approval by the Owner and Engineer, the Contractor shall disassemble and remove the temporary bypass pumping system, including all appurtenant piping. Contractor shall restore the area impacted by the temporary bypass pumping system to a like-new condition.
- C. Contractor shall be responsible for cleanup, repairs, restoration and fines required to address spills or overflows from a failed bypass pumping system.

END OF SECTION

SECTION 01562DUST CONTROLPART 1 - GENERAL1.1 DESCRIPTIONS

## A. Work Included:

1. Furnish and apply water or calcium chloride on the road surfaces within the construction site, when required to control dust and when directed by the Engineer.
2. When dust control is not included as a separate item in the Contract, the work shall be considered incidental to the appropriate items of the Contract.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Water for Sprinkling:  
B. Clean, free of salt, oil, and other injurious matter.  
C. Calcium Chloride:  
1. Meet the requirements of AASHTO M144.

PART 3 - EXECUTION3.1 APPLICATION

## A. Water:

1. Apply water by methods approved by the Engineer.
2. Use approved equipment including a tank with gauge equipped pump and spray bar.

## B. Calcium Chloride:

1. Apply at a rate sufficient to maintain a damp surface but low enough to assure non-contamination of water courses.
2. Apply water prior to calcium chloride addition.

END OF SECTION

SECTION 01570TRAFFIC REGULATIONPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Provide all materials and perform all work necessary to completely regulate traffic in the area of Work.
2. Perform all work in such a manner as to provide safe passage at all times for the public, prevent dust nuisance, and with a minimum of obstruction to traffic.
3. Do not close roads or streets to passage of the public without the permission of the proper authorities.
4. Uniformed officers with vehicles and flaggers (including police officers when required by law, regulations, ordinances, or as a result of poor traffic control) shall be obtained and paid for by the Contractor.

B. The local police department and/or the appropriate state transportation authority who will decide if safe passage is being maintained and shall have the authority to require the Contractor to take any additional steps necessary to maintain safe passage. If the Authority furnishes an inspector on the job or requires additional traffic control as a result of poor traffic control by the Contractor, the Contractor shall be responsible for all costs assessed by the Authority and for additional traffic control at their own expense. Minimize the length of delays or traffic stoppage to the extent practicable. Maximum traffic stoppage time shall be 10 minutes.

C. Develop site specific traffic control plans that meet the requirements of Manual on Uniform Traffic Control Devices (MUTCD) and any local and state requirements. Proposed Traffic Control Plans shall indicate the type, location, and quantities of signs, barricades, lights, signals, delineators, concrete barriers, pavement markings, and other traffic control warning devices. Traffic Control Plans submittal to the Engineer will be for general information only.

D. The Contractor's designated traffic control representative shall respond to all traffic safety complaints and be available to direct traffic control subcontractors the entire time work is occurring on site. If the designated representative is not on site for a period of time, another on site representative shall be designated by the Contractor for that period.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, Division 1, and the NHDOT Standard Specifications Section 619 Maintenance of Traffic.

1.3 SCHEDULING WORK

A. During the Project Pre-Construction Meeting one Contractor representative will be designated as the coordinator between the Police Department and subcontracted traffic control.

- B. Variable Message Signs notifying the public of pending road closure and/or construction must be in place seven days prior to road closure or as required by NHDOT.
- C. Schedule all work so that two adjacent parallel streets are not closed to passage by the public at any one time, if at all possible.
- D. Revise the plan of work if it will create a traffic hazard or an unreasonably long detour.
- E. Do not start work in any new location without the permission of the Engineer.
- F. Notify all police and fire departments of all scheduled detours and when streets are reopened.
- G. All work on Loudon Road shall be performed between the hours of 7pm to 6am.

#### 1.4 SUBMITTALS

- A. Submit separate site specific traffic control plans that meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD) and any local and state requirements. One plan will display work on Loudon Road, and the other plan will display work on the remaining roadways within the project limits, including Grover Street, Pembroke Road, Grant Street, Robinson Street, and Branch Turnpike. The proposed Traffic Control Plans shall indicate the type, location, and quantities of signs, barricades, lights, signals, delineators, concrete barriers, pavement markings, and other traffic control warning devices.
- B. The proposed Traffic Control Plan is provided "for information only" to inform the Owner, Engineer and Resident Project Representative of the project specific traffic control; however, if the Traffic Control Plan is incomplete (e.g., missing elements relevant to the project work), inadequate (e.g., outdated qualifications) or not project specific, it will be returned "revise and resubmit". Delays related to an incomplete Traffic Control Plan are the responsibility of the Contractor.
- C. The proposed Traffic Control Plans must be reviewed and stamped by a New Hampshire licensed professional engineer.

### PART 2 - PRODUCTS

#### 2.1 WARNING SIGNS AND BARRICADES

- A. Traffic control (plans, methods and devices) shall be as outlined in the MUTCD as published by U. S. Department of Transportation, and any local and state requirements.
- B. Provide adequate warning signs, barricades, concrete barrier, lighting, pavement markings, signal lights, flaggers/uniformed police officers, and take other necessary precautions for the safety of the public.
- C. Provide and illuminate suitable warning signs to show where construction, barricades or detours exist.
- D. Provide digital message boards at appropriate locations as determined by the local police department and/or the NHDOT to maintain safe passage of traffic and work zone.
- E. Provide barricades of substantial construction and painted with a finish that increases visibility at night, as outlined in the MUTCD.

- F. Keep signal lights illuminated at all barricades and obstructions from sunset to sunrise.
- G. Maintain all necessary signs, barricades, lights, flaggers, crew and other safety precautions during authorized suspension of the Work, weekends, holidays or other times when the Work is not in progress.
- H. Contractor shall make periodic inspection throughout the day of the traffic control patterns, methods, signs and other devices to ensure that they are properly placed.
- I. Traffic control devices shall conform to the MUTCD and as specified within the NHDOT Standard Specifications Section 619 Maintenance of Traffic.

2.2 UNIFORMED POLICE OFFICER

- A. A uniformed police officer is a police officer (local, county or state) on regular or special duty dressed in uniform with the necessary high visibility vest and apparel needed for traffic control.
- B. Arrange the police detail in accordance with the coverage requirements of the City of Concord Police Department with officers being provided from the Concord Police Department or other available municipal or county police departments.

2.3 FLAG PERSON

- A. A flag person is a trained and certified individual assigned specifically to the task of directing traffic and is outfitted in the necessary high visibility vest and apparel needed for traffic control.
- B. Flag persons shall be provided by the Contractor.

PART 3 - EXECUTION

3.1 DETOURS

- A. It is anticipated that a detour will be necessary on Branch Turnpike. All proposed detours must be approved by the Engineer and the City of Concord.
- B. When the closed part of the project is reopened, restore the detour area and any other disturbed areas to the original condition.

3.2 ACCESS AND INCONVENIENCE TO RESIDENTS OF VICINITY

- A. Whenever a traveled way is closed, perform the Work in such a manner that local travel, residents and businesses in the vicinity of the Work will be inconvenienced as little as possible.
- B. Maintain access to residents and abutting land owners along the project to driveways and other normal outlets from their property.
- C. It is anticipated that sections of Branch Turnpike will need to be closed during construction. The contractor shall maintain access to residential neighborhoods including Hemlock Drive, Cricket Lane and Hyacinth Drive during all closures.
- D. Contractor must provide access through the work zones for emergency vehicles, as determined through prior coordination with the emergency service providers.
- E. Contractor shall not excavate more than they can backfill with crushed stone base and re-open to traffic at the end of the workday.

3.3 WORK WITHIN SIGNALIZED INTERSECTIONS

- A. There is proposed work to be performed within the limits of two existing signalized intersections on Loudon Road (the intersection with D'Amante Drive, and the intersection with the Steeplegate Mall Access Drive). This work is to be conducted during the hours of 7pm to 6am under traffic control officer control.

3.4 TRAFFIC CONTROL OFFICERS

- A. Where required by the local, county or state police departments and/or when specified, traffic control officer shall be Uniformed Police Officers.
- B. Where the local, county or state police departments do not wish to or are unable to furnish traffic control officers and/or when specified, the traffic control officers shall be flag person.

END OF SECTION

## SECTION 01572

### GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Construction activities to be performed under of this Project have been determined to require coverage under the National Pollutant Discharge Elimination System (NPDES) stormwater Construction General Permit (CGP) program. The Environmental Protection Agency (EPA) is the NPDES permitting authority since it has not delegated its authority to administer the CGP program to the State of New Hampshire. The CGP authorizes the discharge of stormwater from construction sites that disturb one acre or more of land, and from smaller sites that are part of a larger, common plan of development. Coverage under the CGP requires Operators to comply with the requirements of the CGP including submitting a Notice of Intent (NOI), developing a Stormwater Pollution Prevention Plan and implementing stormwater controls. The EPA requires all Operators submit a NOI and a Notice of Termination (NOT). Refer to Appendix A of the CGP for the EPA's definition of an "Operator". The CGP, resources, tools and templates can be found here: <https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp>.

#### 1.1 NOTIFICATION PHASE:

##### A. Submit a Notice of Intent (NOI)

1. The Notice of Intent (NOI) for the CGP is an on-line registration form filed with the EPA. A NOI must be filed by all Operators if a project results in a total land disturbance of equal to or greater than one acre, where those stormwater discharges enter waters of the State. Additionally, a NOI must also be filed when a construction activity designated by the EPA shows the potential for contribution to an exceedance of a water quality standard or for significant contribution of pollutants to waters of the State. The NOI must be filed and approved by EPA prior to any soil disturbance or construction. The NOI form provides information including, but not limited to, the Operator's name, address, and contact information. The NOI also includes the Project location, the size of the disturbed area and a brief description of the project. Other information required includes SWPPP, Endangered Species protection information, Historic Preservation information, and chemical treatment information if applicable. By signing the NOI, the Operator certifies that the information is true and agrees to meeting the requirements of the CGP, including standards for erosion and sedimentation control; inspections by a qualified person; compliance with effluent limitations; maintenance of any stormwater control practices; and "housekeeping" (ex. preventing fuel spills and controlling dust on the construction site). Specific standards for these activities are found in the CGP. In signing the NOI, the Operator certifies that the NOI has been prepared accurately and that stormwater from the project areas will be discharged in accordance with the CGP. The EPA requires electronic filing of a NOI using the NPDES eReporting Tool or "NeT" system. More information on e-filing can be found at the following website: <https://www.epa.gov/compliance/npdes-ereporting>



## GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

2. The NOI certifies that a project specific Stormwater Pollution Prevention Plan (SWPPP) has been developed in accordance with the CPG. The SWPPP must be prepared in accordance with good engineering practices and must identify all potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges from the construction site. Additionally, the plan must describe practices to be used to reduce pollutants in stormwater discharges from the construction site and assure compliance with the terms and conditions of the permit.
3. The NOI is deemed approved 14 calendar days after EPA receives the NOI and the Operator can proceed unless notified by EPA to the contrary. The EPA will attempt to contact the Operators regarding any problems or delays, but it is the responsibility of the Operators to check the website or contact the EPA NOI Processing Center at 866-352-7755.

#### 1.2 PERFORMANCE PHASE

- A. The Operators must continue to comply with all conditions and effluent limitations in the CGP until coverage is terminated. Coverage may be terminated if all construction activities have been completed and all disturbed soils have been finally stabilized, all construction material have been removed, and temporary erosion and sediment controls have been removed. All Operators need to submit a Notice of Termination (NOT) to inform the EPA that permanent erosion control measures have been installed and are functioning properly.

#### 1.3 PERMANENT STABILIZATION AND TERMINATION PHASE

- A. Submit Notice of Termination (NOT) - The EPA requires that the Operators use the NPDES eReporting Tool, or “NeT” system to prepare and submit a NOT. The NOT form provides information including, but not limited to, the Operator’s name, address, and contact information. The NOT also includes the project location and terminating coverage, photographs of the completed site, the EPA number, an indication of why coverage under the permit is being terminated; and a signed certification statement.
- B. The Operator's authorization to discharge under the CGP terminates at midnight on the day the NOT is signed.
- C. Retention of Records - Following the termination of construction activities the Operators must keep copies of the SWPPP and records of all data used to complete the Notice of Intent for a period of at least three years following final stabilization. The record retention period may be extended by EPA's request.

#### 1.4 STORMWATER POLLUTION PREVENTION PLAN

- A. Contractor shall develop a construction site SWPPP following the EPA electronic SWPPP template. The template with EPA’s guidance on *Developing Your Stormwater Pollution Prevention Plan* are available on EPA’s website at: <https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates#swppp>. Sample inspection and corrective action forms are included in the guide.

END OF SECTION

SECTION 01580PROJECT IDENTIFICATION AND SIGNSPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Provide and erect sign(s) at the project site to identify the project and to indicate the applicable Federal and State Government Agencies that are participating in the development of the project.
- B. Do not place, or allow the placement of, other advertising sign boards at the project site or along rights-of-way furnished for the project work.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

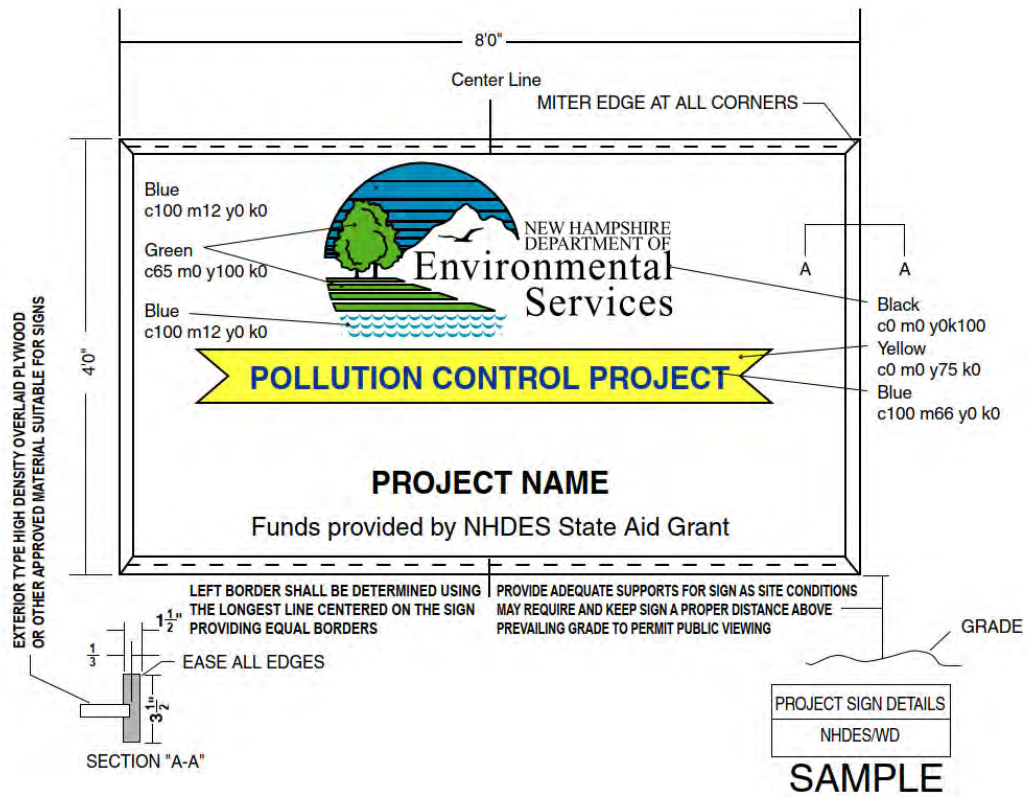
- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

PART 2 - PRODUCTS2.1 MATERIAL AND DESIGN

- A. Construct a sign of 3/4-inch exterior grade, high density overlaid plywood or other material, approved by the Engineer, suitable for signs.

PART 3 - EXECUTION3.1 INSTALLATION

- A. Erect the sign in a prominent location as approved by the Engineer.
- B. Construct the sign in accordance with the following sample Drawing.
- C. Remove the sign when the Work has been completed at no additional cost to the Owner.



END OF SECTION

SECTION 01590TEMPORARY FIELD OFFICEPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Provide and maintain a temporary field office for the exclusive use of the Engineer during the duration of the Contract.
- B. Temporary Field Office must be set up prior to the first week of construction activities.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

PART 2 - PRODUCTS2.1 PRODUCTS

- A. Provide a separate structure or mobile field office trailer, as specified below:

- 1. Size: 10 feet by 16 feet. Door with closure and secure lock.
- 3. Adequate lights over all work areas.
- 4. Convenient and accessible electrical outlets on each wall.
- 5. Adequate heating and air conditioning system with thermostat control.
- B. External portable sanitary facilities.

Furnish the following furniture and supplies:

- 1. One flat top desk, 30 inches by 52 inches, with drawers at each side. Two desk trays, one pencil sharpener and one office chair per desk.
- 2. One plywood drawing table, 3 by 6 feet. One straight chair being suitable for use with drawing table.
- 3. One first aid kit
- 4. One each, broom, dust pan, brush
- 5. One refrigerated, 5-gallon bottle water cooler with refills as needed.
- C. Furnish the following internet and office equipment for the duration of the project:
  - 1. Unrestricted, secure, internet service. Engineer's service shall be separate from the Contractor's service. Verizon Wireless 5G Modem with unrestricted Internet service. If the construction site is not accessible by Verizon Wireless's network, some other form of unrestricted wired Internet service will be provided (i.e., secured, encrypted, HTTPS and VPN connections in addition to simple web browsing. One combination inkjet printer/copier/scanner, including maintenance and paper, Printer shall be capable of printing in black and white or color on 8.5x11 and 11x17 paper (e.g. HP OfficeJet Pro 7740 Wide Format All-in-One Printer or equivalent). Printer shall be wireless enabled and shall support IEEE 802.11 standard Wi-Fi protocol. Provide ink cartridges, paper and maintenance for the duration of the project.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in approved location and properly set up for all anticipated weather conditions.
- B. Provide electric power, heat, and AC for the duration of the work.
- C. All monthly telephone charges, internet charges, and installation fees shall be the Contractor's expense.

3.2 CLEANING

- A. Upon completion of the project, remove the temporary field office and thoroughly clean and restore the area to the Owner's satisfaction.
- B. The Field Office and furnishings shall remain the property of the Contractor.

END OF SECTION

## SECTION 01600

### DELIVERY, STORAGE AND HANDLING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. This Section specifies the general requirements for the delivery, handling, storage and protection for all items required in the construction of the work. An updated delivery and storage log is required with the monthly payment requisition prior to approval. An example log is included in this section.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 TRANSPORTATION AND DELIVERY

- A. Transport and handle items in accordance with manufacturer's instructions.
- B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than 120 days prior to installation without written authorization from the Engineer.
- C. Ship equipment, material and spare parts complete except where partial disassembly is required by transportation regulations or for the protection of components.
- D. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended, including cross reference of the applicable contract specification section.
- E. Deliver spare parts at the same time as pertaining equipment. Deliver spare parts to the Owner after completion of work.
- F. Deliver products to the site in manufacturer's original sealed containers or other packing system, complete with instructions for handling, storing, unpacking, protecting and installing.
- G. Instructions for handling, storing, unpacking, protecting and installing equipment shall be included in the Equipment O&M Manuals, which shall be submitted prior to the equipment being shipped to the site. This information shall be filed in a dedicated three ring binder(s) on-site, in the Contractor trailers, accessible to the Owner and Engineer. The binder(s) shall be clearly labeled, and include dividers for each specification section. The manufacturer-provided instructions for each equipment item shall be labeled with the specification number, equipment name, and equipment number. The instructions shall also be submitted to the Engineer.
- H. Assume responsibility for equipment material and spare parts just before unloading from carrier at site.
- I. All items delivered to site shall be unloaded and placed in a manner which will not hamper the Contractors normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- J. Provide equipment and personnel to unload all items delivered to the site.
- K. Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify the Engineer in writing of any problems.
- L. Pay all demurrage charges if failed to promptly unload items.

1.4 STORAGE AND PROTECTION

- A. Store and protect products and equipment in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instructions shall be studied by the Contractor and reviewed with the Engineer by them. Instructions shall be carefully followed and a written record of this kept by the Contractor for each product and pieces of equipment.
- B. Arrange storage of products and equipment to permit access for inspection. Periodically inspect to make sure products and equipment are undamaged and are maintained under specified conditions.
  - 1. For outdoor storage of pipe, valves and fittings
    - a. All plastic piping shall be covered with tarps or similar and adequately strapped down to eliminate UV exposure.
    - b. All valves and fittings shall be covered adequately to protect from weather (rain, sleet, snow) and sun (UV) exposure.
    - c. The materials shall be inspected by the Contractor at a minimum, weekly, to ensure that the material storage measures have met the requirements of this section and manufacturer recommendations.
- C. Provide protective maintenance during storage consisting of manually exercising equipment, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer necessary for its protection and all other precautions to assure proper protection of all equipment stored and for compliance with manufactures requirements related to warranties.
- D. Store loose granular materials on a solid flat surface in a well-drained area. Prevent mixing with foreign matter.
- E. The location of all stored material and equipment shall be reviewed with the Owner and Engineer. The Owner and Engineer may request that equipment and material be moved to an alternate location to accommodate plant maintenance and operation, or if the location is deemed unacceptable or unsuitable.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING MONTHLY LOG

- A. An updated storage and delivery log is required with the monthly payment requisition prior to approval.
- B. The monthly log shall include the specification section, equipment description, equipment tagging, submittal approval date, date of equipment delivery, date of O&M submittal, contractor start-up sign-off, certified equipment testing date, operator training date, spare parts turnover date, required maintenance (activity and date), and equipment turnover (Owner's witness and date).

3.2 STORAGE AND PROTECTION

- A. Equipment requires acceptance and verification of the storage from the Owner, Engineer, Manufacturer and Contractor at the Engineer's discretion.
- B. Following delivery, the equipment warranty from the Manufacturer is the responsibility of the Contractor.

- C. All storage and maintenance will be the responsibility of the Contractor, conducted at the Contractor's expenses and verified by the Engineer.
- D. It is the Contractor's responsibility to coordinate all storage requirements on site as required by the Manufacturer to achieve acceptance.

END OF SECTION



SECTION 01720PROJECT RECORD DOCUMENTSPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Keep accurate record documents for all additions, demolition, changes of material or equipment (from that shown on the Drawings), variations in work, and any other additions or revisions to the Contract (via Change Order, Request for Information, Work Change Directive, Field Order or Engineer's Clarification).

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 MAINTENANCE OF DOCUMENTS

## A. Maintain at job site, one copy of:

1. Contract Drawings
2. Specifications
3. Addenda
4. Reviewed Shop Drawings
5. Change Orders
6. Any other modifications to the Contract
7. Field Test Reports

- B. Store documents in files and racks specifically identified for Record Drawing use, that are apart from documents used for construction.
- C. File documents in a logical manner indexed for easy reference.
- D. Maintain documents in clean, dry, legible condition.
- E. Do not use record documents for construction purposes.
- F. Records shall be made available for review by the Owner, Engineer, Resident Project Representative and/or Funding Agency(s) upon request.
- G. Failure to maintain current records, as specified herein, shall be grounds for withholding payment from monthly partial payment requests.
- H. Failure to provide records shall also be grounds for withholding of final payment and, if beyond contract time, shall be grounds for imposing liquidated damages.

1.4 RECORDING

- A. Label each document "PROJECT RECORD" in large printed letters.
- B. Keep record documents current and do not permanently conceal any work until required information has been recorded.

- C. General Field Recording Issues:
1. As built record shall be developed by field survey of record with contractor supplied survey grade GPS data.
  2. All horizontal and vertical dimensions, swing-ties, and elevations shall be accurate to within one-tenth of a foot, unless greater accuracy is specified herein or elsewhere in the Specifications (e.g., concrete elevations, weir elevations, etc.).
  3. Swing ties shall be taken from existing, permanent features such as utility poles, corners of buildings and hydrants. Porches, sheds or other house additions shall be avoided as they could be torn down. A minimum of two swing ties shall be taken. Survey grade GPS coordinates are also acceptable.
  4. Stations shall be recorded to the nearest foot.
  5. Inverts shall be recorded to the nearest hundredth of a foot.
  6. Elevations shall be recorded to the nearest hundredth of a foot.
  7. Building dimensions shall be recorded to the nearest 1/4".
  8. Equipment and Piping shall be recorded to the nearest tenth of a foot, and the overall dimensions and layout of the equipment shall be adjusted to reflect the equipment provided.
- D. Project Record Drawings - Legibly mark Contract Drawings to record existing utilities and actual construction of all Work, including but not limited to the following (where applicable):
1. Existing Utilities
    - a. Water mains and services, water main gate valves, water main thrust blocks, sewer mains and services, sewer force main valves, sewer force main thrust blocks, storm drains, culverts, steam lines, gas lines, tanks and other existing utilities encountered during construction must be accurately located and shown on the Drawings. In congested areas supplemental drawings or enlargements may be required.
    - b. Show any existing utilities encountered in plan and profile and properly labeled showing size, material and type of utility. Ties shall be shown on plan. Utility shall be drawn to scale in section (horizontally and vertically) and an elevation shall be called out to the nearest hundredth of a foot.
    - c. When existing utility lines are broken and repaired, ties shall be taken to these locations.
    - d. If existing water lines are replaced or relocated, document the area involved and pipe materials, size, etc. in a note, and with ties.
  2. Manholes, Catch Basins, Valve Pits, Oil/Water Separators and other structures.
    - a. Renumber structure stationing to reflect changes.
    - b. Show ties to center of structure covers or hatches.
    - c. Show all inverts at the face of the structure.
    - d. Draw any new structures that are added on plan and profile.
    - e. Show any field or office redesigns.
    - f. Redraw plan if the structure's location is moved more than 5 feet in any direction.
    - g. Redraw profile if inverts changed by more than 6 inches.
  3. Gravity Sewer Line

- a. Annotate sewer line slopes indicated on Drawings if inverts are changed.
  - b. Draw any new gravity lines that are added on plan and profile.
  - c. Show any field or office redesigns.
  - d. Redraw the sewer line profile if manhole inverts are redrawn.
  - e. Redraw the sewer line on plan corresponding to relocated manholes.
4. Force Mains
    - a. Show ties to the location of all valves, bends (horizontal and vertical), tees and other fittings. Show locations and size of all thrust blocks.
    - b. Revise elevations indicated on the Drawings to reflect actual construction.
  5. House Services
    - a. Draw all house services (even to empty lots) on plans and show ties.
    - b. Show swing ties or distances to wyes from manhole.
    - c. Show chimneys heights in the profile.
    - d. Provide survey grade GPS locations for all services.
  6. Ledge
    - a. Show ledge profiles. Note whether the plotted ledge profile reflects undisturbed or expanded conditions.
  7. Roads
    - a. Show centerline road profile and level spot elevations.
    - b. Show pavement widths.
    - c. Show the pavement cross slope on road cross-sections if they differ from the Drawings.
    - d. Show any deviations from the design plans.
  8. Utilities
    - a. When encountered, additional utilities (e.g., gas, cable, telephone, fiber optic, etc.) shall be indicated on the Record Drawings.
- E. Specifications and Addenda - Legibly mark up each section to record:
1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
  2. Changes made by Change Order, Field Order, or other method.

#### 1.5 SUBMITTALS

- A. At the completion of the project, and prior to the release of retainage, deliver record documents to the Engineer.
  1. "Sanitary Sewer Service Location" forms for all services.
  2. Record drawings shall be provided as a bound paper set of computer-generated drawings, an electronic file (pdf format) of the bound paper set, and electronic files in AutoCAD format. Ownership of the drawings and files shall pass to the Owner at the time of submittal.
- B. Submittal shall be accompanied by a letter containing the following:
  1. Date, project title and number.
  2. Contractor's name and address.
  3. Title and number of each record document with certification that each submitted document is completed and accurate.
  4. Signature of Contractor, or their authorized representative.

## PART 2 - PRODUCTS

Not Applicable

## PART 3 - EXECUTION

### 3.1 MAINTAINING AND PROVIDING RECORDS

- A. Records shall be kept current as the work progresses.
- B. Do not conceal any Work until the required records are collected.
- C. Records shall be made available for review by the Owner, Engineer, Resident Project Representative and/or Funding Agency(s) upon request.
- D. Records shall be submitted as specified herein.

### 3.2 AS-BUILT SURVEY PERFORMANCE

- A. From established survey control, and construction baseline as shown on the drawings, conduct surveys of the project area during construction as needed to obtain information of buried and above ground items. Surveys shall include all the relevant information specified herein.
- B. Actual road alignments; walls; fence and guardrail; existing, new and relocated utility poles; traffic and warning sign locations; crosswalks, parking space and stop bar locations; retaining walls and foundations drains; all underground and overhead utility poles and lines within the project limits, including those installed on private property; all other new features and appurtenances and those existing features and appurtenances changed as a result of this project shall be included in the survey.

### 3.3 FORMAT FOR ELECTRONIC DELIVERABLES

- A. AutoCAD digital survey data for the as-built survey shall include:
  - 1. Copy of field notes and sketches of the survey.
  - 2. Paper copy of description of layers.
  - 3. Paper copy of base map.
  - 4. Provide digital information on compact disk with paper copy printout; information shall be provided in .DWG format (AutoCAD 2011 or earlier). Data shall be provided in 3D format (northing, easting, elevation, or Y, X, Z).
  - 5. Drawing scale: Minimum one inch = twenty feet.
  - 6. Layering:
    - a. Repetitive symbols made into blocks and defined on layer 0.
    - b. All entities shall be drawn "by layer" as opposed to individual properties.
    - c. Use one linetype and one color per layer as opposed to numerous colors/linetypes on a single layer.
    - d. Preface each layer with the initials of the Survey company or Contractor (example, Survey Company: SC "layername").
    - e. Database text annotation will be coordinated so the text will be right-reading.
    - f. Place text on separate layers.



SANITARY SEWER SERVICE LOCATION

|                            |       |                |       |
|----------------------------|-------|----------------|-------|
| Project:                   | _____ | Date:          | _____ |
| Date Installed:            | _____ | Town, City of: | _____ |
| Type, Size of Service Pipe | _____ | Street         | _____ |
| Connection at Sewer Main   | _____ | Dwelling No.   | _____ |
| Depth, End of Service      | _____ | Occupant       | _____ |
| Length of Service Pipe     | _____ | Owner          | _____ |
| Laid                       | _____ |                | _____ |
| Measured, Located By       | _____ | House No.      | _____ |
| Project Contractor         | _____ | Complete       | _____ |
|                            |       | Incomplete     | _____ |

N.T.S.

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Observed By:

|               |        |
|---------------|--------|
| _____         | _____  |
| Contractor    | (Date) |
| _____         | _____  |
| Wright-Pierce | (Date) |

END OF SECTION

SECTION 02050ADEMOLITIONPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. The Contractor shall furnish all labor, materials, tools, equipment and apparatus necessary and shall do all work required to complete the demolition, removal, and alterations of existing facilities as indicated on the Drawings, as herein specified, and/or as directed by the Engineer.
2. Demolition and alteration work within occupied areas shall be accomplished with minimum interference to the occupants and to the facility which shall be in continuous operation during construction.
3. All equipment, piping, and other materials that are not to be relocated or to be returned to the Owner shall become the property of and shall be disposed of by the Contractor, away from the site of the work at Contractor's expense.
4. All demolition or removal of existing structures, utilities, equipment, and appurtenances shall be accomplished without damaging the integrity of existing structures, equipment, and appurtenances to remain, to be salvaged for relocation/reinstallation or stored for future use.
5. Items that are damaged due to the demolition or removal process shall either be repaired or replaced at the Contractor's expense to a condition at least equal to that which existed prior to the start of work.
6. Unless otherwise indicated, all items labeled to be "removed", "demolished" or "remove/demolish" shall be removed and disposed of offsite in accordance with all Local, State and Federal Regulations. Items labeled "remove and reinstall" or "relocate" shall be carefully disconnected from their existing location, cleaned, securely and safely stored in a protected area for subsequent installation in their final location. Items labeled "remove and provide to owner" or "to be salvaged" shall be carefully disconnected from their existing location, cleaned, and securely and safely delivered to the Owner's designated location.
7. The Contractor shall not collect any samples of either Building Materials, Wastes, Soils, or any other site/project related materials, nor have the samples analyzed for any reason without prior written approval from the Owner or Engineer. Furthermore, the Contractor shall not hire or contract with another party or Consultant to conduct sampling of either Building Materials, Wastes, Soils, or any other site/project related materials or to conduct analytical analysis.
  - a. All sampling requests are to be directed in written format to the Owner and Engineer.
  - b. By collecting unauthorized samples, the Contractor shall assume any and all financial burden of the required corrective action.

- c. If a sample is collected and analyzed without prior written approval from the Owner or Engineer, the Contractor shall be responsible for any and all remediation required by any applicable regulatory authority arising from or related to the samples collected and analyzed, as the validity of the materials sampled, sample locations and sampling protocols utilized cannot be confirmed by the Owner's or Engineer's independent Consultant.
- B. Subsurface Demolition may include:
  - 1. Pipeline: Pipe may contain pressurized fluids or debris as a result of their use/function. The Contractor shall be responsible for proper control, isolation and disposal of pressurized fluids or debris within pipe to be demolished or removed. The Contractor shall also be responsible to provide permanent or temporary thrust restraint for pipelines that will remain in use and under pressure. The Contractor shall also be responsible for fill material needed to replace the void created by pipeline removal.
  - 2. Structures: Structures (manholes, vaults, chambers, foundations) may be completely buried or partially buried. The Contractor shall be responsible for disconnecting and making safe any utilities connected to the structures being demolished. Contractor shall plug or cap pipe as needed. Coordinate with utility subcontractors for proper disconnection. The Contractor shall also be responsible for the fill material needed to replace the void created by structure removal.

## 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

## 1.3 JOB CONDITIONS

- A. Condition of Structures:
  - 1. The Owner assumes no responsibility for the actual condition of structures to be demolished.
  - 2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner as far as practicable. However, variations within the structures may occur due to Owner's removal and salvage operations prior to the start of demolition work (where applicable).

## 1.4 UTILITIES

- A. Utility Locations:
  - 1. Utility locations shown on the plans are approximate only, based on information supplied by the utility companies.
- B. Coordination with Utilities:
  - 1. The Contractor shall make all necessary arrangements and perform any necessary work to the satisfaction of affected utility companies and governmental divisions involved with the discontinuance or interruption of affected public utilities and services.

1.5 SUBMITTALS

A. Schedule - Demolition:

1. Submit two (2) copies of proposed methods and operations of demolition to the Engineer for review prior to the start of work. Include in the schedule the coordination for shut-off, capping and continuation of utility services as required.
2. Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the Owner's operations.

1.6 PROTECTIONS

- A. Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and persons. Erect temporary, covered passageways as required by authorities having jurisdiction.
- B. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.7 DAMAGES

- A. The Contractor shall promptly repair damages caused by demolition operations to adjacent facilities at no cost to the Owner.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PERFORMANCE

- A. Remove and dispose of non-salvageable material in accordance with all applicable local and state laws, ordinances and code requirements.
- B. Dispose of material daily as it accumulates.
- C. Carefully remove, store and protect from damage all materials to be salvaged.
- D. Buildings and Adjacent Property:
  1. Protect all buildings and property adjacent to equipment to be removed from damage by erecting suitable barriers or by other suitable means.
  2. Leave such buildings in a permanently safe and satisfactory condition.
- E. Maintaining Traffic:
  1. Ensure minimum interference with roads, streets, driveways, sidewalks and adjacent facilities.
  2. Do not close or obstruct streets, sidewalks, alleys or passageways without permission from authorities having jurisdiction.
- F. Salvage:
  1. Salvaged items shall be stored on site for the Owner in an acceptable location and manner.
- G. Demolition Sequence:
  1. The demolition sequence is to confirm the reviewed and approved project schedule, and restrictions outlined in Section 01310, Construction Schedules.
- H. Pest Control:
  1. Provide pest control when needed or when directed by the Engineer.



2. Exterminate and prevent migration of rodents to adjoining buildings in accordance with the requirements of the state or local health department.

END OF SECTION

SECTION 02076ASBESTOS-CEMENT (TRANSITE) PIPE REMOVAL AND DISPOSALPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Remove and dispose of Asbestos-Cement (AC) sewer main according to all applicable Federal, State, and local laws, regulations, and ordinances.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SCHEDULING

- A. Prior to initiating AC pipe removal, the Contractor shall prepare an abatement plan and provide a copy for record purposes to the Engineer. Refer to Paragraph 1.5 SUBMITTALS for more information.
- B. The Contractor shall update the abatement schedule as requested by the Engineer.

1.4 CODES, REGULATIONS, AND STANDARDS

- A. General Applicability
  - 1. Contractor shall perform all work in accordance with these specifications: U.S. Environmental Protection Agency (U.S. EPA) and Occupational Safety & Health Administration (OSHA) regulations, NIOSH recommendations, New Hampshire Department of Environmental Services (NHDES) rules and regulations, and any other applicable Federal, State and local government regulations and guidelines
  - 2. The most recent edition of any relevant regulation, standard, document, code or policy statement shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirement(s) shall be utilized.
- B. Contractor Responsibility
  - 1. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and local regulations related to all aspects of the abatement project. The Contractor is responsible for providing and maintaining training, accreditation, medical exams, medical records, and personal protective equipment as required by applicable Federal, State and local regulations. The Contractor shall hold the Owner and Owner's Representative harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of the Contractor, Contractor's employees, or subcontractors of the Contractor.

## ASBESTOS-CEMENT (TRANSITE) PIPE REMOVAL AND DISPOSAL

- C. The publications listed below form a part of this specification to the extent referenced. The publications listed below are not intended to be a comprehensive list of all regulations, applicable to this work.
1. Environmental Protection Agency (EPA):
    - a. National Emission Standards for Hazardous Air Pollutants (NESHAP) Title 40, Part 61).
    - b. A Guide to Respiratory Protection for the Asbestos Abatement Industry.
  2. Occupational Safety and Health Administration (OSHA):
    - a. Asbestos Construction Standard 29 CFR Part 1926.1101
    - b. Asbestos General Industry Standard 29 CFR 1910.1001
    - c. Respiratory Protection, 29 CFR 1910.134
    - d. Construction Industry Standards, 29 CFR 1926
  3. U.S. Department of Transportation
    - a. 49 CFR 100 - 185, Transportation
  4. National Institute for Occupational Safety and Health (NIOSH):
    - a. "Respiratory Protection A Guide for the Employee."
  5. American National Standards Institute (ANSI):
    - a. Z86.1-1973 - Commodity Specification for Air
    - b. Z9.2 - HEPA Filter Specifications
    - c. Z88.2-1980-Respiratory Protective Equipment
  6. New Hampshire Department of Environmental Services (NHDES):
    - a. Env-A 1800 Asbestos Management and Control

## 1.5 PERSONNEL QUALIFICATIONS

- A. All personnel of the Contractor or any approved subcontractors involved with asbestos abatement work shall meet the following minimum qualifications:
1. Medical examination within the past year in accordance with OSHA 1926.134 with a physician's written opinion that the worker has no condition that would preclude him/her from working with asbestos or wearing a respirator.
  2. Proof that all workers have completed Class II AC (Transite) Pipe Removal Training.
- B. The Contractor shall employ a competent person to oversee all aspects of AC pipe removal.
- C. There shall be a sufficient number of trained and qualified workers, foremen and superintendents to accomplish the work within the required schedule. No untrained or unqualified person shall be employed to speed up completion of the abatement work.

## 1.6 SUBMITTALS

- A. Submittals shall be in accordance with Specification Section 01300 - Submittals.
- B. At a minimum, the following submittals shall be submitted to the Engineer.
1. Certification of compliance with OSHA requirements including but not limited to medical surveillance, record keeping and personnel exposure monitoring.
  2. Respiratory Protection Program. Include site specific exposure assessment for respirator selection.
  3. A written project schedule. The schedule shall be date specific and include all phases of the project.

## ASBESTOS-CEMENT (TRANSITE) PIPE REMOVAL AND DISPOSAL

4. Emergency Action Plan.
  5. Copies of training certificates for all personnel involved in the removing of asbestos cement pipe.
  6. Copy of current license of the asbestos abatement contractor if utilized.
  7. Proposed waste disposal site and waste transporter. Include name, address, telephone number and operating permits, etc.
  8. Safety data sheets (SDS) for all materials and products to be used by the Contractor on this project.
  9. A work plan outlining the methods to be used during the removal of AC pipe. The work plan shall include the use of the Best Management Practices pertaining to the qualifications of field personnel and methods for dust control, packaging, transportation, and decontamination of equipment.
- C. During Abatement
1. Results of personnel exposure monitoring.
  2. Project schedule.
- D. Post Abatement Submittals
1. Disposal receipts (within timeframes regulated by EPA) signed by the landfill operator demonstrating that the AC pipe removed from the project has been packaged, transported and disposed of properly.
  2. Provide the Engineer with copies of on-site job logs, notifications, permits, accident reports, personnel exposure air monitoring results, waivers of lien.
  3. Copies of any notices of non-compliance issued by governmental authorities.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Polyethylene sheeting: shall be at least 6-mil thickness. Sheeting, labels and tape shall comply with OSHA standard 29 CFR 1926.
- B. Disposable bags and/or drums: shall be of 6-mil polyethylene, on which labels are directly printed, as required by EPA, OSHA and DOT regulations.
- C. Surfactant (wetting agent): shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water or as specified by manufacturer.

### 2.2 PERSONNEL PROTECTION

- A. The Contractor is responsible to determine what personnel protection equipment is needed.
- B. The Contractor is required to provide all required personnel protective equipment.

## PART 3 - EXECUTION

### 3.1 TOOLS AND EQUIPMENT

- A. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transport, and unloading of contaminated waste without exposure to persons or property. The equipment shall be secured at all times and access limited to authorized personnel only.

## ASBESTOS-CEMENT (TRANSITE) PIPE REMOVAL AND DISPOSAL

- B. The Contractor shall provide approved respirators and protective clothing to all Contractor personnel. The Contractor shall also provide approved protective clothing to representatives of the Owner, and to representatives of the State or other governmental entity who may inspect the job site.
- C. Protective clothing requirements must include, but may not be limited to:
  - 1. One-time use, disposable, full-body coveralls made by Tyvek®, 3M, or approved equal.
  - 2. Hard Hats
  - 3. Eye protection
  - 4. Gloves
  - 5. Respiratory protective equipment as required by State law
  - 6. Other as appropriate for site conditions
- D. The Contractor shall have sufficient equipment to mix and spray wetting agents.
- E. The Contractor shall have a sufficient quantity of, ladders, hand tools and materials to conduct the abatement project in an efficient and workmanlike manner.

### 3.2 INSPECTION AND PREPARATION

- A. Before any work commences, post danger signs in and around the work area to comply with Federal, State, and local law.

### 3.3 WORK AREA PREPARATION:

- A. Regulated area access is to be restricted to authorized trained/accredited and protected personnel. The Contractor shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel.
- B. Prior to any asbestos related work in an area, restrict access to all persons other than trained personnel and authorized visitors. The Contractor shall erect signs around the perimeter in accordance with EPA, OSHA and this specification. Maintain a log of all people entering and exiting the workplace during abatement work.
- C. The Contractor shall be responsible for taking whatever steps are necessary to prevent a release to the environment and additional contamination of the areas beneath the AC pipe.

### 3.4 AC PIPE CONNECTION AND REMOVAL PROCEDURES

- A. Cutting of existing AC pipe shall be minimized. Cutting of AC pipe shall be performed in accordance with all applicable OSHA standards and shall minimize release of AC fibers.
- B. AC pipe shall be secured, wrapped, and disposed of in a timely manner. Stockpiling of removed pipe in an unsecured area shall not be allowed.
- C. AC pipe shall be transported to a licensed facility for proper disposal.
- D. Crushing of pipe in-place shall not be allowed.

### 3.5 GENERAL PROCEDURES

- A. Install polyethylene sheeting beneath the AC pipe to minimize contamination of adjacent soil.
- B. All surfaces shall be wetted during removal activities.
- C. If AC pipe is found to be friable or will be rendered friable, abatement shall be conducted in containment.

- D. AC pipe shall be removed from the trench in an “intact” condition in sizes such that the piping may be handled without breakage.
- E. If AC pipe sections can be separated without cutting, the removal may be conducted without containment.
- F. Separated non-friable AC pipe sections may be removed without containment.
- G. If AC pipe sections require breaking/cutting to separate, all breaking/cutting activities shall be conducted within a glove bag or negative pressure regulated work area (containment).
- H. In the event of breakage of AC pipe during removal which results in pieces contacting soil, then the Contractor shall remove all debris and soil located adjacent to and beneath the debris as well as six inches of soil from beneath and surrounding the debris. All resultant debris and soils shall be properly handled, packaged and disposed of as friable, regulated asbestos waste.
- I. The Engineer and Owner shall be notified immediately in the event of breakage.
- J. AC pipe shall be double wrapped in 6-mil polyethylene sheeting and labeled prior to transport as required.

### 3.6 DISPOSAL ACTIVITIES

- A. It is the responsibility of the Contractor to determine current waste handling, transportation, and disposal regulations and or requirements for AC pipe and for each waste disposal facility. The Contractor must comply fully with these regulations and all U. S. Department of Transportation and EPA requirements.
- B. The Contractor will document actual disposal of the waste at the designated landfill by completing a Waste Shipment Record and forwarding a copy of it along with a copy of the Bill of Lading to the Engineer.
- C. All waste load-out and disposal activities shall be the responsibility of the Contractor.
- D. Temporary Storage Locations (TASL) and storage containers shall be locked and secured.
- E. Contractor shall insure that transport vehicles do not leak water or other material while being loaded, transported or while on site partially loaded. At minimum, transport vehicles shall be lined with two layers of 6-mil thick polyethylene sheeting installed to form a watertight barrier within the vehicle. If water is observed leaking from any transport or storage container, contractor shall immediately stop work, unload the container (including dumpsters and semi-trailers) find and correct the source of the leak, and place waste material back into the container. This process will be repeated each time any water is observed leaking from a storage or transport vehicle that contains asbestos waste. Contractor shall also take all steps necessary, to decontaminate the ground or other surfaces that became wet due to water leaking from a container that holds asbestos waste.

### 3.7 CLEANING AND FINAL DECONTAMINATION

- A. After the removal of the AC pipe has been completed and before removal of barriers (as applicable), the entire area shall be thoroughly cleaned. All plastic barriers, tapes and disposable contaminated equipment shall also be disposed of as asbestos waste. All reusable contaminated equipment such as masks, hard hats, etc., shall be thoroughly decontaminated through wet cleaning or sealed within 6-mil polyethylene bags before removal from the work area.

ASBESTOS-CEMENT (TRANSITE) PIPE REMOVAL AND DISPOSAL

END OF SECTION

## SECTION 02080A

### CONTAMINATED SOIL AND WASTE MANAGEMENT

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Provide all labor, equipment, materials, supervision and documentation necessary to manage soil and waste resulting from Work as shown on the Drawings and as specified herein, including:
- B. Project Conditions
  - 1. In the course of the work, it may be necessary to excavate and handle potentially contaminated soil and waste material. The soil and waste management practices specified herein apply to all soil and waste material excavated during the course of this contract. The Contractor shall reuse geotechnically suitable excavated material prior to using imported backfill to reduce the volume of material to be disposed off-site. Imported backfill shall be used only as accepted by the Engineer. Historic fill soils and roadway base/subbase shall be re-used to the maximum extent before reusing naturally occurring soils.
  - 2. To the extent possible, the Contractor shall reuse geotechnically suitable but impacted excavated material prior to using imported backfill material to reduce the volume of impacted or contaminated soil to be disposed of off-site. The Contractor shall segregate fill from natural soils during excavation and shall segregate fill and natural soil stockpiles to avoid mixing impacted and background soils prior to in-project reuse.
  - 3. The Contractor may encounter impacted material on Grover Street and Pembroke Road, where the following boring locations were found to have NHDES Soil Remediation Standard (SRS) exceedance levels: HA24-3 (STA 104+60), HA24-8 (STA 114+50), HA24-13 (STA 124+85), and HA24-28 (STA 154+95). The amount of impacted material is estimated as 10% of the trench soil surrounding an exceedance site from halfway to the next boring location in either direction. Material that cannot be reused on-site shall be disposed of appropriately by Contractor and paid for by unit price items.
  - 4. Notify the Owner and Engineer if unexpected subsurface conditions are encountered and discontinue work in the area until Owner provides notification to resume work.
  - 5. All costs associated with delineation, testing, excavation, remediation, treatment, handling, transport and/or disposal of soil and wastes not previously identified without prior written consent from the Owner or Engineer shall be the responsibility of the Contractor.
- C. Health and Safety
  - 1. The Contractor shall be responsible for providing workers that have safety training complying with OSHA, Title 29 CFR Part 1910, Occupational Safety and Health Standards, and Title 29 CFR Part 1926, Safety and Health Regulations for Construction Sites and NIOSH/OSHA/USCG/USEPA,



Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, DHHS/PHS/CDC/NIOSH, October 1985. The provided workers shall be responsible for actively coordinating activities with the Owner and Engineer.

2. The Contractor shall provide a project-specific Safety and Health Plan for the health and safety of all on-site individuals during performance of the Work described herein, also including any individuals at disposal sites. The Contractors plan shall include provisions for the protection of public health and safety in areas where excavations are located. The Contractor shall comply with all applicable provisions of federal, state, and local health and safety and occupational health and safety statutes and codes.

D. Reporting

1. If a reportable condition as defined in Federal or State Regulations occurs, the Contractor shall immediately notify the Owner and Engineer. Owner will notify the State Environmental Agency.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. All work shall be conducted in compliance with the following site-specific plans prepared by the Contractor, as described herein:

1. Site Specific Safety and Health Plan
2. Soil and Waste Management Plan
3. Dewatering Plan (refer to Section 02140)

B. Objectives

1. The objective of the excavated materials/soils management practices is to manage all soil and other contaminated excavated material at the site during the course of this contract in compliance with applicable Federal, state and local laws and regulations in a cost-effective manner. Contractor shall provide details in the SMP regarding their approach to Quality Assurance during soil excavation, dewatering monitoring and reporting.
2. The objective of the dewatering plan is to manage and control groundwater, divert and handle site stormwater, including groundwater/stormwater discharge flows from/toward the excavation during the course of this contract in compliance with applicable Federal, state and local laws and regulations in a cost-effective manner.
3. The Contractor shall prevent any cross-contamination and/or mixing of materials. If cross-contamination occurs, the Contractor shall perform activities to correct the cross-contamination to the satisfaction of the Owner at no additional cost to the Owner and without delay to the project.

C. Contractor Qualifications

1. Contractor shall demonstrate the necessary skills, experience, training and qualifications to conduct the work specified herein.
2. Contractor shall possess all required licenses, insurances, permits and trained employees to properly execute the work specified herein.

3. Work shall be performed by personnel that are formally trained in handling contaminated soil and groundwater similar to that found on the project site and utilizing the proper equipment.
  4. All personnel involved in the transportation of waste from the site shall have the required Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) training.
- D. Contractor' Environmental Professional Qualifications
1. Contractor shall retain an environmental professional to oversee its operations and conduct any required sampling. Contractor's environmental professional shall:
    - a. Have a minimum of 5 years of demonstrated experience on soil and waste management projects
    - b. Have a current registration as a professional engineer, licensed site professional, in the State of New Hampshire.
    - c. Have current OSHA health and safety training.
- E. Contractor's Analytical Laboratory
1. Contractor shall retain an environmental analytical laboratory to conduct laboratory testing. Contractor's analytical laboratory shall:
    - a. Have accreditation from the State of New Hampshire Department of Public Health.
    - b. Have a minimum five years' experience.
    - c. Have the ability to perform all analyses and provide analytical reports on accordance with the state regulated Protocols.

#### 1.4 SUBMITTALS

- A. Provide submittals in accordance with Specification Section 01340.
- B. Submit qualifications of Contractor's Environmental Professional and Analytical Laboratory.
- C. Submit the following Technical Documents prior to beginning work.
  1. Site Specific Safety and Health Plan
  2. Soil and Waste Management Plan
  3. Dewatering Plan (refer to Section 02140)
- D. Submit the following Quality Control Documents prior to beginning work.
  1. Name and current training certifications for personnel completing the work.
  2. Name and address of transporters to be used on the project to transport Regulated Soil.
  3. Current licenses and permits to operate in all states affected by transport.
  4. Disposal Facility Information: Facility Name & Address, Contact Person Name/Title/Phone Number, and Facility Permit Number.
  5. Written confirmation from the facility that they are permitted to accept and will accept material of the general quality and quantity described by these Specifications, and the Facility's acceptance criteria.
  6. Facility sampling frequency and analytical testing requirements.
  7. Written approval from NHDES for disposal of Regulated Soil or use of Regulated Soil as cover soil in a solid waste disposal area at facilities located in the state of New Hampshire.

8. The Owner shall approve the proposed transporter and disposal facility prior to the transport of any Regulated Soil.
- E. Submit the following documents during execution of Work:
  1. All records, certifications, and results associated with the testing or management of excavated materials shall be submitted to the Owner within time frames identified in the SMP.
  2. If the Contractor makes updates to the Site Specific Safety and Health Plan, Soil and Waste Management Plan, or the Dewatering Plan, the Contractor shall provide updated copies to the Owner and Engineer.
  3. All chemical analytical reports within 48 hours of the Contractor's receipt.
  4. Waste profile forms, material shipping records or any other forms, letters or documents that must be signed by the Owner to obtain authorizations for disposal no less than seven days in advance of shipping materials off site.
  5. Shipping papers or manifests that must be signed by the Owner no less than 14 days in advance of shipping materials off site.
  6. Registrations, letters, forms or applications to be sent to Federal, State or Local environmental regulatory agencies to the Engineer for review prior to submittal. Allow seven days for review. No adjustments for time or money will be made if re-submittals are required due to deficiencies.
  7. Certified manifests or shipping paper and weight slips from the approved disposal facilities for Regulated Soil transported and disposed of off-site within five days of Contractor's receipt. At a minimum, manifests and weight slips include the following:
    - a. Truck transporter name, address and telephone number.
    - b. Truck number, date and time of load-out.
    - c. Gross weight, tare weight and net weight of truck.
    - d. Description of material being transported.

#### 1.5 DEFINITIONS

- A. Soil (Natural Soils): Soil, otherwise known as natural soil, is defined for the purposes of the Contract as unconsolidated sand, gravel, silt and clay, and the organic material which has become part of the unconsolidated soil matrix. For this section only, soil may include broken and fragmented rock.
- B. Solid Waste: Includes all excavated material not classified as Soil.
- C. Urban Soil: Soil that includes natural soil, natural sediment, and rock, brick, ceramics, concrete, asphalt paving fragments, and other miscellaneous debris contained in the excavated soil.
- D. Unauthorized Over-Excavation: Consists of removal of materials beyond indicated elevations and width limits indicated in the Contract Documents without direction of the Engineer. Over-excavation material handling, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Over-excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer.

- E. Unauthorized Excavation: Consists of removal of materials beyond indicated sub-grade elevations or Contract-defined limits as shown in the Contract documents without specific direction of the Engineer. Unauthorized excavation, handling material, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Unauthorized excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer.
- F. Unknown Materials: Any material, that is not readily identifiable as nonhazardous waste, and which has not been previously characterized or encountered during site investigation activities. The Unknown Material classification is to be used in the event that an unexpected, unusual material is encountered for which special handling procedures shall be required in order to handle the material safely. The Owner reserves the right to apply generator knowledge to classify and profile the material as a previously encountered waste or as a known waste. In the event that a material is encountered which the Contractor is uncertain as to its nature, the Owner shall assess the material with the Contractor and inform the Contractor as to the nature of the material (known or unknown).
- G. Non-Hazardous Oil-Contaminated Soil (NOCS): Soil that is contaminated with oil, not a hazardous waste as defined in RSA 147-A:2, VII or RSA 147-B:2, and is certified in accordance with Env-Or 611.03.
- H. Non-Hazardous Contaminated Soil (NCS): Soil that contains a regulated contaminant, is not a hazardous waste as defined in RSA 147-A:2, VII or RSA 147-B:2, and cannot be certified as NOCS in accordance with Env-Or 611.03.
- I. Regulated Contaminant: Any physical, chemical, biological, radiological substance or other matter, other than naturally occurring substances at naturally occurring levels, which adversely affects human health or the environment, and includes, but is not limited to, oil as defined in RSA 146-A:2, III, as reprinted in Appendix C, hazardous substance as defined in RSA 146-C:1, VII-a, as reprinted in Appendix C, hazardous materials as defined in RSA 147-B:2, VIII, as reprinted in Appendix C, hazardous waste as defined in RSA 147-A:2, VII and RSA 147-B:2, VII, both as reprinted in Appendix C, and substances at concentrations in groundwater greater than AGQS or in soil greater than soil remediation standards.
- J. Soil Remediation Standards shall be as defined in Env-Or 600.

## 1.6 HEALTH AND SAFETY

- A. Prepare a written Health and Safety Plan (HASP) as described in Section 01320. Such plan must be approved by signature by the Health and Safety Manager and provide for compliance with OSHA regulations including, as applicable 29 CFR 1910.120. All elements in 29 CFR 1910.120(b) (4) shall be addressed in the HASP.
- B. Designate, in name and title, the Contractor's Health and Safety Manager for all health and safety questions and concerns and provide a 24-hour contact phone number for the Health and Safety Manager.
- C. No work shall be performed related to excavation and handling of Regulated Soil until a HASP is submitted to the Engineer. However, the time to perform under the Contract will begin on the date stipulated in the Notice to Proceed.
- D. Maintain the HASP on site and keep it current with Regulated Soil management activities including loading for transportation and actual site conditions.

- E. Provide personnel protective equipment as stipulated in the Contractor's HASP during the performance of Work in an area identified as potentially posing a risk to worker health and safety for workers employed by the Contractor and Subcontractors.
- F. Inform all on-site workers and Subcontractors of all site safety rules, known or potential hazards, and emergency response procedures.

#### 1.7 SOIL AND WASTE MANAGEMENT PLAN

- A. Prepare a Soil and Waste Management Plan. The plan shall be in compliance with all applicable Federal, State and local regulations; shall be prepared and signed by the Contractor's Qualified Environmental Professional; and at a minimum shall describe detailed procedures that the Contractor plans to follow regarding management of all soil and groundwater, and include the following components:
  - 1. Schedule of activities
  - 2. Soil characterization procedures including sampling frequency, analytical methods and data quality management
  - 3. Storage area construction materials
  - 4. Storage location(s)
  - 5. Disposal facilities and reuse location(s) including address, Owner and Operator
  - 6. Soil segregation procedures
  - 7. Soil loading location and method
  - 8. Operating log to track soil origin, storage location and final disposition
  - 9. Inspection and maintenance procedures
  - 10. Erosion control, dust control, and anti-tracking procedures
  - 11. Emergency and preparedness procedures, including spill response plan
  - 12. Transportation routes
  - 13. Proposed transporters and disposal facilities
  - 14. Site security
- B. No work shall be performed related to excavation and handling of Regulated Soil until the Soil and Waste Management Plan is submitted to and no exceptions taken by the Engineer.
- C. Maintain the Soil and Waste Management Plan on-site and keep it current with Regulated Soil management activities including loading for transportation and actual site conditions.

#### 1.8 SCHEDULING

- A. Notify the Engineer a minimum of 14 calendar days prior to the start of excavation of Regulated Soil. The Engineer will be responsible for contacting regulatory agencies in accordance with the applicable reporting requirements.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Secured Stockpile Area:
  - 1. Urban fill and contaminated soils required temporary storage shall be placed in a properly constructed Secured Stockpile Area. The Secured Stockpile Area shall be constructed using polyethylene sheeting, common borrow and concrete

barriers, as outlined below, and shall be approved by the Engineer or Environmental Professional prior to use.

2. Polyethylene:
  - a. Polyethylene used for liner in the Secured Stockpile Area shall be 3-ply reinforced polyethylene with a non-woven grid of high strength nylon cord, shall have a minimum of 20-mil thickness, and shall meet the requirements of ASTM D3020.
  - b. Sheeting shall be ultraviolet resistant, cold crack resistant to -40 degrees Fahrenheit, and free of holes and foreign matter.
  - c. The material shall be manufactured in a minimum 12-ft seamless width. Label on the rolls shall identify the thickness, length, width and manufacturer's mark number.
  - d. Overlap liner seams 1 foot and joint panels by installing 1.5 inch wide minimum double-sided reinforced black butyl rubber tape between panels.
  - e. Contaminated or suspected contaminated excavated materials shall be placed on a base lined with 20 mil or greater mil thickness reinforced polyethylene and shall be completely securely covered with 6 mil or greater mil thickness reinforced polyethylene.
3. Common Borrow: Material to be used in the construction of the Temporary Secured Stockpile Area soil berm and shall meet the requirements of Section 02200.
4. Concrete Barriers: Concrete jersey barriers and other siltation / stormwater runoff controls to segregate the work areas and stockpile perimeters. Concrete barriers to form the sides of the Secured Stockpile Area shall meet the requirements of NHDOT specifications.

## 2.2 EQUIPMENT

- A. The Contractor shall provide all employees and subcontractors with personal protective equipment and protective clothing as required by the Contractor's site-specific Health and Safety Plan and all applicable federal, state and local regulations.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine and test the areas and conditions under which excavating Regulated Soils is to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Environmental Site Conditions/Safety and Health
  1. Site history indicates the potential for soil contamination which may require off-site disposal and management of excavated soils in conformance with all permits.
  2. Site history indicates the potential for groundwater contamination which will require storage, testing and disposal directly to the City's gravity sewer or through other options as listed in Section 02140.
  3. The Contractor shall notify the workers of the contaminants that may be present and instruct them to be alert for evidence of contaminated soils. The Owner shall

be notified by the Contractor of the presence of hazardous conditions different from those assumed for this document, if encountered.

4. Refer to Section 01320, Safety and Health Plan, for additional safety and health requirements.

### 3.2 PREPARATION

#### A. Temporary Secured Stockpile Area

1. Before placing contaminated material in a temporary stockpile, provide a berm or other drainage barrier around the stockpile area. To prevent accumulation of storm water runoff within the stockpile area, polyethylene sheeting (or other approved method) shall be used to cover stockpiles and the barrier so that runoff is directed outside of the area. Stockpiled areas are to be secured with fencing.
2. Place two complete layers of polyethylene sheeting on the ground in stockpile area, with a minimum overlap of 18 inches for adjacent sheets in each layer and stagger overlaps for each layer. The layers shall hang over the berm or containment.
3. Frac tanks shall be covered and prevent accidental discharge until tested and disposed of in an approved method.

#### B. Temporary Storage of Investigation Derived Waste (IDW)

1. IDW is defined as all soil cuttings, drilling fluids, decontamination fluids, and investigation derived wastes (including, but not limited to, personal protective equipment, disposable sampling devices, and polyethylene sheeting) generated during the drilling and sampling operations by the Contractor.
2. IDW management will be conducted in the Temporary Secured Stockpile Area. Preparation of IDW storage must be included in the Contractor's Soil and Waste Management Plan.

### 3.3 EXCAVATION, BACKFILL AND COMPACTION

#### A. Refer to Section 02200.

- #### B.
- Contractor shall reuse uncontaminated material and urban fill where allowed by the Engineer. Contractor shall dispose of all excess soil and wastes resulting from excavation activities in accordance with federal, state and local regulations and these specifications. Transport shall be by a permitted and licensed waste transporter. The Contractor shall be responsible for supplying the proper manifests to be approved and signed by a representative of the Owner.

### 3.4 EQUIPMENT AND PERSONNEL DECONTAMINATION

- #### A.
- Equipment and personnel decontamination facilities shall be provided by the Contractor when hazardous materials are expected to be encountered and handled onsite. Equipment and personnel decontamination area(s), conforming with the Contractor's HASP and these Specifications, will be constructed in such a manner to protect existing site surfaces, materials, and structures from contamination. The equipment decontamination area(s) will be sized adequately to provide for the decontamination of the largest piece of equipment to be decontaminated. Filter fabric will be placed over an impermeable liner to protect the liner from rips, punctures, or tears from traffic and heavy equipment.

- #### B.
- The Contractor shall establish a site-specific decontamination protocol and

decontamination areas for personnel and equipment utilized at the subject site. Personnel and equipment decontamination shall be conducted in compliance with the HASP.

- C. The decontamination protocol shall include (i) the means, methods, and materials for the proposed decontamination procedures; (ii) the procedures employed to contain and store the wash or rinse liquids/sludges; (iii) procedures used to sample, analyze, and characterize the contaminated wash or rinse liquids/sludges; (iv) procedures to contain or clean contaminated equipment and PPE; and (v) the procedures for handling and disposing of solid wastes generated from site decontamination activities. All sample analysis or sample compositing shall be completed by a certified laboratory. The Contractor shall be responsible for the cost of this analytical work. The Contractor shall submit a copy of the analytical results and laboratory certifications to the Owner for review prior to proceeding with disposal. The Contractor shall be responsible to properly manifest and dispose of all residual wastes generated from on-site activities in conformance with federal, state, and local environmental and transportation regulations. The Contractor shall be responsible for the manifests and procedures to be used to package and dispose of contaminated solid wastes, wash, or rinse liquids at an EPA or state-approved treatment or disposal facility. The Contractor shall be responsible for any releases from site or decontamination activities due to its work, and will remediate any release for which the Contractor is responsible to pre-existing conditions at the Contractor's expense.
- D. Provisions for collecting decontamination water will be incorporated into the maintenance of the decontamination pad and will include placing an impermeable liner over a sloped surface such that water is directed, if necessary, into an area for subsequent pumping to 55-gallon drums or other appropriate tankage. Following completion of the work, the wash water shall be characterized by the Contractor and disposed off-site, in accordance with federal, state, and local regulations.

### 3.5 ENVIRONMENTAL FIELD MONITORING / DUST CONTROL

- A. Refer to related Section 01562, Dust Control.
- B. Dust shall be controlled during excavation of soil/fill waste material to limit potential spread of contaminants and potential exposure of contaminants to workers and the public.
- C. Nuisance dust levels shall be reduced by pre-wetting the surface soils and by establishing and maintaining clean access roads. At a minimum, the Contractor shall provide clean water, free from salt, oil, and other deleterious materials.
- D. Areas of exposed earth to be excavated shall be lightly sprayed with water before excavation if there is potential for nuisance dust generation. Additional water spray may be utilized only when any indication of excessive dust is observed. To the extent feasible, the Contractor shall minimize the use of water within the limits of excavation.
- E. All containers temporarily storing waste material shall be covered at all times except as necessary to place waste material into the container. The Contractor shall monitor the covers daily to ensure the covers are in place and effectively eliminating the generation of dust and make appropriate notes in the site log



3.6 CLEANUP

- A. During the course of the work, the Contractor shall keep the Site and his operations clean and neat at all times. Contractor shall dispose of all residue resulting from the site clearing operations; and at the conclusion for the day's Work, he shall remove and haul away any surplus materials, lumber, equipment, temporary structures, and any other refuse remaining from the site clearing operations and shall leave the entire site in a neat and orderly condition.

3.7 CONTINGENCIES

- A. If during the course of the work, the presence of unforeseen, potentially hazardous materials or conditions becomes known, work in the immediate area shall be suspended and the Owner notified immediately. These conditions include, but are not limited to, finding buried containers, drums, or tanks or finding conditions which materially from those identified in the Bidding Documents.
- B. The effect of unforeseen hazardous conditions on the work shall be evaluated by the Contractor and, if necessary, the Contractor's Safety and Health Plan shall be revised to account for any new hazards due to the unforeseen conditions.

END OF SECTION

SECTION 02110CLEARING AND GRUBBINGPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Clearing and grubbing includes, but is not limited to, removal of trees, brush, stumps, wooded growth, grass, shrubs, poles, posts, signs, fences, culverts and other vegetation and minor structures; the protection of designated wooded growth; the storage and protection of minor structures and materials which are to be replaced; and the disposal of non-salvageable structures and materials, and necessary preliminary grading.

B. Limits of Work:

1. Perform clearing and grubbing work within the areas required for construction, or as shown on the Drawings, to a depth of 12 inches below the existing grade.
2. Perform additional clearing and grubbing work within areas and to depths which, in the opinion of the Engineer, interfere with excavation and/or construction, or are otherwise objectionable.

C. Work Not Included:

1. Clearing and grubbing work performed for the convenience of the Contractor will not be considered for payment.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCEA. Requirements of Regulatory Agencies:

1. Dispose of combustible material by burning only when permitted by and in accordance with all applicable local and state laws, ordinances and code requirements.

- B. Remove and dispose of non-salvageable structures and material in accordance with all applicable local and state laws, ordinances and code requirements.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Provide all materials required to complete the work.

- B. All timber and wood shall become the property of the Contractor unless other agreements are made between the Owner and the Contractor.

- C. Repair any damage to structures to the complete satisfaction of the Owner and Engineer.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Carefully preserve and protect from injury all trees and/or shrubs not to be removed.
- B. Right-of-way:
  - 1. Where excavation is required on public or private rights-of-way containing trees, shrubs, other growth, or any structure or construction, obtain the Engineer's direction concerning the extent to which such obstacles can be cleared or stripped prior to performing the Work.
  - 2. In all rights-of-way, remove only those particular growths or structures which are, in the opinion of the Engineer, essential for construction operations.
  - 3. All other removals or damage shall be replaced or restored at the Contractor's expense.

### 3.2 PERFORMANCE

- A. Clearing:
  - 1. Remove and dispose of all trees, brush, slash, stubs, bushes, shrubs, plants, debris and obstructions within the area to be cleared, except any areas that may be designated as "Selective Clearing", and except as otherwise shown on the Drawings or as directed by the Engineer.
  - 2. Remove all stumps unless otherwise directed by the Engineer.
  - 3. Dispose of material to be removed daily as it accumulates.
  - 4. Take special care to completely dispose of all elm trees and branches immediately after cutting either by burial in approved locations or, when permitted, by burning in areas well removed from standing elm growth.
- B. Protection of Wooded Growth:
  - 1. Fell trees toward the center of the area being cleared to protect trees and shrubs to be left standing.
  - 2. Cut up, remove and dispose of trees unavoidably falling outside the area to be cleared.
  - 3. Employ skilled workmen or tree surgeons to trim and repair all trees that are damaged but are to be left standing.
- C. Selective Clearing:
  - 1. When shown on the Drawings and when directed by the Engineer, perform selective clearing work to preserve natural tree cover.
  - 2. Perform selective clearing work only under the direction and supervision of the Engineer.
  - 3. Remove all dead and uprooted trees, brush, roots and other material which, in the opinion of the Engineer, are objectionable.
  - 4. Cut flush with the ground and remove only those trees indicated by the Engineer.
  - 5. Employ skilled workmen or tree surgeons to carefully trim all branches requiring cutting on trees to be left standing. Wood exposed as the result of removal of branches is to be left exposed to air and sunlight.
  - 6. Bituminous paint shall not be used on wood exposed as a result of branch removal, excavation around roots, or damage to tree bark.
- D. Grubbing:

1. Perform grubbing work beneath new roads, driveways, walks, seeded areas and other areas and as directed by the Engineer.
  2. Grub out all sod, vegetation and other objectionable material to a minimum depth of 12 inches below the existing grade.
  3. Completely remove all stumps, including major root systems.
- E. Disposal:
1. Remove from the site and dispose of material not being burned.
  2. Provide an approved disposal area unless otherwise specified.
- F. Burning:
1. Dispose of combustible materials by burning, only if approved by local and state officials.
  2. Employ competent workmen to perform burning work in such a manner and at such locations that adjacent properties, trees and growth to remain, overhead cables, wires and utilities will not be jeopardized.
  3. Do not leave fires unguarded.
  4. Do not burn poison oak, poison ivy or other plants of similar nature.
  5. Do not use tires or other combustible waste material to augment burning.
  6. Burn combustible materials daily as the work progresses.
  7. The Contractor shall be responsible for all damage caused by burning and shall be responsible for obtaining all necessary permits for burning.

### 3.3 REPLACEMENT OF MATERIALS

- A. Paving, Curbing and Miscellaneous Material:
1. Remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing, flagging and minor structures that are over the area to be filled or excavated.
  2. Remove and replace bituminous asphaltic and portland cement concrete in accordance with the appropriate sections of these Specifications.
  3. Properly store and preserve all material to be replaced in a location approved by the Engineer.
- B. Shrubs and Bushes:
1. Remove, store, and replace ornamental shrubs and bushes to be preserved in accordance with accepted horticultural practices.
- C. Topsoil:
1. When applicable, carefully remove, store, and protect topsoil in accordance with the appropriate section of this division.
- D. Responsibility:
1. Replace, at no additional cost to the Owner, materials lost or damaged because of careless removal or neglectful or wasteful storage, disposal or use of these materials.

END OF SECTION

SECTION 02115STRIPPING AND STOCKPILING TOPSOILPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Segregate topsoil approved by the Engineer prior to excavation, trenching and grading operations and stockpile it for use in the work.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Topsoil shall consist of friable loam of at least two percent decayed organic matter (humus), free of subsoil, and reasonably free of clay lumps, brush, roots, weeds, and other objectionable vegetation, stones and similar objects larger than one (1) inch in any dimension, litter and other materials unsuitable or harmful to plant growth. It shall contain no toxic materials.
- B. The quality of the topsoil material to be used shall be subject to approval by the Engineer.

PART 3 - EXECUTION3.1 PERFORMANCE

- A. Remove topsoil from the areas that are likely to be disturbed as a result of construction operations to a depth based on the soil profile, as approved by the Engineer.
- B. Remove topsoil from all designated areas prior to the performance of normal excavation.

3.2 STORAGE

- A. Transport topsoil and deposit in storage piles convenient to the areas which are subsequently to receive the application of topsoil.
- B. Stockpile topsoil separate from other excavated materials in areas approved by the Engineer.
- C. Take all necessary precautions to prevent other excavated material and objectionable material from becoming intermixed with the topsoil before, during and after stripping and stockpiling operations.
- D. Neatly trim and grade stockpiles to provide drainage from surfaces and to prevent depressions where water may become impounded.
- E. Construct temporary erosion control devices for all stockpiled material, subject to the Engineer's approval.

- F. All loam stripped and stockpiled shall be immediately seeded with 70% Domestic/30% Perennial Rye Grass.

END OF SECTION

SECTION 02140TEMPORARY CONSTRUCTION DEWATERING SYSTEMPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Design, furnish, operate, maintain, and remove temporary dewatering system to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction to be performed in the dry; collect and dispose of ground and surface water where necessary to complete the work.
2. Design, furnish, operate, maintain, and remove temporary treatment system for temporary dewatering system effluent prior to discharge.
3. Conduct structure monitoring, as specified herein.
4. Conduct compliance testing, as specified herein and in accordance with the requirements of the permitting authority.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 DESIGN REQUIREMENTS

- A. The Temporary Construction Dewatering System shall be designed by a Professional Engineer registered in the State of New Hampshire (the "Design Engineer") who is experienced in the design of Temporary Construction Dewatering Systems for subsurface construction operations.
- B. The Temporary Construction Dewatering System shall be of sufficient size and capacity necessary to lower and maintain the ground water table to an elevation at least two feet below the lowest foundation subgrade, or bottom of pipe trench, to allow material to be excavated in a dry condition, including depressurizing the soil stratum beneath the excavation subgrade. Materials to be removed shall be sufficiently dry to permit excavation to grades shown on the Contract Drawings and to stabilize the excavation slopes where temporary excavation support systems are not required. Operate the dewatering system continuously until backfill work has been completed.
- C. Control of surface and subsurface water is part of the Temporary Construction Dewatering System requirements. Maintain adequate control so that:
1. The stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering the prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
  2. Erosion is controlled.
  3. Flooding of excavations or damage to structures does not occur.
  4. Surface water drains away from excavations.

5. Excavations are protected from becoming wet from surface water and ensure excavations are dry before additional work is undertaken.
  6. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
  7. The stability of the sides and bottom of excavations are sustained during excavations. Construction operations shall be performed to dry and stable soils.
  8. Any existing dewatering wells that can affect dewatering and excavation shall be sealed below the excavation subgrade.
- D. The design shall include an assessment of how the dewatering operations will affect the stability of all adjacent structures.
- E. Contractor is responsible to perform additional geotechnical investigations as deemed necessary to facilitate the design of the Temporary Construction Dewatering System and prevent damage to adjacent buildings, roads, structures, utilities and other facilities.

#### 1.4 QUALITY ASSURANCE

- A. The Temporary Construction Dewatering System shall be installed, operated and monitored by the Contractor or a specialty subcontractor specializing in and having experience installing and operating dewatering systems in similar subsurface conditions for at least 5 years.
- B. Well drillers, if required, shall be licensed in the State of New Hampshire.

#### 1.5 SUBMITTALS

- A. Provide submittals in accordance with Specification Section 01340.
- B. Provide a Temporary Construction Dewatering System Plan prepared by a Professional Engineer (as specified above) at least 30 days prior to beginning operations. This submittal shall include:
1. Qualifications of the Temporary Construction Dewatering System Design Engineer and qualifications of the Contractor or specialty subcontractor installing and operating the system.
  2. Detailed written description of dewatering methods to be employed to convey the water from site to adequate disposal, including operations, maintenance and control requirements.
  3. Estimated average, minimum and maximum pumping rates (total).
  4. Capacity and number of standby pumping equipment.
  5. Capacity and number of standby power equipment.
  6. Treatment tankage and discharge locations.
  7. Technical data on the well screens, filter materials and gradations to demonstrate adequacy of the proposed systems to prevent migration of fines.
  8. Structure Monitoring Plan, if required.
  9. Pre-Construction and Post-Construction Survey, if required.
  10. Effluent monitoring provisions and laboratory testing methods, including sample monitoring log (flow, TSS, etc.).
  11. System removal requirements.
  12. Written approval from the NHDES for disposal of the treated water.



- C. The Temporary Construction Dewatering System submittal shall be provided concurrently with and coordinated with the submittals required by Section 02156 (Temporary Excavation Support Systems).
- D. Submit water monitoring results at the frequency required by the permitting authority.
- E. Submit structure monitoring results, if required, at the frequency specified herein.
- F. Submittal review with no exceptions taken of the Temporary Construction Dewatering System Plan shall not in any way relieve the Contractor from full responsibility for the complete and adequate design, installation and performance of the dewatering system and shall not relieve the Contractor of sole responsibility for the dewatering system as necessary to prevent damage and settlement to adjacent buildings, roads, structures, utilities and other facilities adjacent to the excavations and for the safety of people working within the excavated areas.

## PART 2 - PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment used in the Temporary Construction Dewatering System shall adhere to accepted industry standards.
- B. Backup equipment for the Temporary Construction Dewatering System shall be identical to the primary equipment, shall be immediately available and in operating condition at all times.
- C. Pipes and Well Screens: Schedule 40 PVC or stronger.
- D. Sand: Clean, single-size filter sand having an effective size (D10) of 0.3 to 0.5 mm with a fineness modulus of less than 4 and with no more than 4% passing a 100 sieve.
- E. Grout: Cement-bentonite grout of adequate mix proportion and consistency. Seals shall consist of bentonite pellets.
- F. Pumps, meters, hoses and controls shall be suitable for the intended purpose and application.

## PART 3 - EXECUTION

### 3.1 PERFORMANCE

- A. General:
  - 1. Prior to any excavation below the ground water table, place the Temporary Construction Dewatering System into continuous operation (24 hours per day, 7 days per week) to lower the water table as required until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.
  - 2. The Contractor shall coordinate the dewatering system operation with existing and proposed conditions.
  - 3. The Temporary Construction Dewatering System Design Engineer and the Contractor shall modify the dewatering system and methods as required by actual field conditions encountered during construction, at no additional cost to the Owner. Any component of the dewatering system that malfunctions or is damaged during its operation shall be promptly repaired or replaced by the Contractor at no additional cost to the Owner.

## TEMPORARY CONSTRUCTION DEWATERING SYSTEM

4. Surface areas adjacent to the excavation shall be graded and/or curbed to prevent flow of surface water into the excavation.
  5. The Contractor shall install observation wells / piezometers prior to beginning excavation work.
  6. The Contractor shall notify the Engineer 7 days prior to the dewatering system start-up.
  7. Keep work areas dewatered until all construction of new structures, pipes, and appurtenances have been substantially completed to the extent that they will not be damaged by water.
  8. Thoroughly brace, or otherwise protect against flotation, all pipelines and structures which are not stable until final grades and ground cover is established.
  9. Maintain standby, or backup, equipment and power supply throughout the duration of the dewatering operations.
  10. Prevent soil particles from entering the discharge points.
- B. Disposal of Water:
1. Dispose of water pumped or drained from the construction site in a suitable manner to avoid siltation of adjacent drainage structures and piping, wetlands or water bodies, injury to public health, damage to public and private property, and damage to the work completed or in progress.
  2. Provide suitable temporary channels for water that may flow along or across the construction site.
  3. Provide treatment as necessary to prevent discharge of contaminated ground water caused by Contractor's operations or any contaminated ground water that may pass through the Temporary Construction Dewatering System.
  4. Contractor must obtain all necessary regulatory approvals for the disposal of dewatering flows. These may include, among others, approval by the USEPA under the National Pollutant Discharge Elimination System (NPDES) program for construction activities.
- C. Temporary Underdrains:
1. When necessary, temporary underdrains may be placed in excavations.
  2. Underdrain pipe shall be perforated corrugated metal, polyethylene or P.V.C. pipe.
  3. Surround the underdrain completely and fill the space between the underdrain and the pipe or structure with free draining material.
- D. Excavation Sump Pumping:
1. When necessary, and where appropriate to the geotechnical conditions encountered, excavations may be over excavated 12 to 24-inches and filled with screened stone to allow sump pumping of groundwater. Immediately cease operations if boils, loss of fines, quick conditions, softening of the ground or instability of slopes occur.
  2. The system shall be installed with suitable screens and filters so that pumping of fines does not occur.

- E. Well and Wellpoint System:
  - 1. If necessary, dewater the excavations and trenches with an efficient well or wellpoint system to drain the soil and prevent saturated soil from flowing into the excavated wells and area.
  - 2. Wellpoint and well systems shall be of the type designed for dewatering work and shall be installed with suitable screens and filters so that pumping of fines does not occur.
  - 3. Pumping units shall be capable of maintaining sufficient suction to handle large volumes of air and water at the same time.
- F. Removal
  - 1. Remove all equipment after the permanent installations are complete.
  - 2. All wells and piezometers shall be properly abandoned at the completion of the work, unless otherwise directed by the Temporary Construction Dewatering System Design Engineer, in accordance with requirements or guidelines in project location.

### 3.2 PRE-TREATMENT

- A. The Contractor shall provide a settling tank (or tanks) to provide pre-treatment of groundwater prior to discharge. Tanks shall be sized to provide 60-minute hydraulic retention time at the anticipated maximum sustained pumping rate. Tanks shall have an underflow baffle to collect any floatables and shall have a final overflow weir to allow for flow measurement and sample collection. The effluent weir shall be sized to allow for accurate flow measurement based on the anticipated pumping rates.
- B. Routine inspection of the settling tanks shall be carried out daily, with records maintained.
- C. Settling tanks shall be cleaned frequently to prevent excess deposition of solids which could overflow from the tank.
- D. Conduct effluent sampling requirements per the requirements of the permitting authority which is receiving the pre-treated dewatering system effluent.

### 3.3 MONITORING

- A. General:
  - 1. Contractor shall monitor the performance of the dewatering system and the groundwater level achieved throughout construction.
  - 2. Contractor shall monitor the effluent quality from the treatment system as required by the permitting authority.
  - 3. The Temporary Construction Dewatering System Design Engineer shall visit the site during the monitoring program at periodic intervals.
  - 4. General Contractor shall maintain dewatering activities to avoid damage to and settlement of adjacent buildings, roads, structures, utilities and other facilities.

### 3.4 CORRECTIVE ACTION

- A. No movement of or damage to adjacent buildings, roads, structures, utilities and other facilities shall be allowed.

## TEMPORARY CONSTRUCTION DEWATERING SYSTEM

- B. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundations or structures), the Contractor shall stop work and consult with the Design Engineer and resubmit a revised Temporary Construction Dewatering System design submittal. The revised plan shall indicate why the system revisions are needed and indicated what change will be made to address the issues. Contractor shall perform work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor, at no additional cost to the Owner.
- C. Damage to existing structures shall be repaired at no additional cost to the Owner.

END OF SECTION

SECTION 02156TEMPORARY EXCAVATION SUPPORT SYSTEMPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Design, furnish, install, maintain, and remove temporary excavation support system as required to comply with all applicable State and Federal regulations including the Occupational Safety and Health Act. Excavation support system shall consist of steel sheeting, pile and lagging bracing or other systems designed by the Contractor.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 DESIGN REQUIREMENTS

- A. The Contractor shall be responsible for the design and construction of the excavation support structures. The excavation support structures (sheeting systems or other special excavation techniques) shall be properly designed by a Professional Engineer registered in the State in which the project is located, who practices in a discipline applicable to excavation work and has more than 5 years of experience in the design of excavation support systems. The excavation support system shall be designed to accommodate an additional 2 feet of excavation below the bottom of excavation shown on the Contract Drawings.
- B. The excavation support system shall be designed and installed to limit the upward hydraulic gradient into the bottom of the excavation and to sustain all existing and expected loads and utilities, to prevent migration of fine-grained materials into the excavation, to prevent all movement to earth which could in any way cause injury to workmen, delay the work or endanger adjacent structures. If detrimental effects result from construction activities, the Contractor shall modify the design, revise construction procedures and/or take measures to mitigate and abate further movement at no cost to the Owner.
- C. The internal lateral bracing shall be located so that the braces shall not pass through walls and/or slabs of existing or proposed structures.
- D. The support system shall provide adequate room to properly perform the installation and to allow for inspection of the installation.
- E. Prior to the installation of any portion of the temporary lateral support system, the Contractor shall furnish to the Owner precondition surveys documenting the existing conditions of the adjacent structures.
- F. The use of existing structures to support the sheeting bracing or structural framing shall be prohibited.

1.4 SUBMITTALS

- A. Provide submittals in accordance with Specification Section 01340.
- B. Submit qualifications of temporary excavation support system design engineer.
- C. Submit attached certificate of design and complete scaled and dimensioned layout drawings of the proposed excavation system, stamped and sealed by a Professional Engineer registered in the State in which the project is located. Drawings shall show plan, sections and elevations of the support system as well as the proposed structures. Submittal shall identify:
  - 1. Physical location on the site and identify any existing utilities, site piping, site electrical conduit that must be relocated prior to excavation support system installation.
  - 2. Type and location of any surcharge loads adjacent to the excavation support system required by the Contractor to execute the work (e.g., excavators, trucks, cranes, soil piles, etc.).
  - 3. Design calculations, supporting documentation and materials cut sheets.
  - 4. Sample monitoring log.
  - 5. System removal requirements.
- D. Submit excavation support system monitoring plan, including qualifications of Contractor's vibration monitoring consultant and Contractor's surveyor. The excavation support system monitoring plan shall identify: the specific method, location and frequency of measurements (pre-, during and post-construction); individual(s) responsible for inspection/measurements; submittal and maintenance of on-site records; and threshold vibration values and excavation support system deformation values that, if exceeded, will require immediate stoppage of work and the performance of repairs necessary for reinstatement of a functional system. Provide justification for recommended vibration and deformation tolerances, on a structure-by-structure basis.
- E. The Contractor shall have sole responsibility for design, construction, monitoring and removal of the excavation support system as necessary to prevent damage to adjacent structures, utilities, streets adjacent to excavations and for safety of persons working within the excavated areas. The submittals will be reviewed for consistency with the design intent.
- F. Submittals under this Section shall be provided concurrently with and coordinated with the submittals under Section 02140 (Temporary Construction Dewatering System).

PART 2 - PRODUCTS

2.1 MATERIAL

- A. All materials shall conform to all applicable State and Federal regulations including the Occupational Safety and Health Act.

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. Perform preparatory work to discover, protect, maintain and restore utilities, foundations or other facilities located in close proximity of the proposed excavation lateral support system.
- B. Conduct pre-excavation to remove obstructions along the alignment of the excavation lateral support system which will interfere with installation of the excavation lateral support system.
- C. Install the excavation support system, including the installed wall and bracing system, outside the limits of the permanent structure. Construction tolerances (e.g., wall verticality) and lateral wall deflections as a result of excavation and other activities shall be considered in determining the plan location.
- D. Excavation shall not proceed more than 2 ft. below the bracing level, anywhere within the excavation support limits, until the entire level of bracing is completely installed.
- E. The first level of bracing shall be installed within 5 ft. of the ground surface prior to any excavation below this level.

### 3.2 INSTALLATION

- A. Install excavation support system in accordance with all applicable State and Federal regulations including the Occupational Safety and Health Act. The excavation support system design engineer shall visit the site during excavation support system installation.

### 3.3 INTERNAL LATERAL WALL BRACING (RAKERS, WALES AND STRUTS)

- A. Rakers are only allowed for the temporary lateral brace that is installed within 5 ft. of the ground surface.
- B. Use wales, struts, corner braces to provide support of the excavation lateral support walls as required. Include web stiffeners, plates, brackets, or angles as required to prevent rotation, crippling or buckling of connections and points of bearing between structural steel members. Allow for eccentricities due to fabrication and assembly. Consider effects of temperature changes.
- C. Install and maintain all support members in continuous tight contact with each other and with the wall being supported.
- D. Preload all bracing members (including rakers, corner braces, and struts) in accordance with methods, procedures and sequence as described on the reviewed shop drawings. Coordinate excavation work with installation of bracing and preloading. Use steel shims and steel wedges, welded or bolted in place, to maintain the preloading force in the bracing after release of the jacking equipment pressure. Wood shims or wedges shall not be used. Braces shall be preloaded to 50 percent of the maximum design load. Provide means to control the fluctuation of loading due to temperature variations.
- E. Accomplish preloading by jacking struts, rakers, etc. in place against the excavation lateral support system walls, or by other methods acceptable to the Owner or Owner's Representative.

### 3.4 MONITORING

- A. Contractor shall implement the excavation support system monitoring plan intended to monitor the performance of the excavation support system, as well as adjacent grade and adjacent structures, throughout construction. Monitoring shall include the following at a minimum:
  - 1. Pre-Installation Structure Elevation Survey. Survey prior to excavation support system installation.
  - 2. Vibration Monitoring. Full-time vibration monitoring during excavation support system installation.
  - 3. Installation Structure and Support System Surveys.
    - a. After excavation support system installation but prior to first brace installation;
    - b. When at mid-point of excavation;
    - c. When at bottom of excavation;
    - d. At weekly intervals during structure construction.
    - e. Prior to excavation support system removal.
    - f. Each survey shall assess the support system deformation and key structures.
  - 4. Vibration monitoring. Full-time during excavation support system removal.
  - 5. Post-Installation Structure Survey. Survey after removal of excavation support system.
- B. The excavation support system design engineer shall visit the site during the monitoring program at periodic intervals.
- C. Additionally, if the excavation support system monitoring criteria/requirements are not satisfied due to inadequacy or failure of the excavation support system (settlement of adjacent grade, settlement of structures, cracking of structures, etc.), immediately stop work and perform repairs necessary for reinstatement of a functional system, as well as restoration of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor, at no additional cost to Owner.

### 3.5 REMOVAL OF SHEETING

- A. Remove all sheeting and bracing unless the removal may cause injury to adjacent structures and/or property.
- B. The General Contractor shall be responsible for repairing all damage to existing structures caused by the removal of sheeting. The excavation support system design engineer shall visit the site during excavation support system removal.
- C. All backfill disturbed by the removal of the sheeting shall be re-compacted to its in-situ density.
- D. Proceed with backfilling as specified in these Specifications. When the level of compacted backfill reaches the location of bracing and wales, remove these items from the trench or other excavation. When the level of the backfill reaches a point three feet below the existing ground grade, remove the sheeting by approved methods and equipment.
- E. After removing the sheeting, complete backfilling in the usual manner.



## TEMPORARY EXCAVATION SUPPORT SYSTEM

- F. If the Contractor elects to leave the sheeting or any component of the temporary support system in place, the Contractor shall cut the sheeting or such component at least 4 feet below the ground surface, or as directed by the Engineer.

END OF SECTION

SECTION 02200EARTHWORKPART 1 - GENERAL1.1 DESCRIPTION

A. The Work described by this Section consists of all earthwork encountered and necessary for construction of the project as indicated in the Contract Documents, and includes but is not limited to the following:

1. Excavation
2. Backfilling and Filling
3. Compaction
4. Grading
5. Providing soil material as necessary
6. Disposal of unsuitable materials

1.2 DISPOSAL OF EXCESS SUITABLE MATERIAL REQUIREMENTS SPECIFIED ELSEWHERE

A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, Division 1, and Specification 02080A.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. All work shall be performed and completed in accordance with all local, state and federal regulations.
2. The General Contractor shall secure all other necessary permits unless otherwise indicated from, and furnish proof of acceptance by, the municipal and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.

B. Line and Grade:

1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the work.

C. Testing Methods:

1. Gradation Analysis: Where a gradation is specified the testing shall be in accordance with ASTM C117 and ASTM C136 (or latest revision).
2. Compaction Control:
  - a. Unless otherwise indicated, wherever a percentage of compaction for backfill is indicated or specified, it shall be the in-place density divided by the maximum density and multiplied by 100. The maximum density shall be the density at optimum moisture as determined by ASTM Standard Methods of Test for Moisture-Density Relations of Soil Using 10-lb. Hammer and 18-in. Drop, Designation D1557 (Modified Proctor), or latest revision, unless otherwise indicated.

- b. The in-place density shall be determined in accordance with ASTM Standard Method of Test for Density of Soil in Place by the Sand Cone method, Designation D1556, (or latest revision) or Nuclear method Designation D6938.
- c. Wherever specifically indicated, maximum density at optimum moisture may be determined by ASTM Standard Methods of Test for Moisture Density Relations of Soils, ASTM D6938 (Standard Proctor).
- d. An Independent Testing Laboratory will be retained by the Owner to conduct all laboratory and field soil sampling and testing, and to observe earth work and foundation construction activities. Laboratory testing will consist of sieve analyses, natural water content determinations, and compaction tests. Field testing will consist of in-place field density tests and determination of water contents.

#### 1.4 SUBMITTALS

- A. Collection of samples and testing of all materials for submittals shall be performed by the Independent Testing Laboratory and paid for by the Contractor until the materials are approved by the Owner or Engineer.
- B. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.
- C. Submit test results (including gradation analysis) and source location for all borrow material to be used at least 10 working days prior to its use on the site. Contractor shall identify and provide access to borrow sites.
- D. Submit moisture density curve for each type of soil (on site or borrow material) to be used for embankment construction or fill beneath structures or pavement.

#### 1.5 TESTS

- A. The Independent Testing Laboratory shall conform to the procedures and standards listed below. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.
- B. All testing shall be performed by a qualified Independent Testing Laboratory acceptable to the Engineer and Contractor at the Owner's expense unless otherwise indicated (see Section 01400 - Quality Control).
- C. Field density tests on embankment materials shall be as follows:
- D. Tests shall be taken on every 200 cubic yards of embankment material.
- E. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.
- F. Trenches: Field density test in trenches shall be taken at 75 linear foot intervals on every third lift.
- G. Foundation Wall Backfill: Take at least one (1) field density tests per lift per wall at locations and elevations as designated by the Engineer.
- H. In addition to the above tests the Independent Testing Laboratory will perform additional density tests at locations and times requested by the Engineer.
- I. Additional density testing will be required by the Engineer if the Engineer is not satisfied with the apparent results of the Contractor's compaction operation.

1. If the test results fail to meet the requirements of these specifications, the Contractor shall undertake whatever action is necessary, at no additional cost to the Owner, to obtain the required compaction. No allowance will be considered for delays in the performance of the work.
2. Reconciliation of re-testing costs are specified in Section 01400.

## 1.6 JOB CONDITIONS

### A. Site Information:

1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn there from by the Contractor. Data are made available for the convenience of Contractor.
2. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.

### B. Existing Utilities and Structures:

1. The locations of utilities and structures shown on the Drawings are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warrants that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities or structures within the project area.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIAL

- A. Aggregate Base (Crushed Gravel-NHDOT Item 304.3): Shall be crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. At least 50% of the material retained on the 1-inch sieve shall have a fractured face. The gradation of the material shall meet the following grading requirements:

| <u>Sieve<br/>Designation</u> | <u>Percent by Weight<br/>Passing Square Mesh Sieves</u> |
|------------------------------|---------------------------------------------------------|
| 3 inch                       | 100                                                     |
| 2 inch                       | 95-100                                                  |
| 1 inch                       | 55-85                                                   |
| No. 4                        | 27-52                                                   |
| No. 200                      | 0-12 (fraction passing No. 4<br>sieve)                  |

- B. Aggregate Leveling Course and Untreated Surface Course: Shall be screened or crushed gravel consisting of hard durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the material shall meet the grading requirements of the following table:

| <u>Sieve<br/>Designation</u> | <u>Percentage by Weight<br/>Passing Square Mesh Sieves</u> |
|------------------------------|------------------------------------------------------------|
| 1 inch                       | 95-100                                                     |
| 3/4 inch                     | 90-100                                                     |
| No. 4                        | 40-65                                                      |
| No. 10                       | 10-45                                                      |
| No. 200                      | 0-7                                                        |

- C. Common Borrow: Shall consist of approved material required for the construction of the work where designated. Common borrow shall be free from frozen material, perishable rubbish, peat, organic, and other unsuitable material.

| <u>Sieve<br/>Designation</u> | <u>Percentage by Weight<br/>Passing Square Mesh Sieves</u> |
|------------------------------|------------------------------------------------------------|
| 6-inch                       | 100                                                        |
| No. 200                      | 0-5                                                        |

Common borrow may be used for embankments unless otherwise indicated and provided that the material is at a moisture content suitable for compaction to the specified density. No rocks shall exceed 3/4 of the depth of the specified lift thickness.

- D. Crushed Stone: Crushed stone shall be 3/4 inch (ASTM #67) stone and meet the following gradation requirements:

| <u>Sieve Size</u> | <u>% Passing</u> |
|-------------------|------------------|
| 1"                | 100              |
| 3/4"              | 90-100           |
| 3/8"              | 20-55            |
| #4                | 0-10             |
| #8                | 0-5              |

- E. Screened Stone: Shall be a well graded stone consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, meeting the following gradation requirements:

| <u>Sieve<br/>Designation</u> | <u>Percent by Weight<br/>Passing Square Mesh Sieve</u> |
|------------------------------|--------------------------------------------------------|
| 1 inch                       | 100                                                    |
| 3/4 inch                     | 90-100                                                 |
| 3/8 inch                     | 20-55                                                  |
| No. 4                        | 0-10                                                   |
| No. 8                        | 0-5                                                    |

- F. Select Fill (Structural Fill): Shall consist of well graded granular material free of organic material, loam, wood, trash, snow, ice, frozen soil and other objectionable material and having no rocks with a maximum dimension of over 4 inches and meeting the following gradation requirements, except where it is used for pipe bedding in which case the maximum size shall be 2 inches.

| <u>Sieve<br/>Designation</u> | <u>Percent by Weight<br/>Passing Square Mesh Sieve</u> |
|------------------------------|--------------------------------------------------------|
| 4 inch                       | 100                                                    |
| 3 inch                       | 90-100                                                 |
| 1/4 inch                     | 25-90                                                  |
| No. 40                       | 0-30                                                   |
| No. 200                      | 0-5                                                    |

- G. Sand: Shall be well graded durable material free of organic matter and conform to the following gradation requirements:

| <u>Sieve<br/>Designation</u> | <u>Percent by Weight<br/>Passing Square Mesh Sieve</u> |
|------------------------------|--------------------------------------------------------|
| 3/8 inch                     | 100                                                    |
| No. 4                        | 95-100                                                 |
| No. 16                       | 50-85                                                  |
| No. 50                       | 10-30                                                  |
| No.100                       | 2-10                                                   |
| No.200                       | 0-5                                                    |

Sand conforming to the requirement for fine aggregate in ASTM Standard Specifications for Concrete Aggregate, Designation C-33, will meet the above requirement.

2.2 CONCRETE

- A. If concrete is required for excess excavation, provide 3,000 psi concrete complying with requirements of Division 3.

2.3 FILTER FABRIC

- A. If filter fabric is required, refer to Section 02260.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which excavating, backfilling, filling, compaction and grading are to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

- A. General:
1. Excavation consists of removal and disposal of all material encountered when establishing line and grade elevations required for execution of the work.
  2. The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing the piping; shall furnish and place all sheeting, bracing, and supports; shall do all cofferdamming, pumping, and draining; and shall render the bottom of the excavations firm, dry and acceptable in all respects.
  3. All excavation shall be classified as either earth or ledge.
    - a. Earth Excavation shall consist of the removal, hauling and disposal of all earth materials encountered during excavation including but not limited to native soil or fill, pavement (bituminous or concrete), existing sewers and manholes, ashes, loam, clay, swamp muck, debris, soft or disintegrated rock or hard pan which can be removed with a backhoe, or a combination of such materials, and boulders that do not meet the definition of "Ledge" below.
    - b. Ledge Excavation: Shall consist of the removal, hauling, and disposal of all ledge or rock encountered during excavation. "Ledge" and "rock" shall be defined as any natural compound, natural mixture that in the opinion of the Engineer can be removed from its existing position and state only by drilling and blasting, wedging, sledging, boring or breaking up with power operated tools. No boulder, ledge, slab, or other single piece of excavated material less than two cubic yards in total volume shall be considered to be rock unless, in the opinion of the Engineer it must be removed from its existing position by one of the methods mentioned above.

4. The Contractor shall not have any right of property in any materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling. The Contractor shall dispose of unsuitable and excess material in accordance with the applicable sections of the Contract Documents.
- B. Additional Excavation: When excavation has reached required subgrade elevations, notify the Engineer and Resident Project Representative who will observe the conditions.
1. If material unsuitable for the structure or paved area or pipeline (in the opinion of the Engineer) is found at or below the grade to which excavation would normally be carried in accordance with the Drawings and/or Specifications, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill, screened stone, crushed stone, or concrete as directed by the Engineer.
  2. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations in accordance with all State and local laws and the provisions of the Contract Documents.
- C. Unauthorized Excavation: Shall consist of removal of materials beyond indicated subgrade elevations or dimensions without specific authorization of Engineer. Unauthorized excavation, as well as remedial work required by the Engineer shall be at the Contractor's expense. Remedial work required is as follows:
1. If the bottom of a trench is excavated beyond the limits indicated, backfill the resulting void with thoroughly compacted screened stone, unless otherwise indicated.
  2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.
- D. Structural Excavation:
1. Shall consist of the removal, hauling, disposal, of all material encountered in the excavation to permit proper installation of structures.
  2. Excavations for structures shall be carried to the lines and subgrades shown on the Drawings.
  3. Excavate areas large enough to provide suitable room for building the structures.
  4. The extent of open excavation shall be controlled by prevailing conditions subject to any limits designated by the Engineer.
  5. Provide, install, and maintain sheeting and bracing as necessary to support the sides of the excavation and to prevent any movement of earth which could diminish the width of the excavation or otherwise injure the work, adjacent structures, or persons and property in accordance with all state and OSHA safety standards.
  6. Erect suitable fences around structure excavation and other dangerous locations created by the work, at no additional cost to the Owner.



7. Exposed subgrade surfaces shall remain undisturbed, protected, and maintained as uniform, plane areas and shape to receive the foundation components of the structure.
  - a. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
  - b. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade and trim bottoms to required lines and grades to leave solid base to receive the structure.
  - c. If a structure is to be constructed within the embankment, the fill shall first be brought to a minimum of 3 feet above the base of the footing. A suitable excavation shall then be made as though the fill were undisturbed earth.
- E. Trench Excavation: Shall consist of removal, hauling and disposal of all material encountered in the excavation to the widths and depths shown on the Drawings to permit proper installation of underground utilities.
  1. Excavate trenches to the uniform width shown on the Drawings sufficiently wide to provide sufficient space for installation, backfilling, and compaction. Every effort should be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
  2. Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.
  3. Grade bottoms of trenches as indicated for pipe and bedding to establish the indicated slopes and invert elevations, notching under pipe joints to provide solid bearing for the entire body of the pipe, where applicable.
  4. If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least two feet above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.
  5. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
  6. Perform excavation for force mains and water mains in a logical sequence.
  7. The extent of open excavation shall be controlled by prevailing conditions subject to any limits prescribed by the Engineer.
  8. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards, as outlined in the appropriate section of this Specification.
- F. Protection of Persons, Property and Utilities:
  1. Barricade open excavations occurring as part of this work and post with warning lights in compliance with local and State regulations.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. Exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures that may be required.
  3. Rules and regulations governing the respective utilities shall be observed in execution of all work. Active utilities and structures shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped only with written authorization of the utility owner. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable.
  4. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility, the property owner, and the Owner.
- G. Use of Explosives:
1. Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction and the Owner. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
  2. All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc.
- H. Stability of Excavations:
1. Slope sides of excavations to comply with all codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
  2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- I. Shoring and Bracing:
1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
  2. Provide trench shoring and bracing to comply with local codes and authorities having jurisdiction. Refer to Specification Section 02156.
  3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Install shoring and bracing as excavation progresses.
- J. Material Storage:
1. Stockpile excavated materials which are satisfactory for use on the work until required for backfill or fill. Place, grade and shape stockpiles for proper drainage and protect with temporary seeding or other acceptable methods to control erosion.
  2. Locate and retain soil materials away from edge of excavations.
  3. Dispose of excess soil material and waste materials as herein specified.

- K. Dewatering:
  - 1. To ensure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations (including surface and subsurface waters).
  - 2. Excavations shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged. Refer to Specification Section 02140.
- L. Cold Weather Protection:
  - 1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.
  - 2. No frozen material shall be used as backfill or fill and no backfill shall be placed on frozen material.
- M. Separation of Surface Material:
  - 1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the work.
  - 2. Prior to excavation, existing pavement shall be cut where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.
  - 3. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
  - 4. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.
- N. Dust Control:
  - 1. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. Refer to Specification Section 01562.
  - 2. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, the contractor shall furnish and spread the material, as directed.

### 3.3 BACKFILL AND FILL

- A. General:
  - 1. Backfilling shall consist of replacing material removed to permit installation of structures or utilities, as indicated in the Contract Documents.
  - 2. Filling shall consist of placing material in areas to bring them up to grades indicated on the Drawings.
  - 3. The Contractor shall provide and place all necessary backfill and fill material, in layers to the required grade elevations.
  - 4. Backfill excavations as promptly as work permits, but not until completion of the following:
    - a. Acceptance by Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
    - b. Inspection, approval, and recording locations of underground utilities.

- c. Removal of concrete formwork.
  - d. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Temporary sheet piling driven below bottom of structures shall be removed in manner to prevent settlement of the structure or utilities, or cut off and left in place if required.
  - e. Removal of trash and debris.
  - f. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
  - g. Density testing having results meeting requirements specified herein.
5. In general, and unless otherwise indicated, material used for backfilling of trenches and excavations around structures shall be suitable excavated material which was removed in the course of making the construction excavation. Unless otherwise specified or allowed by the Engineer the backfill and fill shall be placed in layers not to exceed 8 inches in thickness.
  6. All fill and backfill under structures and pavement, and adjacent to structures, shall be compacted crushed stone or select fill as specified or as indicated on the Drawings. The fill and backfill materials shall be placed in layers not exceeding 8 inches in thickness.
  7. All structures (including manholes) shall be placed on a 6-inch mat of screened stone unless otherwise indicated.
  8. Suitable excavated material shall meet the following requirements:
    - a. Free from large clods, silt lumps or balls of clay.
    - b. Free from stones and rock fragments with larger than 12 inch max. dimension.
    - c. Free from organics, peat, etc.
    - d. Free from frozen material.
  9. If sufficient suitable excavated material is not available from the excavations, and where indicated on the Drawings, the backfill material shall be select fill or common borrow, unless otherwise indicated, as required and as directed by the Engineer.
  10. Do not backfill with, or on, frozen materials.
  11. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.
  12. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet.
  13. Do not continue backfilling until the previously placed and new materials have dried sufficiently to permit proper compaction.
  14. The nature of the backfill materials will govern the methods best suited for their placement and compaction. Compaction methods and required percent compaction is covered in Compaction section.
  15. Before compaction, moisten or aerate each layer as necessary to provide a water content necessary to meet the required percentage of maximum dry density for each area classification specified.
  16. Do not allow large masses of backfill material to be dropped into the excavation in such a manner that may damage pipes and structures.

17. Place material in a manner that will prevent stones and lumps from becoming nested.
  18. Completely fill all voids between stones with fine material.
  19. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
  20. Deposit backfill and fill material evenly on all sides of structures to avoid unequal soil pressures.
  21. Keep stones or rock fragments with a dimension greater than two inches at least one foot away from the pipe or structure during backfilling.
  22. Leave sheeting in place when damage is likely to result from its withdrawal.
  23. Completely fill voids left by the removal of sheeting with screened stone which is compacted thoroughly.
- B. Pipe Bedding, Initial Backfill and Trench Backfill:
1. Place bedding and backfill in layers of uniform thickness specified herein, and as shown on the Drawings.
  2. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper.
  3. Install pipe bedding and initial backfill in layers of uniform thickness not greater than eight (8) inches.
  4. Deposit the remainder of the backfill in uniform layers not greater than eight inches.
  5. Provide underground utility marking tape for new utility trenches as shown on the Drawings. Refer to Section 02650 – Buried Utility Markings.
  6. Where soft silt and clay soils are encountered the trench shall be excavated six inches below the normal bedding and backfilled with 6-inches of compacted sand.
  7. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footings.
  8. The following schedule lists the bedding materials for various types of pipe. Refer to the pipe trench detail for dimensional requirements.

#### BEDDING REQUIREMENTS

|                     |                |
|---------------------|----------------|
| DI or Concrete Pipe | crushed stone. |
| PVC or PE Pipe      | crushed stone. |

9. The following schedule lists the initial backfill requirements for various types of pipes. Refer to the pipe trench detail for dimensional requirements.

### INITIAL BACKFILL REQUIREMENTS

DI or Concrete Pipe                      Sand or crushed stone.

PVC or PE Pipe                              Sand or crushed stone.

10. Special bedding and backfill requirements shown on the Drawings supersede requirements of this section.

C. Improper Backfill:

1. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.
3. Excavation, backfilling, and compacting work performed to correct improper backfilling shall be performed at no additional cost to the Owner.

D. Ground Surface Preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, scarify or break-up sloped surface steeper than 1 vertical to 4 horizontal.
2. When existing ground surface has a density less than that specified under "compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

### 3.4 COMPACTION

A. General:

1. Control soil compaction during construction to provide not less than the minimum percentage of density specified for each area classification.

B. Percentage of Maximum Density Requirements:

1. Compact soil to not less than the following percentages of maximum dry density determined in accordance with ASTM D1557 as indicated.
  - a. Structures: Compact each layer of backfill or fill material below or adjacent to structures to at least 95% of maximum dry density (ASTM D1557).
  - b. Off Traveled Way Areas: Compact each layer of backfill or fill material to at least 90% of maximum dry density (ASTM D1557).
  - c. Walkways: Compact each layer of backfill or fill material to at least 93% of maximum dry density (ASTM D1557).
  - d. Roadways, Drives and Paved Areas: Compact each layer of fill, subbase material, and base material to at least 95% of maximum dry density (ASTM D1557).

- e. Pipes: Compact bedding material and each layer of backfill to at least 90% maximum dry density (ASTM D1557) in non-paved areas. Where backfilling with excavated material, compact to native field density in non-paved areas. In cases where pipe trenches are within Roadways, Drives, and Paved Areas, 95% compaction requirement in paved areas governs for pipe bedding material and each layer of backfill up through subbase and base material.
  - f. Embankments: Compact each layer of embankment material to at least 95% of maximum dry density (ASTM D1557).
- C. Moisture Control:
- 1. Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, in quantities controlled to prevent free water appearing on surface during or subsequent to compaction operations.
  - 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  - 3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory level.
- D. Embankment Compaction:
- 1. After each embankment layer has been spread to the required maximum 8-inch thickness and its moisture content has been adjusted as necessary, it shall be rolled with a sufficient number of passes to obtain the required compaction. One pass is defined as the required number of successive trips which by means of sufficient overlap will ensure complete coverage and uniform compaction of an entire lift. Additional passes shall not be made until the previous pass has been completed.
  - 2. When any section of an embankment sinks or weaves excessively under the roller or under hauling units and other equipment, it will be evident that the required degree of compaction is not being obtained and that a reduction in the moisture content is required. If at any place or time such sinking and weaving produces surface cracks which, in the judgment of the Engineer are of such character, amount, or extent to indicate an unfavorable condition, he will recommend operations on that part of the embankment to be suspended until such time as it shall have become sufficiently stabilized. The ideal condition of the embankment is that attained when the entire embankment below the surface being rolled is so firm and hard as to show only the slightest weaving and deflection as the roller passes.
  - 3. If the moisture content is insufficient to obtain the required compaction, the rolling shall not proceed except with the written approval of the Engineer, and in that event, additional rolling shall be done to obtain the required compaction. If the moisture content is greater than the limit specified, the material of such water content may be removed and stockpiled for later use or the rolling shall be delayed until such time as the material has dried sufficiently so that the moisture content is within the specified limits. No adjustment in price will be

made on account of any operation of the Contractor in removing and stockpiling, or in drying the materials or on account of delays occasioned thereby.

4. If because of insufficient overlap, too much or too little water, or other cause attributable to defective work, the compaction obtained over any area is less than that required, the condition shall be remedied, and if additional rollings are ordered, they will be done at no cost to the Owner. If the material itself is unsatisfactory or if additional rolling or other means fails to produce satisfactory results, the area in question shall be removed down to material of satisfactory density and the removal, replacement, and re-rolling shall be done by the Contractor, without additional compensation.
  5. Material compaction by hand-operated equipment or power-driven tampers shall be spread in layers not more than 6 inches thick. The degree of compaction obtained by these tamping operations shall be equal in every respect to that secured by the rolling operation.
- E. Compaction Methods: The Contractor may select any method of compaction that is suitable to compact the material to the required density.
1. General: Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. All voids left by the removal of sheeting shall be completely backfilled with suitable materials and thoroughly compacted.
  2. Tamping or Rolling: If the material is to be compacted by tamping or rolling, the material shall be deposited and spread in uniform, parallel layers not exceeding the uncompacted thicknesses specified. Before the next layer is placed, each layer shall be tamped as required so as to obtain a thoroughly compacted mass. Care shall be taken that the material close to the excavation side slopes, as well as in all other portions of the fill area, is thoroughly compacted. When the excavation width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe or structure, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping or rolling, the rate at which backfilling material is deposited shall not exceed that permitted by the facilities for its spreading, leveling, and compacting as furnished by the Contractor.
- F. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

### 3.5 GRADING:

- A. General:
1. Grading shall consist of that work necessary to bring all areas to the final grades.
  2. Uniformly grade areas within limits of work requiring grading, including adjacent transition areas.
  3. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.



- B. Grading Outside Building Lines:
  - 1. Grade areas adjacent to building to drain away from structures and to prevent ponding.
  - 2. Grade surfaces to be free from irregular surface changes, and as follows:
    - a. Lawn or Unpaved Areas: Finish grade areas to receive topsoil to within not more than 1" above or below the required subgrade elevations.
    - b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 1/2" above or below the required subgrade elevation.
    - c. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 3/8" above or below the required subgrade elevation.
- C. Grading Surface of Fill Under Building Slabs:
  - 1. Grade surface to be smooth and even, free of voids, and compacted as specified, to the required elevation.
  - 2. Provide final grades within a tolerance of 1/2" when tested with a 10' straight edge.
- D. Compaction:
  - 1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.
- E. Protection of Graded Areas:
  - 1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
  - 2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

### 3.6 BASE COURSE AND LEVELING COURSE

- A. General:
  - 1. Base course consists of placing the specified materials in layers to support a leveling course or paved surface, as indicated in the Drawings.
- B. Grade Control:
  - 1. During construction, maintain lines and grades including crown and cross-slope of base course and leveling course.
- C. Placing:
  - 1. Place base course on prepared subbase conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base materials.
  - 2. Place leveling course on prepared base course, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction.
- D. Shaping and Compacting:
  - 1. All layers of aggregate base course and leveling course shall be compacted to the required density immediately after placing. As soon as the compaction of any layer has been completed, the next layer shall be placed.
  - 2. The Contractor shall bear full responsibility for and make all necessary repairs to the base leveling courses and the subgrade until the full depth of the base leveling courses is placed and compacted. Repairs shall be made at no additional cost to the Owner.

3. If the top of any layer of the aggregate base or leveling course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.

END OF SECTION

## SECTION 02225

### FLOWABLE FILL

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Provide and install flowable fill material in authorized excavation(s) as shown on the Drawings and/or as specified herein.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 229, Controlled Low-Strength Materials, or as specified here-in.

##### 1.4 SUBMITTALS

- A. Submit Mix designs for each mixture to be provided at least 15 days prior to production.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. General: Materials shall meet the following requirements:
  1. Portland Cement, Type I or II - ASTM C150.
  2. Fly Ash (LOI limits do not apply) - ASTM C618.
  3. Fine Aggregate/Mineral Filler – ASTM C 33, ASTM or non-ASTM sands or mineral fillers with 100% passing the 1/2" sieve may be considered which produce an acceptable flow and desired performance characteristic. Soils with fine clays will not be considered. All other than ASTM C 33 materials must receive prior approval from the Engineer.
  4. Air Entraining Admixtures - As Per Manufacturer's Specifications.
  5. Light Weight Cellular Admixture - As Per Manufacturer's Specifications.
  6. Water – Potable or ASTM C 94.
  7. Preformed Foam – Procedures for evaluation ASTM C 796 and ASTM C 869.
- B. Excavatable Flowable Fill:
  1. Compressive strength at 28 days between 100-200 psi.
  2. Mix:
    - a. Portland Cement: 50-100 lb/yd<sup>3</sup>
    - b. Fly Ash: up to 350 lb/yd<sup>3</sup>, lime content not to exceed 10% by weight.
    - c. Fine Aggregate/Mineral Filler: 2000-3000 lb/yd<sup>3</sup>
    - d. Water: 325-600 lb/yd<sup>3</sup>, for Class F fly ash and cement-only mixtures up to 1000 lb/yd<sup>3</sup> may be acceptable.

- C. Low Density Flowable Fill:
  - 1. The preformed foam shall produce stable air cells capable of resisting the chemical and physical forces imposed during mixing, placing and setting.
  - 2. Submit the foaming agent Manufacturer's recommended mixing procedures and approved mixing equipment to the Engineer.
  - 3. Methods of placement must not cause a change in density due to loss of air content beyond predictable ranges.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Flowable fill shall be produced and delivered using standard concrete construction equipment and practices.
- B. Placing flowable fill shall be by chute, pumping, or other method approved by the Engineer.
- C. The flowable fill shall be discharged directly from the mixer truck into the space to be filled.
- D. No flowable fill shall be placed on frozen ground.
- E. At the time of placement the flowable fill shall have a temperature of at least 40 degrees F.
- F. When flowable fill is placed in freezing temperatures, the material should be covered with blankets and protected from freezing until hardening.
- G. The Contractor shall provide all necessary means to confine the material within a designated space.
- H. The Contractor is responsible to ensure underground utilities, including but not limited to pipes, tanks, structures, cables, etc. are secured to prevent floating.
- I. No compaction or vibration of the material is required.
- J. Where flowable fill is being used as pipe bedding it shall be placed in lifts to ensure lateral support of the pipe develops along the side of the pipe before continuing with the backfilling.
- K. When paving over flowable fill in cold weather, any frozen material on the surface shall be scraped off and removed prior to paving.
- L. The flowable fill shall be left undisturbed until the material obtains sufficient strength. Sufficient strength for paving is achieved when the flowable fill can support the weight of foot traffic without apparent deformation. Sufficient strength for supporting vehicular traffic is 2.5 tons per square foot as measured by a pocket penetrometer.
- M. Trenches shall be covered and barricaded until hardening occurs.

END OF SECTION

SECTION 02260FILTER FABRICPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Furnish all materials and install filter fabric of the types, dimensions and in the location(s) shown on the Drawings and specified herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. A competent laboratory must be maintained by the manufacturer of the fabric at the point of manufacture to ensure quality control.
- B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust and debris.

1.4 SUBMITTALS

- A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification

PART 2 - PRODUCTS2.1 MATERIALS

- A. Filter fabric for use in stabilization, drainage, underdrains, landscaping and beneath structures shall be formed in widths of not less than six (6) feet and shall meet the requirements of Table 1. Both woven and non-woven geotextiles are acceptable; however no "slit-tape" woven fabrics will be permitted for drainage, underdrain, and erosion control applications.

TABLE 1

| <u>Geotextile<br/>Mechanical Property</u> | <u>Test Method</u> | <u>Minimum<br/>Permissible Value</u> |
|-------------------------------------------|--------------------|--------------------------------------|
| Grab Tensile Strength                     | ASTM D4632         | 120 pounds                           |
| Grab Elongation                           | ASTM D4632         | 50 percent                           |
| CBR Puncture Strength                     | ASTM D6241         | 310 pounds                           |
| Trapezoid Tear Strength                   | ASTM D4533         | 50 pounds                            |
| Water Flow Rate                           | ASTM D4491         | 120 gal/min/sf                       |
| Equivalent Opening Size (EOS)             | ASTM D4751         | U.S. Std. Sieve #80                  |
| Coefficient of Permeability               | ASTM D4491         | 0.2 cm/sec                           |

The geotextile shall have property values expressed in "typical" values that meet or exceed the values stated above as determined by the most recent test methods specified above.

- B. Filter Fabric for use under riprap shall meet the requirements as specified in Section 02271 – Riprap and Stone Ditch Protection.
- C. For Silt Fence, refer to Section 02270 - Temporary Erosion Control Execution

### PART 3 - EXECUTION

- 3.1 Install filter fabric as shown on the drawings or as directed in appropriate specifications in this division or in accordance with manufacturer's instructions or as directed by the engineer.

END OF SECTION

SECTION 02270TEMPORARY EROSION CONTROLPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices as specified herein, and as directed by the Engineer.
2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
3. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
4. After awarded the Contract, prior to commencement of construction activities, meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

B. Design Criteria:

1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS

- A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.

1.4 QUALITY ASSURANCE

- A. All materials and methods of erosion control shall meet the guidelines established by the "Stormwater Management and Erosion and Sediment Control handbook for Urban and Developing Areas in New Hampshire" prepared by the New Hampshire Natural Resources Conservation Commission.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Baled Hay:
  - 1. At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary to hold the bale in place.
- B. Sand Bags:
  - 1. Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.
- C. Mulches:
  - 1. Loose hay, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose.
  - 2. Type and use shall be as specified in "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire" prepared by the NHDES, RECD, and the USDA Soil Conservation Service, herein after referred to as the NHSCH.
- D. Mats and Nettings:
  - 1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
  - 2. Type and use shall be as specified in the NHSCH.
- E. Permanent Seed:
  - 1. Conservation mix appropriate to the predominant soil conditions as specified in the NHSCH and subject to approval by the Engineer.
- F. Temporary Seeding:
  - 1. Use species appropriate for soil conditions and season as specified in the NHSCH and subject to approval by the Engineer.
- G. Water:
  - 1. The Contractor shall provide water and equipment to control dust, as directed by the Engineer.
- H. Silt Fence:
  - 1. Silt Fence shall be one of the commercially available brands, meeting the following requirements:

| <u>Geotextile<br/>Mechanical Property</u>  | <u>Test Method</u> | <u>Minimum<br/>Permissible Value</u> |
|--------------------------------------------|--------------------|--------------------------------------|
| Grab Tensile Strength<br>(both directions) | ASTM D-4632        | 124 pounds                           |
| Puncture Strength                          | ASTM D-4833        | 60 pounds                            |
| Apparent Opening Size                      | ASTM D-4751        | #30                                  |
| Flow Rate                                  | ASTM D-4491        | 8 gal/min/ft <sup>2</sup>            |



I. Erosion Control Mix Berm

1. Must consist primarily of organic material, separated at the point of generation, and may include shredded bark, stump grindings, composted bark, or acceptable manufactured products. Wood and bark chips, ground construction debris or reprocessed wood products will not be acceptable as the organic component of the mix.
2. Minimum 12" high and 24" wide berm, meeting the following requirements and as specified by the "New Hampshire Stormwater Manual" prepared by the NHDES:
  - a. Erosion control mix should contain a well-graded mixture of particle sizes and may contain rocks less than 4" in diameter.
  - b. Erosion control mix must be free of refuse, physical contaminants, and material toxic to plant growth.
  - c. Mix composition should meet the following standards:
    - i. The organic matter content should be between 25 and 65%, dry weight basis.
    - ii. Particle size by weight should be 100% passing a 3" screen, 90% to 100% passing a 1-inch screen, 70% to 100% passing a 0.75-inch screen, and a maximum of 30% to 75%, passing a 0.25-inch screen.
    - iii. The organic portion needs to be fibrous and elongated.
    - iv. The mix should not contain silts, clays or fine sands. o Soluble salts content should be < 4.0 mmhos/cm.
    - v. The pH should be between 5.0 and 8.0.

J. Filter sock

1. Minimum diameter of 12" woven or non-woven geosynthetic fabric filled with erosion control mix meeting the following requirements and as specified by the "New Hampshire Stormwater Manual" prepared by the NHDES:
  - i. Organic matter content is between 25 and 65%, dry weight basis.
  - ii. Particle size by weight should be 100% passing a 3" screen, 90% to 100% passing a 1-inch screen, 70% to 100% passing a 0.75-inch screen, and a maximum of 30% to 75%, passing a 0.25-inch screen.
  - iii. The organic portion needs to be fibrous and elongated.
  - iv. The mix should not contain silts, clays or fine sands. o Soluble salts content should be < 4.0 mmhos/cm.
  - v. The pH should be between 5.0 and 8.0.

K. Catch Basin Inlet Protection

1. Catch basin inserts/filter sacks made of woven geotextile with rebar lifting handles.
  - a. Seam strength that meets the following requirements (ASTM D-4884):

| Parameter        | MARV | Units |
|------------------|------|-------|
| Maximum Load     | 852  | Lbs   |
| Maximum Strength | 1280 | Lb/ft |

- b. Fabric strength that meets the following requirements:

| Property                  | Test Method | Units              | MARV      |
|---------------------------|-------------|--------------------|-----------|
| Grab Tensile              | ASTM D-4632 | Lbs                | 281 x 170 |
| Grab Elongation           | ASTM D-4632 | %                  | 16 x 7    |
| CBR Puncture              | ASTM D-6241 | Lbs                | 1005      |
| Trapezoid Tear Strength   | ASTM D-4533 | Lbs                | 85 x 61   |
| UV Resistance @ 500 Hours | ASTM D-4355 | %                  | 96        |
| AOS                       | ASTM D-4751 | U.S. Sieve         | 40        |
| Flow Rate                 | ASTM D-4491 | GPM/ft             | 38.5      |
| Permittivity              | ASTM D-4491 | Sec. <sup>-1</sup> | 0.51      |

2. Strawbales
  - a. Surround perimeter of catch basin inlet with straw bales.
  - b. Stake and embed strawbales 4 inches in ground.
  - c. Not applicable for use on impervious surfaces.
3. Concrete Blocks
  - a. 8-inch standard cement blocks placed on their side around the inlet and wrapped in geotextile fabric.
  - b. Blocks shall be surrounded by ¾-inch minimum and 2-inch maximum clean crushed stone.
  - c. Not applicable on slopes of more than 5%.
4. Silt Fence with Gravel
  - a. Silt fence may be placed around the perimeter of a catch basin and surrounded by ¾-inch minimum and 2-inch maximum clean crushed stone.
5. Sand-Filled Bags
  - a. Sand-filled bags butted together around the perimeter of the catch basin inlet.
  - b. Bags should be staggered and create a berm with a height no less than 12 inches.

## 2.2 CONSTRUCTION REQUIREMENTS

- A. Temporary Erosion Checks:
  1. Temporary erosion checks shall be constructed in ditches and other locations as necessary.
  2. Baled hay, sand bags or siltation fence may be used in an arrangement to fit local conditions.
- B. Temporary Berms:
  1. Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.

C. Temporary Seeding:

1. Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated below:

| <u>Season</u>                           | <u>Seed</u>          | <u>Rate</u>  |
|-----------------------------------------|----------------------|--------------|
| Summer (5/15 - 8/15)                    | Sudangrass           | 40 lbs/acre  |
| Late Summer/Early Fall<br>(8/15 - 9/15) | Oats                 | 80 lbs/acre  |
| Fall (9/15 - 10/1)                      | Annual Ryegrass      | 40 lbs/acre  |
| Winter (10/1 - 4/1)                     | Winter Rye           | 112 lbs/acre |
|                                         | Mulch w/Dormant Seed | 80 lbs/acre* |
| Spring (4/1 - 7/1)                      | Oats                 | 80 lbs/acre  |
|                                         | Annual Ryegrass      | 40 lbs/acre  |

\* seed rate only

D. Silt Fence shall be supported by posts and installed per the manufacturer's recommendations.

1. A trench 6-inches in width and 6-inches in depth should be excavated to toe in the bottom of the silt fence. The trench should be backfilled after the silt fence is installed.

E. Mulch All Areas Receiving Seeding:

Use either wood cellulose fiber mulch (750 lbs/acre); or straw mulch with chemical tack (as per manufacturers specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.

F. Wildlife Safety:

1. Use temporary erosion and sediment control products that either do not contain netting, or that contain netting manufactured from 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber. Degradable, photodegradable, UV-degradable, oxo-degradable, or oxo-biodegradable plastic netting (including polypropylene, nylon, polyethylene, and polyester) are not equivalent alternatives. Netting used in these products should have a loose-weave wildlife-safe design with movable joints between the horizontal and vertical twines, allowing the twines to move independently and thus reducing the potential for wildlife entanglement.
2. Avoid the use of silt fences reinforced with metal or plastic mesh or if possible recommend the use of erosion control berms.
3. When no longer required, temporary erosion and sediment control products should be removed promptly from the project site.
4. Use nonwoven coir fabric when a surface fabric treatment is required for erosion control and stabilization, such as 100% biodegradable coconut fiber mat or equal as reviewed and approved by the project design engineer.
5. Use woven coir fabric when site conditions warrant. The outer layer of woven coir fabric should be a high strength, continuously woven mat (i.e., without seams) and made of 100% coconut fiber.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Temporary Erosion Checks:

1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas as necessary to inhibit soil erosion.
3. Siltation fence shall be located and installed as shown on plans or as required to comply with all Federal, State and Local Regulations.

#### B. Maintenance:

1. Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor as appropriate.

#### C. Removing and Disposing of Materials:

1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of as approved by the Engineer.
2. When removed, such devices may be reused in other locations provided they are in good condition and suitable to perform the erosion control for which they are intended.
3. When dispersed over adjacent areas, the material shall be scattered to the extent that it causes no unsightly conditions nor creates future maintenance problems.

END OF SECTION

SECTION 02431CATCH BASINS, GRATES AND FRAMESPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Construct catch basins, grates, frames and brick masonry in conformance with the dimensions and locations shown on the Drawings.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Precast Catch Basin Base, Barrel and Top Sections:
1. Conform to ASTM C478-97 except as modified herein, on the Drawings, or as directed by the Engineer.
  2. Minimum strength of 4,000 psi at 28 days
  3. Testing:
    - a. Determine concrete strength by tests on 6 inch by 12 inch vibrated test cylinders cured in the same manner as the bases, barrels and tops.
    - b. Have tests conducted at manufacturer's plant or at an approved testing laboratory.
    - c. Have not less than 2 tests made for each 100 vertical feet of precast catch basin sections.
- B. Frames and Covers:
1. Acceptable Manufacturers:
    - a. EJ Group, Inc.
    - b. Neenah Foundry Company
    - c. Or equivalent.
- C. Masonry:
1. Brick: Shall comply with the ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
  2. Cement: ASTM C-150.
  3. Hydrated Lime: ASTM C-207.
  4. Sand: ASTM C144.

1.4 SUBMITTALS TO THE ENGINEER

- A. Submit shop Drawings and manufacturer's literature in conformance with the Standard General Conditions of the Construction Contract.
- B. Bases, Barrel Sections and Tops: Submit test results and receive approval from the Engineer prior to delivery to the site.

## PART 2 - PRODUCTS

### 2.1 PRECAST CATCH BASIN SECTIONS

- A. Dimensions, as shown on the Drawings.
- B. Use flat tops or eccentric cones as appropriate. Exterior face of cone sections shall not flare out beyond the vertical.
- C. Joints: Bell-and-spigot or tongue-and-groove formed on machine rings to ensure accurate joint surfaces.
- D. Constructed to support an HS-20 wheel loading.
- E. Openings:
  - 1. Provide openings in the risers to receive pipes entering the catch basin of the types and materials approved by the Engineer.
  - 2. Make openings at the manufacturing plant or cut openings in the field.
  - 3. Size: To provide a uniform annular space between the outside wall of pipe and the riser.
  - 4. Location: To permit setting of the entering pipes at the correct elevations.
- F. Joints:
  - 1. Joint gaskets to be flexible self seating butyl rubber joint sealant installed according to manufacturer's recommendations. For cold weather applications, use adhesive with joint sealant as recommended by manufacturer.
  - 2. Acceptable Materials:
    - a. Kent-Seal No. 2
    - b. Ram-Nek
    - c. Or equivalent.
  - 3. Joints between precast sections shall conform to related standards and manufacturer's instructions.

### 2.2 FRAMES AND GRATES

- A. All essential details of design shall conform to the Drawings. Standard castings differing in non-essential details may be approved by the Engineer.
- B. All frames and grates shall be made of cast iron and shall have machined bearing surfaces to prevent rocking under traffic.
- C. Grate castings will be smooth with no sharp edges.
- D. Constructed to support an HS-20 wheel loading.

### 2.3 MASONRY

- A. Brick:
  - 1. Sound, hard, uniformly burned, regular and uniform in shape and size, compact texture, and satisfactory to the Engineer.
  - 2. Immediately remove rejected brick from the work.
- B. Mortar:
  - 1. Composition (by volume):
    - a. 1 part portland cement.
    - b. 1/2 part hydrated lime.
    - c. 4-1/2 parts sand.

2. The proportion of cement to lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.
- C. Cement:
  1. Shall be Type II portland cement.
- D. Hydrated Lime:
  1. Shall be Type S.
- E. Sand:
  1. Shall consist of inert natural sand.
- F. Grading:

| <u>Sieve</u> | <u>Percent Passing</u> |
|--------------|------------------------|
| No. 4        | 100                    |
| No. 8        | 95-100                 |
| No. 16       | 70-100                 |
| No. 30       | 40-75                  |
| No. 50       | 10-35                  |
| No. 100      | 2-15                   |
| No. 200      | 0-5                    |

## PART 3 - EXECUTION

### 3.1 PERFORMANCE

- A. Precast Catch Basin Sections:
  1. Perform jointing in accordance with manufacturer's recommendations and as approved by the Engineer.
  2. Install barrels and tops level and plumb.
  3. Make all joints water tight.
  4. Solidly fill annular spaces around pipes entering the catch basin with non-shrink grout or other material approved by the Engineer.
  5. Cut openings (as required) carefully to prevent damage to barrel sections and tops. Damaged barrel sections and tops shall be replaced by the Contractor at no additional expense to the Owner.
- B. Pipe Connections to Catch Basins: Connect pipes to catch basins with joint design and materials approved by the Engineer.
- C. Masonry:
  1. Laying Brick:
    - a. Use only clean bricks in brickwork for catch basins.
    - b. Moisten the brick by suitable means until they are neither so dry as to absorb water from the mortar or so wet as to be slippery when laid.
    - c. Lay each brick in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and thoroughly bond as directed.
    - d. Construct all joints in a neat workmanlike manner, construct the brick surfaces inside the manholes so they are smooth with no mortar extending beyond the bricks and no voids in the joints. Maximum mortar joints shall be 1/2 inch.

2. Curing:
  - a. Protect brick masonry from drying too rapidly by using burlaps which are kept moist, or by other approved means.
  - b. Protect brick masonry from the weather and frost as required.
- D. Frames and Grates:
  1. Set all frames in a full bed of mortar, true to grade and concentric with the catch basin opening.
  2. Completely fill all voids beneath the bottom flange to make a watertight fit.
  3. Place a ring of mortar at least one inch thick around the outside of the bottom flange, extending to the outer edge of the catch basin all around its circumference.
  4. Clean the frame seats before setting the covers in place.
- E. Bedding and Backfilling:
  1. Catch Basins:
    - a. Bedding material of catch basin shall be 8 inches of crushed stone (see Section 02200).
    - b. Backfill 12 inches all around catch basin with gravel borrow.

END OF SECTION



SECTION 02435CULVERTS AND STORM DRAINSPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Provide and install culvert or storm drain pipe and sections of the type(s), size(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS

- A. Submit, in duplicate, sworn certificates of inspections and tests performed at the location of manufacturers.
- B. Submit shop drawings in accordance with the General Conditions of the Construction Contract.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Exercise care when handling pipe to prevent damage of any nature to pipe and finish.
- B. Immediately remove damaged materials and replace at no additional cost to the Owner.
- C. Store materials above ground on platforms, skids or other adequate supports.

1.5 FIELD QUALITY CONTROL

- A. Acceptance will be on the basis of tests of materials and inspection of the complete product.
- B. Inspection may be made at the place of manufacture or on the construction site after delivery, or both, and the pipe shall be subject to rejection at any time due to failure to meet all of the specification requirements, even though sample pipe units may have been accepted as satisfactory at the place of manufacture.
- C. Immediately remove from the project site all rejected pipe.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Pipe shall be one of the following as specified on the Drawings or at the option of the Contractor and with the approval of the Engineer.
1. Polyvinyl Chloride (PVC) Pipe
  2. Reinforced Concrete Pipe
  3. Ductile Iron Pipe

- B. Materials for pipes shall conform to Standards listed as follows:
1. PVC (Polyvinylchloride) Pipe. This pipe and fittings shall conform to the requirements of AASHTO M278. All pipe shall be supplied with gasket type joints meeting the requirements of ASTM D3212.
  2. Reinforced Concrete Pipe, Class I-V. This pipe shall conform to the requirements of AASHTO M170, (ASTM C76) except paragraph 6.2. Elliptical pipe shall conform to the requirement of AASHTO M207 M/207 M, except paragraph 6.2. Unless otherwise specified, pipe wall design and use of elliptical reinforcement in circular pipe are optional. Pipe arch shall conform to the requirements of AASHTO M 206M/M 206, except paragraph 6.2. Aggregates shall meet the requirements of MDOT Standard Specifications Subsections 703.01 and 703.02 for fine aggregates and coarse aggregates respectively, except that grading requirements are hereby waived. Precast reinforced concrete special sections shall conform to the requirements of the cited specifications to the extent to which they apply.
  3. Ductile Iron Pipe. This pipe shall be 4-inches or greater meeting or exceeding AWWA C150 and AWWA C151 with a pressure class of 350 or a minimum thickness class of 50. Push on joints shall meet or exceed AWWA C111. Double cement lining shall be provided meeting or exceeding AWWA C104. An asphaltic coating shall be applied to both the outside and inside of the pipe. Outside coating shall meet or exceed AWWA C151 and inside coating to meet or exceed AWWA C104.

### PART 3 - EXECUTION

#### 3.1 INSPECTION

- A. Examine areas to receive piping for the following:
1. Obstructions that adversely affect the installation and quality of the work.
  2. Deviations beyond allowable tolerances for clearances.
- B. Examine pipe and fittings before installation to assure no defective materials are incorporated.
- C. Start the work only when conditions are satisfactory.
- D. Remove and replace all defective materials at no additional cost to the Owner.

#### 3.2 INSTALLATION

- A. Do not install pipe, nor backfill, between November 15 and April 1 without the written permission of the Engineer.
- B. Begin laying the pipe at the downstream end.
- C. Lay paved or partially lined pipe with the lining on the bottom.
- D. Join flexible pipe sections and metal end sections by coupling bands.
- E. Assemble the plates for structural plate arches according to the manufacturer's assembly instructions and as shown on the Drawings.

END OF SECTION

SECTION 02485LOAMING & SEEDINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS AND TESTING

A. Seed:

1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
2. This certification shall appear in, or with, all copies of invoices for the seed.
3. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
4. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.

B. Topsoil:

1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
3. Have soil samples tested by an independent soils testing laboratory, approved by the Engineer, at the Contractor's expense.
4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing.
5. Approval, by the Engineer, to use topsoil for the work will be dependent upon the results of the soils tests.

C. Lime & Fertilizer:

1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.

2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.
3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

#### 1.4 DELIVERY, STORAGE & HANDLING

##### A. Seed:

1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
2. Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.

##### B. Fertilizer:

1. Furnish all fertilizer in unopened original containers.
2. Containers shall be labeled with the manufacturer's statement of analysis.

#### 1.5 JOB CONDITIONS

A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading.

##### B. Seeding:

1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
2. Weather Conditions:
  - a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
  - b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
  - c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

##### A. Seed:

1. Provide the grass seed mixture approved by the Engineer, having the following composition:
  - a. Park Mixture:
    - i. 50 percent Creeping Red Fescue
    - ii. 30 percent Kentucky Bluegrass

- iii. 20 percent Annual Ryegrass
      - iv. Add 1 pound White or Dutch Clover per acre
      - v. No weed seeds allowed
    - b. Roadside Mixture:
      - i. 50 percent Creeping Red Fescue
      - ii. 15 percent Kentucky Bluegrass
      - iii. 5 percent White Clover
      - iv. 2 percent Red Top
      - v. 3 percent Birdsfoot Trefoil
      - vi. 25 percent Annual Ryegrass
      - vii. Add 1 pound of White or Dutch Clover per acre
      - viii. No weed seeds allowed
    - c. Lawn Areas:
      - i. Kentucky 31 Fescue 25 percent
      - ii. Chewing Fescue 15 percent
      - iii. Creeping Red Fescue 15 percent
      - iv. Pennfine Perennial Rye 25 percent
      - v. Lynn Perennial Rye 10 percent
      - vi. Common Annual Rye 10 percent
      - vii. No weed seeds allowed
  - 2. Do not use seed which has become wet, moldy, or otherwise damaged in transit or during storage.
- B. Topsoil:
- 1. Fertile, friable, natural topsoil typical of the locality, without admixture of subsoil, refuse or other foreign materials and obtained from a well-drained site. Mixture of sand, silt, and clay particles in equal proportions.
  - 2. Free of stumps, roots, heavy of stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, weeds, sticks, brush or other deleterious matter.
  - 3. Not less than 4 percent nor more than 20 percent organic matter.
  - 4. Topsoil depth shall be 4-inches, unless otherwise indicated.
- C. Lime:
- 1. Provide lime which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. 100 sieve.
  - 2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. 100 sieve. No additional payment will be made to the Contractor for the increased quantity.
- D. Fertilizer:
- 1. Provide a commercial fertilizer approved by the Engineer.
  - 2. Provide fertilizer containing the following minimum percentage of nutrients by weight:
    - a. 10% Available phosphoric acid
    - b. 10% Available potash
    - c. 10% Available nitrogen (75% of the nitrogen shall be organic)

## PART 3 - EXECUTION

### 3.1 PREPARATION

#### A. Equipment:

1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.

#### B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.

1. Scarify the subgrade to a depth of 2 inches to allow the bonding of the topsoil with the subsoil.
2. Apply topsoil to a depth of 4 inches or as directed on areas to be seeded.
3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
4. Remove all objectionable material and form a finely pulverized seed bed.

### 3.2 PERFORMANCE

#### A. Grading:

1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.
2. Leave all surfaces in even and properly compacted condition.
3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.

#### B. Placing Topsoil:

1. Uniformly distribute and evenly spread topsoil on the designated areas.
2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
3. Correct any irregularities in the surface resulting from topsoiling or other operations to prevent the formation of depressions where water may stand.
4. Thoroughly till the topsoil to a depth of at least 3 inches by plowing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer. The surface shall be cleared of all debris and or stones one inch or more in diameter.

#### C. Placing Fertilizer:

1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
2. Incorporate fertilizer into the soil to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
3. The incorporation of fertilizer may be a part of the tillage operation specified above.
4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.

#### D. Placing Lime:

1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.
2. Distribute lime at a rate determined from the pH test, to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.

- E. Seeding:
1. Fine rake and level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
  2. Hydroseeding:
    - a. Hydroseeding may be performed where approved and with equipment approved by the Engineer.
    - b. Sow the seed over designated areas at a minimum rate of 5 pounds per 1000 square feet.
    - c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydroseeder.
    - d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.
- F. Compacting:
1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
  2. Compact the entire area immediately after the seeding operations have been completed.
  3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
  4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
  5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.
- G. Mulching for Permanent Seeding:
1. Apply mulch at the specified rate for the given type and as specified by the "New Hampshire Stormwater Manual, Volume 3: Erosion and Sediment Controls During Construction" prepared by the NHDES and Comprehensive Environmental Inc.

| New Hampshire                             |                                                                                                          |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Mulch Type                                | Rate                                                                                                     |
| Straw                                     | 2 bales, (70-90lbs)/1,000 SF                                                                             |
| Wood Chips or Bark<br>Erosion Control Mix | 2-6 inches, (460-920) lbs/1,000 SF<br><15% Slope: 2 inches thick min.<br>>15% Slope: 4 inches thick min. |
| Erosion Control Blankets                  | Per manufacturer's instructions                                                                          |
| Wood Fiber Mulch                          | 500 lbs/acre                                                                                             |

### 3.3 PROTECTION & MAINTENANCE

#### A. Protection:

1. Protect the seeded area against traffic or other use.
2. Erect barricades and place warning signs as needed.

#### B. Maintenance:

1. At the time of the first cutting, set mower blades two inches high. All lawns shall receive at least two mowings before acceptance. Coordinate schedule for mowing with Engineer.
2. Maintenance shall also include all temporary protection fences, barriers and signs and all other work incidental to proper maintenance.
3. Maintain grass areas until a full stand of grass is indicated, which will be a minimum of 45 days after all seeding work is completed, and shall not necessarily related to Substantial Completion of the General Contract.
4. Protection and maintenance of grass areas shall consist of watering, weeding, cutting, repair of any erosion and reseeding as necessary to establish a uniform stand for the specified grasses, and shall continue until Acceptance by the Engineer of the work of this section. It shall also include the furnishing and applying of such pesticides as are necessary to keep grass areas free of insects and disease. All pesticides shall be approved by Engineer prior to use.

### 3.4 ACCEPTANCE

- #### A.
- At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

### END OF SECTION



SECTION 02510CEMENT CONCRETE SIDEWALKSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: This work shall consist of the construction of new cement concrete sidewalks and driveways in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the Engineer.
- B. 6" reinforced concrete sidewalk with detectable warning panels shall be constructed at all intersections and at commercial driveways which are provided with traffic control devices or serving a site with greater than 20,000 square feet of floor area, in accordance with City of Concord Standard Details. Curb ramps shall comply to the most recently adopted guidance provided by the U.S. Access Board for Public Rights-of-Way.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.
  - 1. Division 3

1.3 RELATED DOCUMENTS

- A. State of New Hampshire Department of Transportation Standard Specifications for Highways and Bridges, latest edition, herein after referred to as NHDOT Specifications.

1.4 QUALITY ASSURANCE

- A. Materials: Use only materials furnished by a bulk cement concrete producer regularly engaged in the production of portland cement concrete.
- B. Submittals: A certificate of compliance shall be furnished to the Engineer that the materials supplied comply with the specification requirements.

1.5 SUBMITTALS

- A. Refer to Division 3 for required material submittals.

PART 2 - PRODUCTS2.1 MATERIALS

- A. The portland cement concrete shall conform to the requirements of AASHTO M85 Type II with a moderate heat of hydration and with the following exceptions:
  - 1. The autoclave expansion shall be limited to a maximum of 0.20 percent.
  - 2. There will be no requirements for tensile strength.  
Only one brand of cement shall be used on any one contract unless otherwise permitted, in writing, be the Engineer.
- B. The welded wire fabric for reinforcement shall conform to the requirements of

AASHTO M 55/M 55, unless otherwise specified.

- C. The premolded expansion joint material shall be non-extruding and resilient bituminous type and shall conform to the requirements of AASHTO M213.

### PART 3 - EXECUTION

#### 3.1 EXCAVATION

- A. Excavation shall be to the depth and width that will permit the installation and bracing of the forms. The foundation shall be shaped and compacted to a firm even surface conforming to the section shown on the plan. All soft and yielding material shall be removed and replaced with acceptable material.

#### 3.2 FORMS

- A. Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be true, free from warp and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.

#### 3.3 PLACING CONCRETE

- A. The foundation shall be thoroughly moistened immediately prior to placing the concrete. The proportioning, mixing and placing of the concrete shall be in accordance with good construction practices, as stated in the requirements of the NHDOT specifications Section 502 - Structural Concrete.
- B. Concrete shall not be placed during inclement weather or when temperatures are below 40 degrees or above 95 degrees Fahrenheit.

#### 3.4 FINISHING

- A. The surface shall be finished to produce a broom like pattern.
- B. No plastering of the surface with mortar will be permitted.

#### 3.5 JOINTS

- A. Joints shall be located as shown on the plans. Slabs shall be placed alternately and the joints coated with an approved bituminous material before placing the adjacent slab.
- B. When a concrete sidewalk is constructed adjacent to a curb, building, retaining wall, light pole base or other fixed structure, a 1/4 inch thick premolded joint filler shall be used between the slab and the structure.

#### 3.6 CURING

- A. Concrete shall be cured for at least 72 hours. Curing shall be by moist burlap or mats, white pigmented curing compound or by other approved methods. During the curing period, all traffic, both pedestrian and vehicular, shall be excluded. Vehicular traffic shall be excluded for such additional time as may be directed.
- B. Cracked, dimpled, damaged, discolored, or improperly cured concrete will be removed and replaced immediately at no additional cost to the Owner.

END OF SECTION

SECTION 02513CBITUMINOUS CONCRETE PAVING (NEW HAMPSHIRE)PART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Furnish all plant, labor, equipment and materials required to install bituminous concrete pavement courses, including sidewalks, driveways, temporary and permanent trench paving and restoration of pavement markings as shown on the Drawings and as specified herein.
2. Remove bituminous asphaltic and/or Portland cement pavement, and replace bituminous asphaltic pavement, base, binder courses and surface courses, including temporary pavement, within the area(s) shown on the Drawings and as directed by the Engineer.
3. Keep pavement removal to a minimum width suitable for the required construction.
4. Apply pavement markings to the permanent paving as specified.

B. Work Not Included: Removal and replacement of paving for the convenience of the Contractor will not be considered for payment.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Materials: Use only materials furnished by a bulk bituminous concrete producer regularly engaged in the production of hot mixed, hot laid bituminous concrete.
- B. Equipment: Provide, maintain and operate pavers, dump trucks, tandem, 3-wheel and pneumatic tired rollers well suited to the mixtures being placed. Provide, maintain and operate hand equipment as required. When applicable, provide, maintain and operate trimming equipment and materials.
- C. Mix Requirements, Method of Placement and Compaction: Standard Specifications for Road & Bridge Construction, State of New Hampshire, Department of Transportation, latest edition, hereinafter called NH DOT Standards for mixing, placing and compacting bituminous concrete surfaces are applicable to this work.

1.4 SUBMITTALS

- A. A certificate of compliance shall be furnished to the Engineer that the materials supplied comply with the specification requirements.
- B. A Job Mix Formula approved by the State of New Hampshire Department of Transportation's Bureau of Materials and Research shall be submitted for each mixture and supplied at least 15 calendar days prior to production.
- C. Delivery slips shall be furnished with each load of mix delivered to the project. Information shall include:

1. Vehicle identification.
2. Date.
3. Project.
4. Identification of material.
5. Gross, tare and net weights.
6. Signed by the bituminous concrete producer.
7. Stamped by a licensed public weigh master.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Hot Bituminous Paving Mix:

1. Binder Course - 19.0 mm nominal maximum aggregate size.
2. Surface Course - 12.5 mm nominal maximum aggregate size.
3. Sidewalks and Drives - 9.5 mm nominal maximum aggregate size.
4. Deep Lifts in Full Construction - 25.0 mm nominal maximum aggregate size.

#### B. Composition of Mixtures - Control Points

| SIEVE SIZE | GRADING                                        |            |              |             |
|------------|------------------------------------------------|------------|--------------|-------------|
|            | TYPE 25 mm                                     | TYPE 19 mm | TYPE 12.5 mm | TYPE 9.5 mm |
|            | PERCENT BY WEIGHT PASSING - COMBINED AGGREGATE |            |              |             |
| 37.5 mm    | 100                                            |            |              |             |
| 25 mm      | 90-100                                         | 100        |              |             |
| 19 mm      | -90                                            | 90-100     | 100          |             |
| 12.5 mm    | -                                              | -90        | 90-100       | 100         |
| 9.5 mm     | -                                              | -          | -90          | 90-100      |
| 4.75 mm    | -                                              | -          | -            | -90         |
| 2.36 mm    | 19-45                                          | 32-42      | 42-52        | 46-56       |
| 1.18 mm    | -                                              | -          | -            | -           |
| 0.60 mm    | -                                              | -          | -            | -           |
| 0.30 mm    | -                                              | -          | -            | -           |
| 0.075 mm   | 1-7                                            | 2-8        | 2-10         | 2-10        |

#### C. Tack Coat:

1. Emulsified type, Grade RS-1, CRS-1, HFMS-1, CSS-1, 1h

#### D. Pavement markings shall be in accordance with Section 02577.

## PART 3 - EXECUTION

### 3.1 GENERAL

#### A. Grade Control:

1. The Contractor shall establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.

#### B. Trench areas shall receive initial paving as the work progresses where trenches are in paved streets. Not more than 300 linear feet of backfill trench shall be left unpaved.

- C. Reset all existing manholes to finished grade as required at no additional cost to the Owner.

### 3.2 PAVEMENT REMOVAL

#### A. General:

1. Exercise extreme care in the removal of pavement so that pavement will not be unnecessarily disturbed or destroyed.
2. Mechanically cut pavement to be removed to a straight line, unless otherwise directed by the Engineer.
3. All pavement removed shall become the property of the Contractor and disposed of at acceptable locations designated by the Owner and at no additional cost to the Owner.

#### B. New Hampshire DOT Areas:

1. When removing pavement under the jurisdiction of the New Hampshire Department of Transportation (NHDOT) strictly adhere to all DOT regulations controlling pavement openings.

### 3.3 SURFACE PREPARATION

#### A. Tack coats shall conform to the NH DOT Standard Specifications.

#### B. Tack Coat:

1. Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.05 to 0.15 gallons per square yard of surface.

### 3.4 PLACING THE MIX

#### A. General:

1. Place asphalt concrete mixture on prepared surface. Minimum allowable temperature for placing is 250°F. Maximum shall be 325°F. Place in areas inaccessible to paving machine and small areas by hand. Place each course to required grade, cross-slope and compacted thickness.

#### B. Protection:

1. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened to the extent that the pavement will not be damaged.

### 3.5 PAVEMENT MARKINGS

- A. Material, approved by the Engineer, is to be furnished and applied after the installation of permanent paving.
- B. Apply pavement markings in accordance with existing markings. Match paint color, marking dimensions, layout and other details with existing markings in the vicinity of the project.
- C. If new pavement markings are not shown on the Drawings, replace previously existing pavement markings to restore existing conditions.

END OF SECTION

## SECTION 02525

### GRANITE CURBS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: This work shall consist of furnishing and installing curb or edging, or removing and relaying existing curbing or edging in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the Engineer. The types of curbs are designated as follows:

Type 1 - Vertical granite curb

Type 5 - Sloped granite edging

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 SUBMITTALS

- A. Submit shop drawings in accordance with the applicable sections of Division 1, and the General Conditions of the Specifications.
- B. Provide dimensional information, layout diagrams, and source of materials.
- C. Submit mortar mix design.
- D. Submit masonry contractor's qualifications.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. General:
1. The stone for curbing and edging shall be hard, durable, quarried granite.
  2. It shall be gray in color, free from seams, cracks or other structural defects and shall be of smooth splitting character.
  3. The curb may contain natural color variations that are characteristic of the granite source.
  4. The dimensions, shape and other details shall be as shown on the Drawings.
- B. Source:
1. The Contractor shall submit for approval the name of the quarry which is the proposed source of the granite for curb materials.
  2. Samples shall be submitted for acceptance by the Engineer when requested.
- C. Finish and Surface Dimensions:
1. Vertical Curb, Type 1:
    - a. The individual curb stones shall conform to the dimensions indicated on the Drawings.
    - b. Individual stones shall be furnished in minimum lengths of 6 feet, unless otherwise specified.

- c. The exposed face of the stone curb shall be free from indications of drill holes. Half drill holes not larger than 3/4 inches diameter will be permitted in the arris line in the plane of the back.
  - d. The top surface shall be sawed or dressed to an approximately true plane with no depression or projection on that surface of over 1/8 inch.
  - e. The top front arris line shall be pitched straight and true with no variations from a straight line greater than 1/4 inch.
  - f. The top back arris line shall meet the same requirement as the top front arris except that indentations of a maximum of 3/8 inch will be allowed.
  - g. There shall be no projection or depression on the back face which would exceed a batter of 1 horizontal on 3 vertical for a distance from the top of 3 inches.
  - h. The front face shall be at right angles to the top and shall be smooth split and have no projections greater than one inch or depressions greater than 1/2 inches, measured from the vertical plane of the face through the top arris line, for a distance down from the top of 8 inches. The remainder of the face shall have no projections or depressions greater than one inch measured in the same manner.
  - i. The ends of the curb shall be approximately square with the planes of the top, back and face and so finished that when the sections are placed end to end with the required minimum spacing of 1/4 inch no more than 5/8 inch space shall show in the joint for the full width of the top surface and for the entire exposed front face. The remainder of the end may extend back no more than 8 inches from the plane of the joint.
  - j. The bottom surface may be sawn or split.
  - k. Drill holes through the curb will be allowed providing they are at least 9 inches below the top and are mortared full with portland cement mortar before placing the stone.
2. When curbing is specified on the Drawings with a radius of 60 feet or less, it shall be cut on the specified radius.
3. Curb Inlets: Inlets used at catch basins shall conform to the applicable requirements of Vertical Curb, Type 1, and to the shape, dimensions and details as shown on the Drawings.
4. Sloped Edging, Type 5:
- a. The individual edging stones shall conform to the dimensions indicated on the Drawings.
  - b. Individual stones shall be furnished in minimum lengths of two (2) feet, unless otherwise specified.
  - c. The exposed face shall be smooth split to an approximate true plane having no projections or depressions which will allow over one (1) inch to show between a two (2) foot straightedge and the face when the straightedge is placed as closely as possible on any part of the face.
  - d. Half drill holes not more than three (3) inches in length and 3/4 inch in diameter will be permitted along the bottom.
  - e. The arris line, top front shall be straight and true with no variation from a straight line greater than 1/8 inch.

- f. The arris lines at the bottom of the face shall be straight and true so that not over one (1) inch shall show between the stone and a straightedge for the full length of the stone.
    - g. The ends shall be square to the length at the face and so finished that when the stones are placed end to end, no space more than 1 1/2 inches will show in the joint for the width of the face.
    - h. When sloped edging is specified on the Drawings with a radius of thirty (30) feet or less, it shall be cut on the specified radius.
  - 5. Terminal curb, Type 1: Shall meet the requirements of Vertical Curb, Type 1 as contained herein.
- D. Joint Mortar:
  - 1. Shall consist of one (1) part portland cement and two (2) parts sand and mixed with sufficient water to form a plastic composition.
  - 2. The portland cement shall conform to AASHTO M85, Type II-A.
  - 3. The sand shall consist of the following gradation:
    - 100% Passing the No. 8 sieve
    - 15-40% Passing the No. 50 sieve
    - 0-10% Passing the No. 100 sieve
    - 0-5% Passing the No. 200 sieve

### PART 3 - EXECUTION

#### 3.1 REMOVAL OF CURBING

- A. The Contractor shall carefully remove, store and clean curb specified on the Drawings or designated for resetting.
- B. Curbing damaged or destroyed, as a result of the Contractor's operations or because of his failure to store and protect it in a manner that would prevent loss or damage, shall be replaced with curbing of equal quality at the Contractor's expense.

#### 3.2 EXCAVATION

- A. Excavation shall be made to the required depth and base material upon which the curb is to be set shall be compacted to a firm, even surface.
- B. All soft and unsuitable material shall be removed and replaced with suitable material which shall be thoroughly compacted.

#### 3.3 INSTALLATION

- A. The curb and sloped edging shall be set so that the front top arris line is in close conformity to the line and grade required.
- B. All space beneath the curbing shall be filled and thoroughly tamped with material meeting the requirements of the bed course material.

#### 3.4 JOINTS

- A. The required spacing between stones shall be a minimum of 1/4 inch and a maximum of 5/8 inch for Type 1 curb.
- B. The required spacing between stones shall be a maximum of 1/2 inch for Type 5 curb.
- C. Joints between stones shall be carefully filled with mortar along the back portion of the joint to prevent loss of backfill material.



3.5 BACKFILLING

- A. After the joints have set, any remaining excavated areas shall be filled and tamped with approved material placed in eight (8) inch layers.

3.6 CURB INLETS

- A. Curb placed adjacent to curb inlets shall be installed with steel dowels cemented into each stone with epoxy grout.

END OF SECTION

## SECTION 02601

### MANHOLES, COVERS AND FRAMES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Construct manholes, covers, frames, brick masonry, inverts and apply dampproofing in conformance with the dimensions, elevations, and locations shown on the Drawings and as specified herein.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 QUALITY ASSURANCE

- A. Precast Manhole Base, Barrel and Top Sections:
1. Conform to ASTM C478 latest edition except as modified herein, and on the Drawings.
  2. Average strength of 5,000 psi at 28 days.
  3. Testing:
    - a. Determine concrete strength by tests on 6-inch by 12-inch vibrated test cylinders cured in the same manner as the bases, barrels and tops. NTS: For structures 6' in diameter or greater – delete if not applicable.
    - b. Have tests conducted at the manufacturer's plant or at a testing laboratory approved by the Engineer.
    - c. Have not less than 2 tests made for each 100 vertical feet of precast manhole sections. Testing not required for projects with less than 100 vertical feet of precast structures. Test aggregate in accordance with ASTM C1293 and Section 03420. Aggregate having an expansion less than 0.04% at 1-year is acceptable for use. Section 03420 only applicable on projects with precast structures of 6'-0" or greater interior dimension.
- B. Frames and Covers:
1. Acceptable Manufacturers:
    - a. EJ Castings
    - b. Neenah Foundry Company.
    - c. Or equal
- C. Masonry:
1. Brick: Shall comply with the ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
  2. Cement: ASTM C150, C595 Type IL.
  3. Hydrated Lime: ASTM C207
  4. Sand: ASTM C33
- D. Dampproofing:
1. Acceptable Manufacturers:

- a. Karnak #220 AF Fibered Emulsion Dampproofing, Karnak Corp., Clark, NJ.
  - b. Master Seal 615Sealmastic Type II Emulsion
  - c. Or equal.
- E. Pipe connections shall conform to ASTM C923, "Standard Specifications for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals"
- F. Sealant between precast sections shall be butyl rubber sealant with a minimum diameter of 1-inch. Conseal SC-102, Kent Seal, RN 101 Ram Nek or equivalent.

#### 1.4 SUBMITTALS

- A. Submit shop drawings and manufacturer's literature in conformance with Section 01340 and the Standard General Conditions of the Construction Contract.
- B. Precast Manhole Sections:
  - 1. Submit concrete test results for review prior to delivery to the site.
  - 2. Submit all accessories products for review.
- C. Submit riser diagrams for each precast structure for review and field verification.

#### 1.5 WARRANTY

- A. Contractor's one year warranty, as specified in Division 0, shall include but not be limited to:
  - 1. Cracking, spalling or other surface and structural defects.
  - 2. Separation of joints or misalignment of adjacent units due to faulty precast concrete sections.
  - 3. Leakage through all joints between concrete sections due to faulty materials or improper installation.
- B. The Contractor shall repair or replace all defective work at no additional cost to the Owner within warranty period.

### PART 2 - PRODUCTS

#### 2.1 PRECAST MANHOLE SECTIONS

- A. Dimensions, shall be as shown on the Drawings:
  - 1. Base & Riser Sections:
    - a. Diameter: As shown on the Drawings.
    - b. Length: As required.
    - c. Wall Thickness: Not less than 5 inches.
    - d. Joints: Bell-and-spigot or tongue-and-groove formed on machine rings to ensure accurate joint surfaces.
  - 2. Tops:
    - a. Diameter: Eccentric cone type, 30 inches I.D. at top, match I.D. at bottom unless otherwise shown on the Drawings.
    - b. Height: 4 feet.
    - c. Wall thickness: Not less than 5 inches at the base, tapering to not less than 8 inches at the top.
    - d. Joints: Bell-and-spigot or tongue-and-groove formed on machine rings to ensure accurate joint surfaces.

- e. Exterior face of cone sections shall not flare out beyond the vertical.
- B. Aggregates:
  - 1. The use of crushed hydraulic cement or recycled aggregate is prohibited.
  - 2. Coarse aggregate shall consist of a well graded crushed stone or a washed gravel conforming to the requirements of ASTM C33/C33M.
- C. Openings:
  - 1. Provide openings in the risers to receive pipes entering the manhole.
  - 2. Make openings at the manufacturing plant.
  - 3. Size: To provide a uniform annular space between the outside wall of pipe and riser.
  - 4. Location: To permit setting of the entering pipes at the correct elevations.
  - 5. Openings shall have a flexible watertight union between pipe and the manhole wall.
    - a. Cast into the manhole wall and sized to the type of pipe being used.
    - b. Type of flexible joint being used shall be approved by the Engineer. Install materials according to the Manufacturer's instructions.
      - i. Lock Joint Flexible Manhole Sleeve made by Interpace Corporation.
      - ii. Kor N Seal made by Trelleborg.
      - iii. Press Wedge II made by Press-Seal Gasket Corporation.
      - iv. A-Lok Manhole Pipe Seal made by A-Loc Corporation.
      - v. Or equivalent.
- D. Joints:
  - 1. Joint gaskets to be flexible self-seating butyl rubber joint sealant installed according to manufacturer's recommendations. Install a double row of joint sealants for every manhole joint. For cold weather applications, use adhesive with joint sealant as recommended by manufacturer.  
Acceptable Materials:
    - a. Kent-Seal No. 2
    - b. Ram-Nek
    - c. Or equivalent.
  - 2. Joints between precast sections shall conform to related standards and manufacturer's instructions.
  - 3. All manholes greater than 6 ft. diameter and all manholes used as wet wells, valve pits and other dry-pit type structures shall be installed with exterior joint collars. The joint collar shall be installed according to the manufacturer's instructions.
  - 4. Acceptable Materials:
    - a. MacWrap exterior joint sealer as manufactured by Mar-Mac Manufacturing Company
    - b. Cretex External Joint Wrap
    - c. Or equivalent.
- E. Dampproofing:
  - 1. The exterior surface of all manholes shall be given two coats of dampproofing material at an application rate as recommended by the manufacturer.

2. The coating shall be applied after the manholes have cured adequately and can be applied by brush or spray in accordance with the manufacturer's written instruction.
3. Sufficient time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat.

## 2.2 FRAMES AND COVERS

- A. Standard Units:
  1. Made of cast iron conforming to ASTM A48 latest edition, Class 30 minimum.
  2. Have machined bearing surfaces to prevent rocking.
  3. Castings shall be smooth with no sharp edges.
  4. Constructed to support an H-20 wheel loading.
  5. Dimensions and Style shall conform to the Drawings, Standard castings differing in non-essential details are subject to approval by the Engineer:
    - a. Covers - Solid with sewer in 3-inch letters diamond pattern. Pick hole dimensions shall not exceed the thickness of the frame inner flange.
    - b. Frame - 30-inch diameter clear opening, with flange bracing ribs.
- B. Water Tight Units:
  1. Same features as above for Standard Units, with 30-inch diameter minimum clear opening.
  2. Sealing features:
    - a. Inner lid held by a bronze tightening bolt in a locking bar.
    - b. Neoprene gasket
    - c. Water tight pick hole.
  3. Constructed to support H-20 wheel loading.

## 2.3 MASONRY

- A. Brick:
  1. Sound, hard, uniformly burned, regular and uniform in shape and size, compact texture, and satisfactory to the Engineer.
  2. Immediately remove rejected brick from the work.
- B. Mortar:
  1. Composition (by volume):
    - a. 1 part portland cement.
    - b. 1/2 part hydrated lime.
    - c. 4-1/2 parts sand.
  2. The proportion of cement to lime may vary from 1:1/4 to 1:3/4, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.
  3. Cement shall be Type II portland cement.
  4. Hydrated lime shall be Type S.
  5. Sand:
    - a. Shall consist of inert natural sand.
    - b. Grading:

Sieve  
No. 4

Percent Passing  
100

|         |        |
|---------|--------|
| No. 8   | 95-100 |
| No. 16  | 70-100 |
| No. 30  | 40-75  |
| No. 50  | 10-35  |
| No. 100 | 2-15   |
| No. 200 | 0-5    |

## PART 3 - EXECUTION

### 3.1 PERFORMANCE

- A. Precast Manhole Sections:
  - 1. Perform jointing in accordance with manufacturer's recommendations and as approved by the Engineer.
  - 2. Install riser sections and tops level and plumb.
  - 3. Make all joints watertight.
  - 4. When necessary, cut openings carefully to prevent damage to barrel sections and tops. Replace damaged manhole sections and tops at no additional cost to the Owner.
- B. Drop Manholes:
  - 1. The difference in elevation between the invert of the inlet pipe and outlet pipe is to be either less than 6-inches (which does not require a drop manhole) or more than 24-inches (which does require a drop manhole).
  - 2. Where difference in elevation between the invert of the inlet pipe to the invert of the outlet pipe exceeds 24 inches, construct a drop manhole as shown on the Drawings or as directed by the Engineer.
- C. Adjust to Grade:
  - 1. Adjust tops of manholes to grade with brick masonry.
  - 2. Concrete rings are not acceptable for adjusting to grade.
  - 3. In paved areas, set frame and cover to final grade after binder pavement is placed and the grade of surface pavement has been determined.
- D. Pipe Connections to Manholes: Connect pipes to manholes with joint design and materials approved by the Engineer. Special care shall be taken to ensure that the openings through which pipes enter the structure are watertight.
- E. Invert Channels:
  - 1. After manhole and all pipes entering or exiting the manhole have been installed, construct the invert channels and shelf.
  - 2. Channels to be smooth and semicircular in shape conforming to the inside of the adjacent sewer section.
  - 3. Make changes in direction of flow with smooth curves having a radius as large as permitted by the size of the manhole.
  - 4. Stop the pipes at the inside face of the manhole where changes of direction occur.
  - 5. Form invert channels and shelf with brick.
  - 6. The maximum change in elevation from the invert of the inlet pipe to the invert of the outlet pipe is 6-inches. Shape invert to make smooth transition in vertical grade.

7. Slope the floor of the manhole (shelf) to the flow channel, as shown on the Drawings.
- F. Masonry:
  1. Laying Brick:
    - a. Use only clean bricks in brickwork for manholes.
    - b. Moisten the brick by suitable means until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
    - c. Lay each brick in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and thoroughly bond as directed.
    - d. Construct all joints in a neat workmanlike manner. Construct the brick surfaces inside the manholes so they are smooth with no mortar extending beyond the bricks and no voids in the joints. Maximum mortar joints shall be 1/2 inch.
    - e. Outside faces of brick masonry shall be plastered with mortar from 1/4-inch to 3/8-inch thick.
    - f. Completed brickwork shall be watertight.
  2. Curing:
    - a. Protect brick masonry from drying too rapidly by using burlaps which are kept moist, or by other approved means.
    - b. Protect brick masonry from the weather and frost as required.
- G. Frames and Covers:
  1. Set all frames in a full bed of mortar, true to grade and concentric with the manhole opening.
  2. Completely fill all voids beneath the bottom flange to make a watertight fit.
  3. Place a ring of mortar at least one inch thick around the outside of the bottom flange, extending to the outer edge of the manhole all around its circumference.
  4. Clean the frame seats before setting the covers in place.
- H. Plugging and Patching:
  1. Fill all exterior cavities with non-shrink grout and with bituminous waterproofing once the concrete and mortar has set.
  2. Touch up damaged water proofing.
- I. Cleaning:
  1. Thoroughly clean manholes, steps, frames and covers of all debris and foreign matter.
- J. Bedding and Backfilling:
  1. Bedding of manholes shall be 6 inches of 3/4" screened stone.
  2. Backfill a minimum of 18 inches all around manhole with gravel borrow.

### 3.2 MANHOLE TESTING

- A. General:
  1. Perform a vacuum test on all manholes.
  2. Perform all testing in the presence of the Engineer.
  3. Suitably plug all pipes entering each manhole and brace plugs to prevent blow out.

- B. Vacuum Test:
1. The manhole shall be tested by a vacuum test after assembly of the manhole and connection piping. Vacuum testing to be conducted prior to construction of invert channels.
  2. Plug all lifting holes completely with non-shrink grout.
  3. Properly tighten all boot clamps and brace all plugs to prevent them from being sucked into the manhole.
  4. Install the testing equipment according to the manufacturer's instructions.
  5. A vacuum of 10 inches of Hg shall be drawn on the manhole and the loss of 1 inch of Hg vacuum timed. The manhole shall be considered to have passed the test if the time for the loss of 1 inch of Hg vacuum is:
    - a. Greater than 2 minutes for manholes less than 10-feet deep.
    - b. Greater than 2.5 minutes for manholes 10 to 15-feet deep.
    - c. Greater than 3.5 minutes for manholes more than 15-feet deep.
  6. If the manhole fails the initial test, the Contractor shall locate the leak(s) and make repairs. The manhole shall be retested until a satisfactory test result is obtained.

### 3.3 FIELD REPAIRS

- A. Structural repairs shall be completed at the direction of the Engineer.
- B. Leakage Repairs
1. Correct leakage by reconstruction, replacement of gaskets and/or other methods as approved by the Engineer.
  2. The use of lead-wool or expanding mortar will not be permitted.
- C. After the manholes have been backfilled, and prior to final acceptance, any signs of leaks or weeping visible inside the manholes shall be repaired and the manhole made watertight.

END OF SECTION



## SECTION 02601A

### DRYWELLS, COVERS AND FRAMES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Construct drywells, covers, frames, brick masonry, inverts, crushed stone bedding, and geotextile filter fabric and conduct soil testing in conformance with the dimensions, elevations, and locations shown on the Drawings and as specified herein.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 QUALITY ASSURANCE

- A. Precast Drywell Base, Barrel and Top Sections:
  - 1. Conform to ASTM C478 latest edition except as modified herein, and on the Drawings.
  - 2. Minimum average strength of 4,000 psi at 28 days.
  - 3. Testing:
    - a. Determine concrete strength by tests on 6-inch by 12-inch vibrated test cylinders cured in the same manner as the bases, barrels and tops. NTS: For structures 6' in diameter or greater – delete if not applicable.
    - b. Have tests conducted at the manufacturer's plant or at a testing laboratory approved by the Engineer.
    - c. Have not less than 2 tests made for each 100 vertical feet of precast manhole sections. Testing not required for projects with less than 100 vertical feet of precast structures. Test aggregate in accordance with ASTM C1293 and Section 03420. Aggregate having an expansion less than 0.04% at 1-year is acceptable for use. Section 03420 only applicable on projects with precast structures of 6'-0" or greater interior dimension.
- B. Frames and Covers:
  - 1. Acceptable Manufacturers:
    - a. EJ Castings
    - b. Neenah Foundry Company.
    - c. Or equal
- C. Masonry:
  - 1. Brick: Shall comply with the ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
  - 2. Cement: ASTM C150, C595 Type IL.
  - 3. Hydrated Lime: ASTM C207
  - 4. Sand: ASTM C33
- D. Pipe connections shall conform to ASTM C923, "Standard Specifications for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and

Laterals”

- E. Sealant between precast sections shall be butyl rubber sealant with a minimum diameter of 1-inch. Conseal SC-102, Kent Seal, RN 101 Ram Nek or equivalent.
- F. Steel Reinforcement:
  - 1. Conform to ASTM A-615 for Grade 60 Rebar.
  - 2. Conform to A-185 for Welded Wire Fabric.

#### 1.4 DESIGN REQUIREMENTS

- A. Reinforcement:
  - 1. The minimum steel reinforcement in each direction in flat slab tops shall not be less than 0.0025 times the gross area of the concrete section.
  - 2. Concrete clear cover on reinforcement: 1-1/2 inches minimum.
- B. The interior dimensions of the precast concrete structures shall be as shown on the Drawings.
- C. The precast concrete structure shall be designed to resist flotation:
  - 1. A minimum factor of safety of 1.15 shall be used against flotation based on weights of empty structure and soil directly over footing extensions and above the top slab (if any), and any frictional resistance.
  - 2. Unless the design high groundwater or flood elevation is noted on the Drawings, the maximum groundwater level shall be assumed at finished grade.
  - 3. If frictional resistance is included, an appropriate coefficient of friction for soil against concrete shall be used. For determination of frictional resistance, active earth pressure shall be used.
  - 4. Where the structure is composed of successive vertical segments, the weight of the segments plus any frictional resistance used shall be such as to provide the same factor of safety for buoyancy, or stainless steel mechanical connections shall be used to connect the segments together. The design shall also include such anchorage to the reinforced concrete anti-buoyancy slab, if such slab is indicated on the Drawings.
  - 5. The buoyant force acting on an object is equal to the weight of the volume of water that is displaced by the object. The actual weight of the same volume determines whether or not the object is buoyant.
  - 6. If the Engineer determines that the submitted buoyancy calculations are incorrect, the Engineer shall direct the Contractor to implement specific measures to counteract buoyancy to the Engineer's satisfaction. Any and all costs associated with such measures shall be borne entirely by the Contractor and shall be at no additional cost to the Owner.

#### 1.5 SUBMITTALS

- A. Submit shop drawings and manufacturer's literature in conformance with Section 01340 and the Standard General Conditions of the Construction Contract.

- B. Precast Drywell Sections:
  - 1. Submit concrete test results for review prior to delivery to the site.
  - 2. Submit all accessories products for review.
- C. Submit riser diagrams for each precast structure for review and field verification.
- D. Submit buoyancy calculations. Calculations and Drawings shall be prepared and stamped by a Professional Engineer registered in New Hampshire. Calculations will be reviewed for consistency with the project intent only. The Professional Engineer stamping the shop drawings and calculations shall be responsible for the design.

#### 1.6 WARRANTY

- A. Contractor's one year warranty, as specified in Division 0, shall include but not be limited to:
  - 1. Cracking, spalling or other surface and structural defects.
  - 2. Separation of joints or misalignment of adjacent units due to faulty precast concrete sections.
  - 3. Leakage through all joints between concrete sections due to faulty materials or improper installation.
- B. The Contractor shall repair or replace all defective work at no additional cost to the Owner within warranty period.

### PART 2 - PRODUCTS

#### 2.1 PRECAST DRYWELL SECTIONS

- A. Dimensions, shall be as shown on the Drawings:
  - 1. Base & Riser Sections:
    - a. Diameter: As shown on the Drawings.
    - b. Length: As required.
    - c. Wall Thickness: Not less than 5 inches.
    - d. Joints: All sections are butt joint.
  - 2. Flat Slab Tops:
    - a. Location: All drywell locations shall be constructed with flat slab tops.
    - b. Slab thickness: Not less than 6 inches.
    - c. Constructed to support an H-20 wheel loading.
  - 3. Drain Holes:
    - a. Drain Holes will be spaced evenly throughout the walls of the drywell structure as shown on the Drawings, with a minimum of 2" clear between successive openings.
- B. Aggregates:
  - 1. The use of crushed hydraulic cement or recycled aggregate is prohibited.
  - 2. Coarse aggregate shall consist of a well graded crushed stone or a washed gravel conforming to the requirements of ASTM C33/C33M.
- C. Openings:
  - 1. Provide openings in the risers to receive pipes entering the manhole.
  - 2. Make openings at the manufacturing plant.
  - 3. Size: To provide a uniform annular space between the outside wall of pipe and riser.
  - 4. Location: To permit setting of the entering pipes at the correct elevations.

5. Openings shall have a flexible watertight union between pipe and the manhole wall.
  - a. Cast into the manhole wall and sized to the type of pipe being used.
  - b. Type of flexible joint being used shall be approved by the Engineer. Install materials according to the Manufacturer's instructions.
    - i. Lock Joint Flexible Manhole Sleeve made by Interpace Corporation.
    - ii. Kor N Seal made by Trelleborg.
    - iii. Press Wedge II made by Press-Seal Gasket Corporation.
    - iv. A-Lok Manhole Pipe Seal made by A-Loc Corporation.
    - v. Or equivalent.
- D. Joints:
  1. Joint gaskets to be flexible self-seating butyl rubber joint sealant installed according to manufacturer's recommendations. Install a double row of joint sealants for every manhole joint. For cold weather applications, use adhesive with joint sealant as recommended by manufacturer.

Acceptable Materials:

    - a. Kent-Seal No. 2
    - b. Ram-Nek
    - c. Or equivalent.
  2. Joints between precast sections shall conform to related standards and manufacturer's instructions.

## 2.2 FRAMES AND COVERS

- A. Standard Units:
  1. Made of cast iron conforming to ASTM A48 latest edition, Class 30 minimum.
  2. Have machined bearing surfaces to prevent rocking.
  3. Castings shall be smooth with no sharp edges.
  4. Constructed to support an H-20 wheel loading.
  5. Dimensions and Style shall conform to the Drawings, Standard castings differing in non-essential details are subject to approval by the Engineer:
    - a. Covers - Solid with DRAIN in 3-inch letters diamond pattern. Pick hole dimensions shall not exceed the thickness of the frame inner flange.
    - b. Frame - 30-inch diameter clear opening, with flange bracing ribs.
- B. Water Tight Units:
  1. Same features as above for Standard Units, with 30-inch diameter minimum clear opening.
  2. Sealing features:
    - a. Inner lid held by a bronze tightening bolt in a locking bar.
    - b. Neoprene gasket
    - c. Water tight pick hole.
  3. Constructed to support H-20 wheel loading.

## 2.3 MASONRY

- A. Brick:
  1. Sound, hard, uniformly burned, regular and uniform in shape and size, compact texture, and satisfactory to the Engineer.
  2. Immediately remove rejected brick from the work.

- B. Mortar:
1. Composition (by volume):
    - a. 1 part portland cement.
    - b. 1/2 part hydrated lime.
    - c. 4-1/2 parts sand.
  2. The proportion of cement to lime may vary from 1:1/4 to 1:3/4, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.
  3. Cement shall be Type II portland cement.
  4. Hydrated lime shall be Type S.
  5. Sand:
    - a. Shall consist of inert natural sand.
    - b. Grading:

| <u>Sieve</u> | <u>Percent Passing</u> |
|--------------|------------------------|
| No. 4        | 100                    |
| No. 8        | 95-100                 |
| No. 16       | 70-100                 |
| No. 30       | 40-75                  |
| No. 50       | 10-35                  |
| No. 100      | 2-15                   |
| No. 200      | 0-5                    |

### PART 3 - EXECUTION

#### 3.1 PERFORMANCE

- A. Precast Drywell Sections:
1. Perform jointing in accordance with manufacturer's recommendations and as approved by the Engineer.
  2. Install riser sections and tops level and plumb.
  3. Make all joints watertight.
  4. When necessary, cut openings carefully to prevent damage to barrel sections and tops. Replace damaged manhole sections and tops at no additional cost to the Owner.
- B. Adjust to Grade:
1. Adjust tops of manholes to grade with brick masonry.
  2. Concrete rings are not acceptable for adjusting to grade.
  3. In paved areas, set frame and cover to final grade after binder pavement is placed and the grade of surface pavement has been determined.
- C. Pipe Connections to Manholes: Connect pipes to manholes with joint design and materials approved by the Engineer. Special care shall be taken to ensure that the openings through which pipes enter the structure are watertight.
- D. Masonry:
1. Laying Brick:
    - a. Use only clean bricks in brickwork for manholes.
    - b. Moisten the brick by suitable means until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.

- c. Lay each brick in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and thoroughly bond as directed.
  - d. Construct all joints in a neat workmanlike manner. Construct the brick surfaces inside the manholes so they are smooth with no mortar extending beyond the bricks and no voids in the joints. Maximum mortar joints shall be 1/2 inch.
  - e. Outside faces of brick masonry shall be plastered with mortar from 1/4-inch to 3/8-inch thick.
  - f. Completed brickwork shall be watertight.
- 2. Curing:
  - a. Protect brick masonry from drying too rapidly by using burlaps which are kept moist, or by other approved means.
  - b. Protect brick masonry from the weather and frost as required.
- E. Frames and Covers:
  - 1. Set all frames in a full bed of mortar, true to grade and concentric with the manhole opening.
  - 2. Completely fill all voids beneath the bottom flange to make a watertight fit.
  - 3. Place a ring of mortar at least one inch thick around the outside of the bottom flange, extending to the outer edge of the manhole all around its circumference.
  - 4. Clean the frame seats before setting the covers in place.
- F. Plugging and Patching:
  - 1. Fill all exterior cavities with non-shrink grout and with bituminous waterproofing once the concrete and mortar has set.
  - 2. Touch up damaged water proofing.
- G. Cleaning:
  - 1. Thoroughly clean manholes, steps, frames and covers of all debris and foreign matter.
- H. Bedding and Backfilling:
  - 1. Bedding of drywells shall be 12 inches of 3/4" crushed stone.
  - 2. Backfill a minimum of 24-36 inches all around manhole with 3/4" crushed stone (see drawings for specific dimensions).

### 3.2 SOIL TESTING

- A. Soil infiltration testing shall be performed at the location of each proposed drywell, using the following procedures:
  - 1. The Ksat shall be measured by a CPESC, certified soil scientist, professional geologist, qualified engineer, or other qualified professional licensed to practice in the state of New Hampshire, using one of the following:
    - a. A Guelph Permeameter, per the manufacturer's instructions, which shall be done at least 2 additional times, for a minimum of 3 observations in each location;
    - b. A Compact Constant Head Permeameter, per the manufacturer's instructions, which shall be done at least 2 additional times, for a minimum of 3 observations in each location;
    - c. A Double Ring Infiltrometer, in accordance with ASTM 3385 standards and using an inner ring that is at least 12 inches in diameter, which shall

- be done at least one time, for a minimum of one observation in each location; or
- d. A Borehole Infiltration Test, in accordance with the following protocol:
    - i. Install a solid 4- to 6-inch diameter by 30-inch long casing to a depth of 24 inches below the proposed bottom of the practice;
    - ii. Remove any smeared soil surfaces and provide a natural soil interface into which water can percolate;
    - iii. Remove all loose material from inside the casing;
    - iv. Fill the casing with water to a depth of 24 inches and allow to pre-soak for 24 hours;
    - v. After pre-soaking in accordance with iv., refill the casing with 24 inches of water and record the drop in water level from the top of the casing at the end of one hour;
    - vi. Divide the drop in water elevation by one hour to obtain the infiltration rate for the given observation;
    - vii. Repeat v. and vi., above, at least 3 additional times, for a minimum of 4 observations in each location; and
    - viii. Use the lower of the average of the calculated infiltration rates or the last observation.

### 3.3 FIELD REPAIRS

- A. Structural repairs shall be completed at the direction of the Engineer.

END OF SECTION

SECTION 02610RIGID BOARD INSULATION FOR PIPE IN TRENCHESPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Provide and install rigid board insulation in trenches over or between piping, as shown on the Drawings and as specified herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 REFERENCES

- A. ASTM C272 - Test Method for Water Absorption of Core Materials for Structural Sandwich Construction.
- B. ASTM C518 - Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter.
- C. ASTM D1621 - Test Method for Compressive Properties of Rigid Cellular Plastics.

1.4 SUBMITTALS

- A. Submit shop drawings, product data and manufacturer's written installation instruction in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site in manufacturer's original unopened packaging.
- B. Identify contents, manufacture, brand name, thermal values, and applicable standards.
- C. Store materials in area protected from weather, and moisture.
- D. Remove damaged materials from site.

PART 2 - PRODUCTS2.1 MANUFACTURERS

- A. Rigid Pipe Insulation
  - 1. Dow Chemical Company – Styrofoam Highload 40
  - 2. Certifoam 40
  - 3. Or equivalent

2.2 RIGID PIPE INSULATION

- A. Insulation: Closed cell polystyrene foam board
  - 1. Standard Two Foot Width.
  - 2. Aged "R" Value - "R" = 5.0 per inch, ASTM C518.
  - 3. Water Absorption - 0.1 percent, ASTM C272.
  - 4. Water Vapor Permeance - 1.0 perm (max) ASTM E96
  - 5. Compressive Strength - 40 pounds per square inch, ASTM D1621.



PART 3 - EXECUTION3.1 INSTALLATION

- A. Lay rigid board insulation in trenches over or between piping where depth of pipe cover is than that required on the Drawings. Install rigid board insulation as shown on the Drawings.

END OF SECTION

SECTION 02612REINFORCED CONCRETE PIPE AND FITTINGSPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Furnish and install reinforced concrete pipe and fittings of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Reinforced-concrete pipe and fittings shall be manufactured by a reputable manufacturer with a minimum of five years' experience in the design and fabrication thereof.
- B. Standards:
  1. Pipe: AASHTO M170-79I unless otherwise specified herein.
  2. Gasket: ASTM C990.
  3. Steel reinforcement: AASHTO M 55M/M 55.
  4. Portland cement: AASHTO M85-79I.

1.4 SUBMITTALS

- A. Submit shop Drawings in accordance with the Standard General Conditions of the Construction Contract showing pipe dimensions, reinforcement, joint and other details prior to fabrication.
- B. Submit certified copies of mill test reports for all tests as outlined for concrete pipe under AASHTO M170-79I.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Do not ship pipe units until they have aged for at least five days at an average minimum temperature of 60 °F.
- B. Prevent earth, water, and other material from entering the pipe at all times.
- C. Furnish devices to permit satisfactory support of the pipe unit when it is lifted and handle each unit in a manner and by such means as recommended by the manufacturer.

1.6 FIELD QUALITY CONTROL

- A. Acceptance will be on the basis of tests of materials, absorption tests, plant load bearing tests, pressure tests, and inspection of the complete product.
- B. Inspection may be made at the place of manufacture or on the construction site after delivery, or both, and the pipe shall be subject to rejection at any time due to failure to meet all of the specification requirements, even though sample pipe units may have been accepted as satisfactory at the place of manufacture.

- C. Immediately remove from the project site all rejected pipe.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Pipe:

1. Interior surfaces free from roughness, projections, indentations, offsets, or irregularities of any kind.
2. Class and nominal diameter as shown on the Drawings.
3. Minimum laying length: 8 feet, unless otherwise approved by the Engineer.
4. Reinforcement: Welded steel wire fabric conforming to AASHTO M 55M/M 55. Elliptical reinforcement will not be permitted.
5. Cured as specified under AASHTO M170-79I.

B. Joints:

1. Sealed by rubber gaskets set into grooves in the spigot rings.
2. Constructed to remain watertight during service and to allow movement due to expansion, contraction, and normal settlement.

C. Gaskets:

1. Continuous rings of a composition and texture that will assure a watertight and permanent seal.
2. Suitable in size to fill the groove on the spigot when pipe lengths are assembled.
3. Smooth surfaces free from pitting, blisters, porosity, and other imperfections.

D. Concrete:

1. Consist of cement, sand and crushed stone or crushed or uncrushed gravel accurately proportioned for density and strength.
2. Minimum cement content 6 bags (564 pounds) per cubic yard.
3. Aggregate: Hard, durable particles, clean and free from loam and organic materials.
4. Water: Clean and free from deleterious amounts of acids, alkalis, and organic materials.
5. Minimum strength: 3000 psi at 7 days, and 4500 psi at 28 days.

E. Fittings:

1. Of the same strength as the pipe.
2. Joints compatible with pipe.

### 2.2 MARKING

A. Clearly mark the following information on each unit of pipe.

1. Class of pipe
2. Date of manufacture
3. Name of manufacturer

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Inspect all pipe prior to installation. Replace pipe discovered to be defective either before or after installation.
- B. Install all pipe and fittings to the lines and grades shown on the Drawings and/or as

directed by the Engineer.

- C. Jointing:
  - 1. Thoroughly clean and check each joint before installing.
  - 2. Thoroughly lubricate the bell and gasket with the lubricant supplied by the manufacturer.
  - 3. Joint all lengths of pipe in accordance with the manufacturer's installation instructions.
  - 4. Provide gasket feeler gages for use by the pipe layer and the Engineer for checking the position of the rubber gaskets in the completed joints.
- D. During installation, close open ends of pipe with temporary, watertight plugs to prevent earth, water, and other material from entering the pipe.

END OF SECTION

SECTION 02622POLYVINYL CHLORIDE (PVC) NON-PRESSURE PIPEPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Provide and install PVC non-pressure pipe and fittings of the size(s) and type(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCEA. Manufacturers:

1. Ipex
2. JM Eagle
3. National Pipe & Plastics
4. Or equivalent.

1.4 SUBMITTALS TO THE ENGINEER

- A. Submit shop drawings in accordance with the General Conditions of the Construction Contract.
- B. Submit manufacturer's "Certification of Conformance" that pipe and fittings meet or exceed the requirements of these Specifications.
- C. Submit other documents as specified in the appropriate Sections of this Division.

1.5 DELIVERY STORAGE AND HANDLING

- A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets and other materials.
- B. Carefully inspect all materials at the time of delivery and just prior to installation.
- C. Carefully inspect all pipe and fittings for:
1. Defects and damage
  2. Deviations beyond allowable tolerances for joint dimensions.
  3. Removal of debris and foreign matter.
- D. Examine area and structures to receive piping for:
1. Defects, such as weak structural components that adversely affect the execution and quality of work.
  2. Deviations beyond allowable tolerance for pipe clearances.
- E. All materials and methods not meeting the requirements of the Contract Documents will be rejected.
- F. Immediately remove all rejected materials from the project site.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Pipe and Fittings:

1. The polyvinyl chloride pipe and fittings, including those required for stubs, shall conform to ASTM standard specification for PVC Sewer Pipe and Fittings, Designation D 3034 (SDR 26 and SDR 35) (4" to 15"), F679 (18" to 27"), or F1760-01 (for recycled pipe, all diameters).
2. Straight pipe shall be furnished in lengths of not more than 14 feet.
3. Saddles will not be allowed.

#### B. Joints:

1. Joints for the polyvinyl chloride pipe shall be push-on joints using factory installed elastomeric ring gaskets.
2. The gaskets shall be securely fixed into place by the manufacturer so that they cannot be dislodged during joint assembly.
3. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and ground water, and which will endure permanently under the conditions of the proposed use.
4. The joints shall conform to ASTM Specifications for Joints for Drain and Sewer Plastic Pipes using Flexible Elastomeric Seals, Designation D3212-76.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Inspection:

1. Each pipe unit shall be inspected before being installed. No single piece of pipe shall be laid unless it is generally straight.
2. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length.
3. If a piece of pipe fails to meet this requirement for straightness it shall be rejected and removed from the site.
4. Any pipe unit or fitting discovered to be defective either before or after installation shall be removed and replaced with a sound unit.

#### B. Jointing:

1. All pipe and fittings shall be cleared of all debris, dirt, etc., before being installed and shall be kept clean until accepted in the completed work.
2. Pipe and fittings shall be installed to the lines and grades indicated on the drawings or as required by the Engineer. Care shall be taken to ensure true alignments and gradients.
3. All joint surfaces shall be cleaned. Immediately before jointing the pipe, the bell or groove shall be lubricated in accordance with the manufacturer's recommendation.

4. Each pipe unit shall than be carefully pushed into place without damage to pipe or gasket. Suitable devices shall be used to force the pipe units together so that they will fit with a minimum open recess inside and outside and have tightly sealed joints. Care shall be taken not to use such force as to wedge apart and split the bell or groove ends.
  5. Joints shall not be "pulled" or "cramped" unless permitted by the Engineer.
- C. Service Connections:
1. All service connections to new pipe shall utilize a tee wye fitting.
  2. All service connections must enter the top half of the mainline pipe or sewer manhole, as shown on the Contract Drawings.
  3. Service connections shall be 6-inch, unless otherwise noted.
  4. An eccentric coupling shall be provided for all connections to existing 4-inch services.
  5. Contractor shall provide all necessary fittings, adapters and couplings to connect the service to the sewer main.
  6. Service laterals shall be placed at 2% slope, unless otherwise noted. If 2% slope is not available, notify the Engineer.
  7. Contractor shall maintain the trench for sufficient time for the Engineer to inspect the work. Contractor shall provide 3 working day notice to the Engineer.
- D. Pipe Deflection:
1. Pipe provided under this specification shall be installed so there is no more than a maximum deflection of 5.0 percent. Such deflection shall be computed by multiplying the amount of deflection (normal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
  2. The Contractor shall wait a minimum of 30 days after completion of a section of sewer, including placement and compaction of backfill, before measuring the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
  3. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.
- E. Testing:
1. Clean and test pipe in accordance with appropriate sections of this division.
  2. CCTV sewer main in accordance with Section 02755.

END OF SECTION

SECTION 02628HIGH DENSITY POLYETHYLENE PIPE AND FITTINGSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, install and test all polyethylene pipe, pipe fittings and appurtenances of the type(s) and size(s) and in the location(s) as shown on the Drawings and as herein specified.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Pressure rating or pressure class of pipe as shown on the Drawings or specified herein.
- B. Standards:
1. ANSI/AWWA C901-02: Standard for Polyethylene (PE) Pressure Pipe and Tubing, ½" (13 mm) through 3" (76 mm) for Water Service.
  2. AWWA C 906-99: Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4" (100 mm) through 63" (1,575 mm) for Water Distribution and Transmission.
  3. ASTM D 2657-07: Standard Practice for Heat Joining Polyolefin Pipe and Fittings.
  4. ASTM D 2683-14: Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
  5. ASTM D 2837-13e1: Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
  6. ASTM D 3261-15: Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
  7. ASTM D 3350-14: Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
  8. ASTM F 1055-16: Standard Specification for Electrofusion type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and tubing.
  9. NSF/ANSI-61-2003e: Standard for Drinking Water Systems Components - Health Effects, NSF International, Ann Arbor, MI. All components in contact with potable water, or water being processed to become potable water, shall be compliant with NSF 61 and shall be constructed of "Lead-free" material in compliance with NSF 372.
  10. CSA B 137.1-2002: Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
  11. ASTM F2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Piping Systems Using Hydrostatic Pressure.



12. Manufacturers of high density polyethylene pipe, fittings, adapters, and couplings must be certified under ISO 9000, Quality Management Systems - Fundamentals and Vocabulary, International Organization for Standardization (ISO), Geneva, Switzerland.
  13. 49 CFR 192 subpart F, 192.281, selected requirements for plastic joints; 192.282, requirements for qualifying joining procedures; 192.285, specifies qualifying persons to make joints; and 192.287, specifies inspection of joints.
  14. Fusion Operators: Operators shall meet the minimum qualification requirements outlined in 49 CFR 192 subpart F, 192.285 and shall have documented experience with successful butt fusion of pipe larger than 24-inch diameter.
  15. Joint Fusion Data: Fusion plate temperature (°F), interfacial fusion pressure (psi), interfacial contact fusion time (sec.), and cooling time (min.) shall be recorded by data logger for computer download or recorded by the operator(s) in a field book for each joint fusion completed.
  16. Pipe deemed damaged or unacceptable to the Engineer shall be replaced at no additional cost to the Owner. Pipe shall be adequately protected during storage to prevent external damage to the pipe side wall or ends. Pipe with gouged side walls will be rejected by the Engineer.
  17. Exterior pipe markings shall include the nominal pipe diameter, SDR, and rated working pressure.
- C. Acceptable Pipe and Fitting Supplier/Manufacturers:
1. PolyPipe, Inc. "PW Pipe"
  2. KWH Pipe, "Sclairpipe"
  3. Performance Pipe
  4. "Isco-Pipe"
  5. "Poly-Cam"
  6. "Friatec"
  7. Vari-Tech "Performance Pipe"
  8. Independent Pipe Products, Inc.
  9. Or approved equal.

#### 1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.
- B. Submit manufacturer's "Certification of Conformance" that pipe and fittings and other piping appurtenances meet or exceed the requirements of these Specifications.
- C. Submit experience statement for operator(s) to complete the pipe fusion to demonstrate the minimum experience and qualification requirements described in paragraph 1.2.B.14.
- D. Following pipe construction, submit joint fusion data in an electronic spreadsheet format as a record to document joint fusion quality control.
- E. Submit manufacturers installation instructions and specifications for all fittings, couplings, adapters, saddles, etc.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Pipes shall be either Iron Pipe Size (IPS) or Ductile Iron Pipe Size (DIPS) with SDR ratings as indicated in the pipe schedule.
- B. Polyethylene compounds utilized in the manufacture of products furnished under this specification shall be listed in PPI TR-4, with a minimum cell classification of PE 445574C for PE 4710 materials, as defined in ASTM D3350. Pipe shall be in conformance with AWWA C901, AWWA C906, or CSA B137.1. They shall have a PPI recommended Hydrostatic Design Basis (HDB) of 1600 psi (PE4710) at a temperature of 73.4°F (23°C).
- C. All materials which come in contact with water, including lubricants, shall be evaluated, tested and certified for conformance with NSF/ANSI Standard 61.
- D. Clean re-work material of the same type grade, and cell classification generated from the manufacturer's own pipe and fitting production may be used by the same manufacturer as long as the pipe, tubing and fittings produced meet all the requirements of AWWA C901, AWWA C906, or CSA B137.1.
- E. Pipe and tubing furnished under this specification shall be manufactured using compounds complying with the requirements above. Dimensional and performance characteristics shall conform to the requirements of AWWA C901, AWWA C906, or CSA B137.1.
- F. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black, well dispersed in a concentration of not less than 2%.
- G. The polyethylene resin compound shall have a resistance to environmental stress cracking as determined by procedure detailed in ASTM D 1693 with sample preparation by procedure C of ASTM D 4703 of not less than 40 hours.
- H. Pipe shall be homogeneous throughout and free of visible cracks, holes, foreign material, blisters, or other deleterious faults.
- I. Polyethylene fittings shall have the same pressure rating as the pipe itself for all pressurized pipeline applications.
- J. Polyethylene fittings shall be molded style for diameters up to 12 inches and fabricated style for diameters larger than 12 inches.

### 2.2 PIPE SCHEDULE

- A. Refer to the Contract Drawings.

### 2.3 ADAPTERS AND COUPLINGS (AS APPLICABLE)

- A. Polyethylene Mechanical Joint Adapter
  - 1. For joining IPS or DIPS size polyethylene pipe to any ANSI/AWWA C153 ductile iron fitting and valve.
  - 2. Molded from NSF listed PE 4710 resin.
  - 3. Adaptor shall meet requirements of AWWA C901, 906.
  - 4. Adaptor kit to include anchor fitting, epoxy coated ductile iron retainer gland ring, gasket, and long tee-bolts, and rubber gasket.
  - 5. Provide stainless steel stiffeners as necessary.

- B. Polyethylene Electrofusion Coupling
  - 1. For joining plain ends of polyethylene pipe where butt fusion is not practical as approved by the Engineer.
  - 2. Molded from NSF listed PE 4710 resin or fabricated from pipe meeting NSF requirements with an integral heating element and electrical leads to connect the heating element power supply.
  - 3. Pressure rating and size shall be the same as the required pipe and fitting SDR.
- C. Polyethylene Electrofusion Saddle
  - 1. For installation corporation stops in HDPE pipe for water service connection or manual air release valve.
  - 2. Molded from NSF listed PE 4710 resin with an integral heating element and electrical leads to connect the heating element power supply.
  - 3. Pressure rating and size shall be the same as the required pipe and fitting SDR.

## 2.4 FABRICATION

- A. Thermal Butt-Fusion:
  - 1. Join the pipe to itself, or to the polyethylene fittings or to the flange connections by means of thermal butt-fusion.
  - 2. Have all fusion performed by personnel trained by the pipe supplier or other qualified persons, using tools approved by the pipe supplier.
  - 3. The polyethylene fittings and flanged connections to be joined by thermal butt-fusion shall be from the same type, grade and class of polyethylene compound as the polyethylene pipe unless otherwise approved.
  - 4. Joint strength must be equal to that of the adjacent pipe.
- B. Electrofusion (When Applicable)
  - 1. Applies to the installation of electrofusion couplings and saddles.
  - 2. Have all fusion performed by personnel trained by the pipe supplier or other qualified persons, using tools approved by the pipe supplier.
  - 3. The coupling or saddle shall be joined using heat created by electric current from a control box.
  - 4. Install clamps to hold the fitting in place during the fusion process.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PIPES AND FITTINGS

- A. Install joint and transition adapters in accordance with the manufacturer's recommendations.
- B. Refer to the drawings and Section 02200 for additional bedding and backfill requirements.
- C. Joining surfaces must be clean and dry.
- D. Pipe must not be dumped, dropped, pushed or rolled into the trench. Provide appropriate equipment to lift move and lower the pipe into the trench as necessary.

### 3.2 TESTING

#### A. Joint Quality

1. 12" diameter and smaller - On each day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion test straps shall be cut out. The test strap shall be 12" or 30 times the wall thickness in length (minimum) and 1" or 1.5 times the wall thickness in width (minimum). Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
2. Pipes larger than 12" diameter - Visual inspection of the joint shall be the primary indicator of joint quality. Specific visual inspection criteria shall be provided by the pipe and fitting manufacturer. The v-groove between the bends shall be uniform around the circumference of the pipe and both sides of the bead shall have uniform thickness and height indicating proper pipe alignment during the fusion process.
3. All fused joints shall be visually inspected by qualified fusion operators and the Engineer during construction to assure uniform alignment and beading.

#### B. Leak Test: Refer to Section 02755 for testing requirements.

END OF SECTION

SECTION 02649TRACER WIREPART 1 - GENERAL1.1 DESCRIPTION

- A. Install electrically continuous tracer wire with access points as described herein to be used for locating non-metallic pipe with an electronic pipe locator after installation.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS

- A. Manufacturer's materials specifications

1.4 QUALITY ASSURANCE

- A. All system components specified herein shall be furnished by a single Manufacturer who regularly engages in the production of this type of equipment. The Manufacturer shall be responsible for the performance and warranty of the entire system provided under this section.
- B. Qualifications of Manufacturers: The Manufacturer shall have a minimum of 10 years of experience in the design and manufacture of the specified systems.
- C. Acceptable Manufacturers:
  - 1. Copperhead Industries
  - 2. Seton
  - 3. Or equivalent
- D. Project Design: Attention is directed to the fact that the Drawings are based on Copperhead Industries as listed in this Section.

1.5 PROJECT CONDITIONS

- A. Service Laterals on public property - Trace wire must terminate at an approved grade level/inground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.
- B. Service Laterals on private property - Trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/inground trace wire access box, located within 2 linear feet of the building being served by the utility.
- C. Hydrants – Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties shall not be acceptable)

- D. Long-runs, in excess of 500 linear feet without service laterals or hydrants - Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground trace wire access box shall be delineated using a minimum 48" polyethylene marker post, color coded per APWA standard for the specific utility being marked.

## PART 2 - PRODUCTS

### 2.1 MATERIAL

- A. Tracer wire for open trench installations shall be 10-gauge minimum copper clad steel wire (CCS) with thermoplastic insulation recommended for direct burial (Copperhead #1030-HS, APHS High Strength BoreTough Series Tracer Wire #APHS-1001, or equal).
- B. All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector (Copperhead #LCS1030, Pro-Line Safety Tracer-Lock Connector #TL-LUG-SS, or equal). At Crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative. Wire connectors shall be watertight and provide electrical continuity.
- C. Direct bury wire connectors shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure (Copperhead #3WB-01, King Innovation DryConn Direct Bury Lug Plus #90750, or equal).
- D. Tracer wire color shall be blue for all water construction and green for all wastewater construction.
- E. Tracer wire access boxes or test stations shall be heavy duty in-ground boxes with cast iron lids color coded to identify use. Non-Roadway access boxes shall be light-duty grade level boxes (Copperhead # LD14\*TP or equal). Concrete/Driveway boxes shall be standard grade level boxes (Copperhead #CD14\*TP 14" or equal). Fire hydrant access boxes shall be above ground two terminal boxes with 1" conduit (Copperhead Cobra #T3-75-F or equal).
- F. Trace wire must be properly grounded at all dead ends/stubs. Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20-feet of #14 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility (Copperhead #ANO-14 or equal).

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. Tracer wire shall be installed on HDPE force main and services. The wire shall be installed in such a manner as to be able to properly trace all water mains without loss or deterioration of signal or without the transmitted signal migrating off the tracer wire.
- B. Trace wire shall be installed in the same trench for open trench installation. It shall be secured to the pipe as required to ensure that the wire remains adjacent to the pipe. The trace wire shall be securely bonded together at all wire joints with an approved watertight connector to provide electrical continuity, and it shall be accessible at all new water valve boxes.
- C. At all valve box connections, tracer wire shall be installed inside the valve box with tracer wire clips to hold the tracer wire to one side to avoid interference when valve wrench is used. Tracer wire clips shall be Vait Products Gate Valve Box Tracer Wire Clips or approved equal.
- D. Tracer wire shall be laid flat and securely affixed to the pipe at 10 foot intervals. The wire shall be protected from damage during the execution of the works. No breaks or cuts in the tracer wire or tracer wire insulation shall be permitted. At water service saddles, the tracer wire shall not be allowed to be placed between the saddle and the water main. Except for approved spliced-in connections, tracer wire shall be continuous and without splices from valve box to valve box.

### 3.2 TERMINATION/ACCESS

- A. All tracer wire termination points shall utilize an approved tracer wire access box specifically manufactured for this purpose.
- B. All grade-level/in-ground boxes shall be properly identified with “sewer” cast into the cap and color coded.
- C. A minimum of 2 feet of excess/slack wire is required at all tracer wire access boxes after meeting final elevation.
- D. All tracer wire access boxes must include a manually interruptible conductive/connective link between the terminals for the tracer wire connection and the terminal for the grounding anode wire connection.
- E. A drive-in grounding anode rod is required at each termination/access point installed at pipe elevation. Anode rod shall have factory applied grounding anode wire for connection to access box. Grounding anode wire shall be connected to the identified terminal on all access boxes.

### 3.3 TESTING REQUIREMENTS

- A. Contractor shall perform a continuity test on all trace wire in the presence of the Engineer or the Engineers’ representative. If the trace wire is found to be not continuous after testing, Contractor shall repair or replace the failed segment of the wire.

3.4 MEASUREMENT

- A. There is no separate payment for the supply and installation of tracer wire on any construction or installation of non-ductile iron water main by the Contractor. The Contractor shall consider the supply and installation of the tracer wire incidental to all construction of non-ductile mains.

END OF SECTION



## SECTION 02650

### BURIED UTILITY MARKINGS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Work Included:

1. This work shall consist of providing and installing utility line markings above all buried lines installed as part of this contract and replacing existing markings disturbed as part of this contract. Buried utilities are indicated on the Civil and Electrical Drawings.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- ###### A.
- Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 SUBMITTALS

- ###### A.
- Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.
- ###### B.
- Submit manufacturer's "Certification of Conformance" that utility markings meet or exceed the requirements of these Specifications.
- ###### C.
- Submit manufacturers specifications for utility markings.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- ###### A.
- Materials and color shall be in accordance with latest AASHTO specifications for pipe and utility marking.
- ###### B.
- Marking tape color shall be in accordance with latest American Public Works Association (APWA) Uniform Color Code and American National Standards Institute ANSI Standard Z535.1, Safety Color Code specifications for buried utility marking as noted in the Schedule below.
1. Schedule

| Marker Color | Buried Utility                                           |
|--------------|----------------------------------------------------------|
| Blue         | Potable Water & Associated lines                         |
| Green        | Sanitary Sewers, Storm Drain and other Drain lines       |
| Orange       | Telecommunication, signal, alarm                         |
| Purple       | Reclaimed, Recycled, Irrigation Water and Slurry Lines   |
| Red          | Electric Power lines cables conduits and lighting cables |
| Yellow       | Gas, Oil, Steam, Petroleum or Gaseous Material Lines     |

2. Warning Information shall be in Black Letters with typical wording of:
  - a. "CAUTION: BURIED (NAME OF UTILITY LINE) BELOW"

- C. For ferrous pipe material use 0.004" minimum polyethylene film; 6" wide clearly marking type of buried utility.
- D. For non-ferrous pipe material (e.g. Concrete, PVC, PE, etc.) use detection tape composite of polyethylene and metallic core 6" wide clearly marking type of buried utility.
- E. Seton Identification Products, New Haven, CT, Utility Safeguard LLC or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Marking tape shall be installed over utility lines centerline and buried 12" above top of pipe.
- B. Markings damaged during opening of trench shall be reinstalled with 2' overlap at broken sections.

END OF SECTION

## SECTION 02655

### COUPLINGS & CONNECTORS FOR BURIED APPLICATIONS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Furnish and install couplings and connectors of the type and size in the location shown on the Drawings and as specified herein.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 QUALITY ASSURANCE

- A. Minimum pressure rating equal to that of the pipeline in which they are to be installed.
- B. Couplings and connectors, other than those specified herein, are subject to the Engineer's approval. Acceptable Manufacturers:
  - 1. Romac Industries
  - 2. Krausz
  - 3. Smith Blair
  - 4. Ford Meter Box Company
  - 5. Or Equal
- C. Reference Standards:
  - 1. AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
  - 2. AWWA C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
  - 3. AWWA C116 – Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
  - 4. AWWA C153 – Ductile-Iron Compact Fittings
  - 5. AWWA C213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings
  - 6. AWWA C219 – Bolted, Sleeve-Type Couplings for Plain-End Pipe
  - 7. All components in contact with potable water, or water being processed to become potable water, shall be compliant with NSF 61 and shall be constructed of “Lead-free” material in compliance with NSF 372.

##### 1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.
- B. Submit manufacturers product data and installation instructions.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. All Couplings and Connectors:
  - 1. Gasket Materials: Composition suitable for exposure to the liquids to be contained within the pipes.
  - 2. Diameters to properly fit the specific types of pipes on which couplings and connectors are to be installed.
  - 3. Buried Restrained Couplings:
    - a. Two top facing bolt design
    - b. Fusion bonded epoxy steel or ductile iron center sleeve and end rings.
    - c. Two wedge-section EPDM or NBR rubber gaskets compounded for water service and NSF-61 certified.
    - d. 304 Stainless Steel bridge or Armor over gasket in expansion zone.
    - e. Nuts and bolts shall be 304 Stainless Steel with rolled thread and anti-galling compound.
    - f. Couplings shall be long barrel type.
    - g. Coupling shall be fusion bonded epoxy coated meeting AWWA C213 and NSF-61 standards for potable water applications
    - h. Acceptable Manufacturers:
      - i. Romac Industries – Alpha™
      - ii. Krausz – Hymax Grip
      - iii. Smith Blair – Pipe Lock Coupling
      - iv. Or Equal
- B. Solid Sleeve Couplings
  - 1. Solid sleeves shall be ductile iron with mechanical joint ends.
  - 2. Couplings shall meet AWWA/ANSI C-153/A21.53 and C-111/A21.11 for joints, and C-104/A21.4 for cement lining in sizes 3"-24".
  - 3. Nuts and bolts shall be ductile iron low alloy steel per ANSI/AWWA A21.11/C-111.
  - 4. Acceptable Manufacturers:
    - a. Romac – Model 501
    - b. Smith Blair – Model 441.
    - c. Ford – Model FC1 or FC2A
    - d. Or Equal
- C. Flexible Couplings for drain connections (Fernco or equal)
  - 1. Rubber material with stainless steel clamps
  - 2. Must provide a positive seal against infiltration and exfiltration
  - 3. Coupling materials must conform to applicable portions of ASTM C443 (Concrete), C564 (Cast Iron), D1869 (A.C.), D5926 (PVC), C1173 (transition) and CSA B602.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Sleeve Type Couplings:

1. Thoroughly clean pipe ends a minimum of 12-inches from the ends prior to installing couplings and use soapy water as a gasket lubricant.
2. Slip an end ring and gasket over each pipe and place the center sleeve centered over the joint.
3. Insert the other pipe length into the center sleeve the proper distance.
4. Press the gaskets and end rings evenly and firmly into the center sleeve flares.
5. For two-bolt systems, insert or tighten the bolts, finger tighten and progressively tighten nuts on the top of the coupling with a torque wrench applying the torque recommended by the manufacturer. For multiple bolt systems, insert or tighten the bolts, finger tighten and progressively tighten diametrically opposite nuts around the coupling with a torque wrench applying the torque recommended by the manufacturer.
6. Insert and tighten the tapered threaded lock pins as needed.

#### B. Install thrust rods, supports, and other provisions to properly support pipe weight and axial equipment loads.

END OF SECTION

SECTION 02751SEWER FLOW CONTROLPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: During the installation, replacement, rehabilitation and/or testing of sanitary sewer lines and sanitary sewer manholes via open-cut or trenchless approach, the Contractor shall maintain and control flow around the pipe segment(s) or structure(s) that are temporarily out of service. Existing sewer services shall remain live at all times during the progress of the Work. Sewer flow control which extends outside of Contractor work hours shall be completed in accordance with Section 01515. All temporary pumping equipment shall meet the requirements outlined in local noise regulations.
- B. Additional Requirements Specified Elsewhere:
  - 1. Summary of Work: Section 01010
  - 2. Submittals: Section 01340
  - 3. Sewer Line Cleaning: Section 02752
  - 4. Television Inspection of Sewers: Section 02753
  - 5. Final Sewer Testing: Section 02755

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 SUBMITTALS

- A. In accordance with the requirements of Section 01340. Additional specific information required is listed below.
  - 1. Proposed schedule, sequence of construction, duration of activities and description of sewer control methods to be utilized for each element of the project.
  - 2. Technical data (including capacity and fuel tank size) of any portable temporary pumping equipment to be used during normal Contractor work hours.
  - 3. Supplemental information required under Section 01515 for sewer flow control which extends beyond Contractor work hours.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION3.1 COORDINATION OF WORK

- A. Provide all labor and equipment necessary to coordinate work of this section and maintain communications.

- B. Notify all personnel, including but not limited to the Owner, Engineer, and Utility Companies seven days in advance of any temporary bypass pumping work. The Owner will identify personnel to be notified in addition to those identified by the Contractor.
- C. Contractor shall coordinate temporary bypass pumping operations with the Owner and Engineer on a daily basis.

### 3.2 PERFORMANCE

- A. General
  - 1. The Contractor shall install and test all sewer flow control methods to the satisfaction of the Owner and Engineer prior to proceeding with the Work.
  - 2. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.
- B. Plugging or Blocking:
  - 1. Insert plug at a manhole upstream of line to be inspected and tested.
  - 2. Plug shall be so designed that all or any portion of the sewage flows can be released.
  - 3. Flows shall be shut off or substantially reduced during line testing.
- C. Pumping and Bypassing:
  - 1. When required, supply the necessary pumps, conduits and other equipment (including standby equipment) to divert the flow of sewage around the line in which work is being performed.
  - 2. Furnish the necessary labor and 24-hour supervision to set up, test and operate the pumping and bypassing system.
  - 3. Any temporary pumps, piping, fuel storage, or other appurtenances associated with the portable temporary pumping equipment shall be either located above the 100-year flood elevation or protected against flotation or other damage which would be caused by a flood event.

END OF SECTION

## SECTION 02752

### SEWER LINE CLEANING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Provide all equipment necessary for the proper cleaning of the sewers prior to the joint testing operations and/or closed circuit television inspection.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 REFERENCE

- A. The type of pipe cleaning (light vs heavy) shall be chosen based on the definitions in the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Version 8.0 standards.
1. Light cleaning definition – Cleaning and removal of settled deposits when the deposits are less than the following percentage of the pipe diameter:
    - a. Pipe diameters less than or equal to 12-inches: < 25%
    - b. Pipes diameters between 13-inches and 24-inches: < 15%
    - c. Pipes diameters between 25-inches and 30-inches: < 10%
    - d. Pipe diameters greater than 30-inches: not applicable (use heavy cleaning)
  2. Heavy cleaning definition – Cleaning and removal of settled deposits when the deposits are greater than the following percentage of the pipe diameter:
    - a. Pipe diameters less than or equal to 12-inches: > 25%
    - b. Pipes diameters between 13-inches and 24-inches: >15%
    - c. Pipes diameters between 25-inches and 30-inches: >10%
    - d. Pipe diameters greater than 30-inches: all pipes regardless of the amount of deposits

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. High Velocity Hydro-Cleaning Equipment shall:
1. Have a minimum of 400 feet of high pressure hose.
  2. Have multiple high velocity nozzles, as follows:
    - a. Standard 35 degree nozzle with multiple rear jets and one front jet.
    - b. Sand nozzle capable of transporting sand and gravel to the downstream manhole; and
    - c. Rotating nozzle for removal of grease and scale.
  3. Include a high velocity gun for washing and scouring manhole walls and floor.
  4. Be capable of producing flows from a fine spray to a long distance solid stream.
  5. Include a water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
  6. Have equipment operating controls located above ground.



- B. Water Source
  - 1. Water shall be available from Owner's water distribution system in accordance with Section 01050 Coordination. Unauthorized use of City water is subject to a minimum \$1,000 fine.

### PART 3 - EXECUTION

#### 3.1 PERFORMANCE

- A. Select cleaning equipment based on the conditions of the lines at the time the work commences.
  - 1. Light cleaning (as defined by NASSCO PACP): Use high pressure water jetting equipment, brushes and swabs.
  - 2. Heavy cleaning (as defined by NASSCO PACP): Use high pressure water jetting equipment specifically designed for the intended use.
- B. Use selected equipment to remove all dirt, grease, rock and other deleterious materials and obstructions.
- C. Protect existing sewer lines from damage caused by improper use of cleaning equipment.
- D. Take precautions to avoid damage or flooding to public or private property being served by the line being cleaned.
- E. Removal of Materials:
  - 1. Remove all solids and semi-solids at the downstream manhole of the section being cleaned.
  - 2. Passing material from one section of a line to another will not be permitted.
- F. Disposal of Materials: Remove from the site and dispose of all solids or other waste materials recovered during the cleaning operations in an approved manner.

#### 3.2 DETERMINING TYPE OF CLEANING

- A. All heavy cleaning must be coordinated with RPR or Engineer verbally or written for each pipe before any heavy cleaning commences.

#### 3.3 FIELD QUALITY CONTROL

- A. Acceptance of this portion of the work may be made upon completion of subsequent television inspection and shall be to the complete satisfaction of the Engineer.

END OF SECTION

SECTION 02753TELEVISION INSPECTION OF SEWER AND STORMWATER PIPEPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish all necessary labor, materials, supervision and equipment to satisfactorily inspect gravity sewer lines and sewer service pipes as required by the Contract Documents by means of a closed circuit television (CCTV) system.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. CCTV work shall be performed by a Contractor with at least 5 years experience in sewer CCTV work.
- B. CCTV work shall be completed and delivered per the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Version 8.0 standards. Operators of CCTV equipment shall be currently certified in NASSCO PACP.

1.4 SUBMITTALS

- A. Provide shop drawings as specified in the General Conditions and Section 01340.
- B. Contractor shall submit copies of active NASSCO PACP certifications.

PART 2 - PRODUCTS2.1 MATERIALS AND EQUIPMENT

- A. The cameras shall be designed and constructed for sewer line inspection work. The mechanical design of the lens shall allow it to turn and rotate 360 degrees to provide a close up view of sewer pipe walls and sewer service pipes. The camera shall be designed to maintain proper orientation of the picture while the lens is turning and rotating.
- B. The cameras shall be operative in 100% humidity conditions.
- C. The lighting for the cameras shall be suitable to allow a clear picture of service pipes and the entire periphery of the mainline sewer pipe, such that joints, root intrusions, cracks, offset joints, deposits, etc. can be seen and identified by the Engineer.
- D. The lens focus and rotational capabilities and the light intensity will be remotely controlled from an above ground television "studio".
- E. The cameras shall produce a continuous, full color picture with a quality acceptable to the Engineer.

## PART 3 - EXECUTION

### 3.1 PERFORMANCE

- A. Flow Control:
  - 1. A minimum of 75% of the periphery of the sewer line shall be visible at all times.
  - 2. The bottom of the pipe shall be visible.
- B. Operation:
  - 1. Perform inspection of sewer lines after lines have been suitably cleaned.
  - 2. When inspecting newly constructed sewer lines, introduce water into the sewer lines to be tested from the upstream manhole prior to the television inspection, but no more than 24 hours in advance of the inspection.
  - 3. Lines will be suitably isolated from the remainder of the sewer line as required.
  - 4. Move the cameras through the line in either direction at a moderate rate, not to exceed 30 feet per minute, as recommended by NASSCO PACP standards.
  - 5. The Engineer may require Contractor to pull cameras back to get a second view of a section of the pipe.
  - 6. Use manual winches, power winches, television cable reel powered rewinds, high-pressure hose and reels on jet-cleaning trucks, or a flexible pole, to move the camera through the sewer.
  - 7. If, during the inspection operation, the camera will not pass through the entire pipe section, the Contractor shall set up the equipment so that the inspection can be performed from the opposite manhole on the pipe segment.
  - 8. The screen monitor and winch operators shall be in full communication at all times.
  - 9. Remove all wires, screens, sand bags, etc. used in the television inspection process from the sewers at the completion of inspection of each sewer section.
- C. Measurement:
  - 1. Measurement for location of defects, service connections, etc., shall be accurate to two tenths (0.2) of a foot over the length of the section being inspected.
- D. Records:
  - 1. Pre-lining CCTV work does not require PACP record.
  - 2. Printed records shall be provided, reflecting location of defects, service connections, etc., and shall be recorded per NASSCO PACP standards and stored to a NASSCO PACP-certified digital reporting software:
    - a. Keep records and supply to the Engineer when the work has been completed.
    - b. Show the exact location in relation to adjacent manholes, of each infiltration point discovered by the television camera.
    - c. Show locations of laterals, unusual conditions, roots, break-in storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features.
  - 3. Inventory the houses and apparent empty lots bordering each section of sewer line that is inspected and compare results to the number and location of house services found during the inspection. Log inconsistencies and report them to the Engineer.

## TELEVISION INSPECTION OF SEWER AND STORMWATER PIPE

4. Database
  - a. One copy of the NASSCO PACP Exchange database shall be provided in digital format (MS Access).
5. Video / Photographs:
  - a. Two copies of the video shall be provided on an external hard drive, downloaded or output from a NASSCO PACP-certified software: one copy to the Engineer and one copy to the Owner.
  - b. The video shall be digitally recorded, indexed by pipe section (labeled by manhole number or other means acceptable to Engineer) and allow for printing of still photographs.
  - c. Photographs shall be printed at Engineer's request and shall be identified on the back as follows:

Date \_\_\_\_\_; Section: MH# \_\_\_\_\_ to MH# \_\_\_\_\_  
Diameter of Sewer \_\_\_\_\_; Distance from MH# \_\_\_\_\_ is \_\_\_\_\_ LF  
Description of item photographed \_\_\_\_\_  
\_\_\_\_\_

END OF SECTION

SECTION 02755FINAL SEWER TESTINGPART 1 - GENERAL1.1 DESCRIPTION

## A. Work Included:

1. Final sewer testing work includes the performance of testing and inspecting each and every length of sewer pipe, pipe joints and each item of appurtenant construction.
2. Perform testing at a time acceptable to the Engineer, which may be during the construction operations, after completion of a substantial and convenient section of the work, or after the completion of all pipe laying operations.
3. Provide all labor, pumps, pipe, connections, gages, measuring devices and all other necessary apparatus to conduct tests.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION3.1 PERFORMANCE

## A. General:

1. All sewers, manholes, and appurtenant work, in order to be eligible for acceptance by the Engineer, shall be subjected to tests that will determine the degree of watertightness and horizontal and vertical alignment.
2. Thoroughly clean and/or flush all sewer lines to be tested, in a manner and to the extent acceptable to the Engineer, prior to initiating test procedures.
3. Perform all tests and inspections in the presence of the Engineer and the plumbing or building inspector in accordance with the requirements of the local and state plumbing codes.
4. Perform testing by test patterns determined by or acceptable to the Engineer.
5. Remedial Work:
  - a. Perform all work necessary to correct deficiencies discovered as a result of testing and/or inspections.
  - b. Completely retest all portions of the original construction on which remedial work has been performed.
  - c. Perform all remedial work and retesting in a manner and at a time acceptable to by the Engineer at no additional cost to the Owner.

B. Line Acceptance Tests:

1. Test all gravity sewer lines with no active service connections for leakage by conducting a low pressure air test.
2. Equipment:
  - a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
  - b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
  - c. All air used shall pass through a single control panel.
  - d. Connect 3 individual hoses:
    - i. From the control panel to the pneumatic plugs for inflation.
    - ii. From the control panel to the sealed sewer line for introducing the low pressure air.
    - iii. From the sealed sewer line to the control panel for continually monitoring the air pressure rise in the sealed line.
3. Testing Pneumatic Plugs:
  - a. Seal test all pneumatic plugs prior to using them in the actual test.
  - b. Lay one length of pipe on the ground and seal both ends with the pneumatic plugs to be tested.
  - c. Pressurize the sealed pipe to 5 psig.
  - d. The pneumatic plugs are acceptable if they remain in place without bracing.
4. Testing Sewer Pipeline:
  - a. After the sewer pipe has been cleaned and the pneumatic plugs checked, place the plugs in the sewer line at each manhole and inflate them.
  - b. Introduce low pressure air into the sealed sewer pipeline until the air pressure reaches 4 psig greater than the average groundwater pressure.
  - c. Allow a minimum of 2 minutes for the air pressure to stabilize to a minimum of 3.5 psig greater than the groundwater pressure. Groundwater is assumed to be at ground surface unless the Contractor can prove otherwise by test pitting.
  - d. After the stabilization period, disconnect the air hose from the control panel to the air supply.
  - e. The pipeline will be acceptable if the pressure decrease is not greater than 1/2 psig in the time stated in the following table for the length of pipe being tested:

| <u>Pipe Diameter</u><br>(inches) | <u>Time (Min.) for Length of Pipe</u> |                   |                   |                   |
|----------------------------------|---------------------------------------|-------------------|-------------------|-------------------|
|                                  | <u>0-100 ft</u>                       | <u>101-200 ft</u> | <u>201-300 ft</u> | <u>301-400 ft</u> |
| 4                                | 2.0                                   | 2.0               | 2.0               | 2.0               |
| 6                                | 3.0                                   | 3.0               | 3.0               | 3.0               |
| 8                                | 4.0                                   | 4.0               | 4.0               | 5.0               |
| 10                               | 5.0                                   | 5.0               | 6.0               | 8.0               |

| <u>Pipe Diameter</u><br>(inches) | <u>Time (Min.) for Length of Pipe</u> |                   |                   |                   |
|----------------------------------|---------------------------------------|-------------------|-------------------|-------------------|
|                                  | <u>0-100 ft</u>                       | <u>101-200 ft</u> | <u>201-300 ft</u> | <u>301-400 ft</u> |
| 12                               | 5.5                                   | 5.5               | 8.5               | 11.5              |
| 15                               | 7.0                                   | 8.5               | 13.0              | 17.0              |
| 18                               | 8.5                                   | 12.0              | 19.0              | 25.0              |
| 21                               | 10.0                                  | 17.5              | 26.0              | 35.0              |
| 24                               | 11.5                                  | 23.0              | 34.0              | 45.5              |
| 27 and larger                    | 14.5                                  | 29.0              | 43.0              | 58.0              |

C. Test Results:

1. If the installation fails the low pressure air test, determine the source of leakage.
2. Repair or replace all defective materials and/or handiwork and repeat low pressure air test at no additional cost to the Owner.

D. Testing Sewer Pipeline Joints:

1. Sewer Pipeline Joint tests shall be completed only upon failure to complete low pressure air test successfully and as directed by the Engineer.
2. Test all joints except those with visible infiltration.
3. Re-clean and re-inspect all lines not approved by the Engineer at no additional cost to the Owner.
4. Repairing of Joints:
  - a. When a joint fails the pressure test, excavate and repair the failed joint. Repairing joints with chemical grout will not be permitted.
5. The Engineer may request checking of the testing equipment for accuracy.
  - a. Perform standard air test on a clean continuous section of pipe.
  - b. Repair the equipment if the void pressure drops.
6. Testing Operation Inspection:
  - a. Reset each joint, as specified herein, prior to acceptance and final payment for joint testing. Retest all joints that fail until the test requirements are met.
7. The Contractor will supply a photograph of every joint that fails the pressure test.

E. Alignment Tests (Gravity Sewers):

1. Perform tests for the correctness of horizontal and vertical alignment on each and every length of gravity sewer pipeline between manholes.
2. Alignment tests to be conducted after all pipe has been installed and backfilled.
3. The observation test shall be conducted after all upstream work has been completed and the pipeline cleaned of debris.
4. Notify the Engineer at least 24 hours in advance of the proposed observation testing.
5. Introduce water into the sewer lines to be tested from the upstream manhole prior to the observation test but no more than 24 hours in advance of the test.
6. Beam a source of light, acceptable to the Engineer, through the pipeline from both ends and the Engineer will directly observe the light in the downstream, and/or upstream manhole of each test section.

7. To pass this test, the following conditions must be met:
    - a. A full circle of light (full diameter of the pipe) shall be observed.
    - b. No standing water shall be allowed. The presence of standing water shall be cause for rejection of that pipe (including manhole) section.
  8. Improper alignment will be corrected by re-excavation and resetting of pipe at no additional cost to the Owner.
- F. Pipe Deflection: (Gravity Sewers)
1. Pipe provided under this specification shall be installed so there is no more than a maximum deflection of 5.0 percent. Such deflection shall be computed by multiplying the amount of deflection (normal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
  2. The Contractor shall wait a minimum of 30 days after completion of a section of sewer, including placement and compaction of backfill, before measuring the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
  3. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.
- G. Television Inspection Tests (Gravity Sewers)
1. Where television inspection testing is required, test procedures shall be in compliance with the requirements outlined in Specification Section 02753.
- H. Inspection of Appurtenant Installations:
1. Completely inspect, at a time determined by the Engineer, all manholes and inlets to ascertain their compliance with the Drawings and Specifications.
  2. Provide access to each manhole and inlet and check the following characteristics:
    - a. Shape and finish of invert channels
    - b. Watertightness and finish of masonry structures
    - c. Location, type, and attachment of stops
    - d. Elevation and attachment of frames, covers, and openings
    - e. Pattern and machining of covers
    - f. Drop connection arrangements
- I. Testing Pressure Sewers – HDPE pipe:
1. Hydrostatic leak testing shall be performed in accordance with procedures specified in Chapter 2, Inspections, Tests and Safety Considerations of Plastic Pipe Institute's (PPI) "Handbook of Polyethylene Pipe" 1st edition, 2006.
  2. Two types of leak test procedures are acceptable: 1) Monitored Make-up Water Test, and 2) Non-Monitored Make-Up Water Test



3. Monitored Make-Up Water Test procedures are as follows:
- Clean water shall be used as the pipe testing fluid. The test section of pipe shall be completely filled with water taking care to bleed off any trapped air. Venting at high points may be required to purge air pockets while the test section is filling.
  - The test pressure is 1.5 times the system design pressure at the lowest elevation in the section under test or 100 psi, whichever is greater.
  - The test procedure consists of 2 phases, an initial expansion phase and a testing phase. During the expansion phase, the test section is pressurized to test pressure and a sufficient quantity of make-up water is added each hour for 3 hours to maintain test pressure.  
After the initial expansion phase, about 4 hours after pressurization, the test phase begins. The test phase begins with the water pressure in the pipe at the test pressure. The test phase may be 1, 2 or 3 hours long, after which time a measured amount of water is added in order for the water pressure in the pipe to return to the test pressure. If the quantity of make-up water does not exceed the values in the table below, the test section of pipe passes the leak test.

LEAK TEST MAKE-UP WATER ALLOWANCE

| Nominal Pipe Size<br>(inches) | Make-up Water Allowance<br>( U.S. Gallons per 100 feet of pipe) |             |             |
|-------------------------------|-----------------------------------------------------------------|-------------|-------------|
|                               | 1 Hour Test                                                     | 2 Hour Test | 3 Hour Test |
| 1 ¼                           | 0.06                                                            | 0.10        | 0.16        |
| 1 ½                           | 0.07                                                            | 0.10        | 0.17        |
| 2                             | 0.07                                                            | 0.11        | 0.19        |
| 3                             | 0.10                                                            | 0.15        | 0.25        |
| 4                             | 0.13                                                            | 0.25        | 0.40        |
| 5                             | 0.19                                                            | 0.38        | 0.58        |
| 5.375                         | 0.21                                                            | 0.41        | 0.62        |
| 6                             | 0.3                                                             | 0.6         | 0.9         |
| 7 .125                        | 0.4                                                             | 0.7         | 1.0         |
| 8                             | 0.5                                                             | 1.0         | 1.5         |
| 10                            | 0.8                                                             | 1.3         | 2.1         |
| 12                            | 1.1                                                             | 2.3         | 3.4         |
| 13.375                        | 1.2                                                             | 2.5         | 3.7         |
| 14                            | 1.4                                                             | 2.8         | 4.2         |
| 16                            | 1.7                                                             | 3.3         | 5.0         |
| 18                            | 2.0                                                             | 4.3         | 6.5         |
| 20                            | 2.8                                                             | 5.5         | 8.0         |
| 22                            | 3.5                                                             | 7.0         | 10.5        |
| 24                            | 4.5                                                             | 8.9         | 13.3        |
| 26                            | 5.0                                                             | 10.0        | 15.0        |
| 28                            | 5.5                                                             | 11.1        | 16.8        |

|    |      |      |      |
|----|------|------|------|
| 30 | 6.3  | 12.7 | 19.2 |
| 32 | 7.0  | 14.3 | 21.5 |
| 34 | 8.0  | 16.2 | 24.3 |
| 36 | 9.0  | 18.0 | 27.0 |
| 42 | 12.0 | 23.1 | 35.3 |
| 48 | 15.0 | 27.0 | 43.0 |
| 54 | 18.5 | 31.4 | 51.7 |
| 63 | -    | -    | -    |

4. Non-Monitored Make-Up Water Test procedures are as follows:
  - a. The test procedure consists of 2 phases, an initial expansion phase and a testing phase. For the initial expansion phase, make-up water is added as required to maintain the test pressure in the test section of pipe for 4 hours. The test pressure is 1.5 times the system design pressure at the lowest elevation in the section under test or 100 psi, whichever is greater.
  - b. After the expansion phase is complete, the test phase begins with the pressure in the pipe at test pressure. The test pressure is then reduced by 10 psi. If the pressure remains steady (within 5% of target value) after one hour, then the pipe has passed the leakage test.

J. Manhole Leakage Testing:

1. Specified in the "Manholes, Covers and Frames" Section in Division 2.

END OF SECTION

SECTION 02756APIPE LINING USING STEAM CURINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Provide all equipment necessary for the manhole-to-manhole lining and short lining via installation of short liners in sanitary sewer lines by the cured-in-place-pipe (CIPP) method and the reinstatement of sewer services.
- B. The system shall provide for the rehabilitation of pipes by the installation of a resin impregnated fiberglass or polyester tube patch inserted against the inside of the existing pipe utilizing air pressure (manhole-to-manhole lining) or an inflatable element and air pressure (short lining). Curing shall be accomplished by circulating steam to cure the resin into a hard, impermeable pipe within a pipe. The CIPP should extend over the length of the repair in a continuous, tight-fitting, watertight pipe within a pipe.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 QUALITY ASSURANCE

- A. Standards:
  - 1. Cured-in-place-pipe (CIPP) shall meet all the requirements of ASTM F1216 (for direct inversion installation), ASTM F1743 (for pulled-in-place installations), and ASTM F2019 (for fiberglass reinforced pulled-in-place installations).
  - 2. Testing of CIPP shall meet all of the requirements of ASTM D638, ASTM D790, ASTM D792, and ASTM D5813.
- B. References:
  - 1. NASSCO (National Association of Sewer Service Companies) Recommended Specifications for Sewer Collection System Maintenance and Rehabilitation.
- C. Contractor's Staff
  - 1. The CIPP superintendent shall have a minimum experience of 3 years.
  - 2. The CIPP lateral reinstatement operator shall have a minimum experience of 1 year.
  - 3. If the above minimum years of experience for both roles cannot be met, an acceptable alternative is to have a manufacturer representative onsite during the lining work.

1.4 SUBMITTALS

- A. The Contractor shall submit to the Owner and/or Engineer, complete design calculations by a professional engineer for the liner that meet the requirements of ASTM F1216 or ASTM F1743 or ASTM F2019. The design shall be based on the following physical conditions of the existing pipe to be rehabilitated:
  - 1. All pipes are subjected to a soil load of 120 lbs/cf with an H-20 live traffic load.
  - 2. The water table is assumed to be 3 feet below the ground surface.

3. The minimum pipe ovality is 2%.
  4. The minimum wall thickness for CIPP liner is 4.5 mm.
  5. The minimum flexural modulus of elasticity of the cured liner shall be 250,000 psi, with a minimum flexural strength of 4,500 psi as tested in accordance with ASTM D-790.
- B. Contractor to submit materials and installation procedures for review by Owner and/or Engineer, including manufacturer information on resin, tube, coatings, manhole or liner end sealants, and service sealants; safety data sheets; an installation schedule; manufacturer's recommended liner installation minimum and maximum pressures; wet-out schedule; the manufacturer's recommended curing schedule; means of obtaining and collecting samples for testing; method of monitoring liner temperature during curing; quality management programs; odor mitigation plan (in addition to or part of the project-wide health and safety plan); noise mitigation plan; plans for by-passing or handling of sewer flows; and traffic control.
  - C. Contractor to submit video format with electronic video files on external hard drives of pre-installation CCTV inspection and post-lining CCTV inspection, and a 1-year warranty inspection as specified in Section 02753.
  - D. Contractor to submit an outreach plan to the Engineer at least 1 week prior to the commencement of lining activities, this plan shall at minimum include a schedule for 1 week and 24 hour advance notices to residents who will be affected by the pipe lining, and samples of notices to be provided to residents.
  - E. Contractor to submit documentation relative to the qualifications, training and experience of the installers.
  - F. Contractor to supply an equipment listing including redundant tools and spare parts to be on site during the lining work.
  - G. Contractor to submit a plan for providing and disposing of water if curing the liner by water.
  - H. Contractor to supply information on proposed or potential repair and/or rehabilitation methods based on manufacturer's recommendations in the event of a failed liner installation including step-by-step repair procedure and how the finished product will meet the requirements of this contract specification.
  - I. Prior to liner installation, Contractor shall supply wet-out logs, saturation charts, and curing schedules.
  - J. During liner installation, Contractor shall collect, record, maintain, and supply temperature measurements and collected samples for testing.

## PART 2 - PRODUCTS

### 2.1 PIPE LINER

- A. The liner shall be fabricated from materials that are chemically resistant to exposure to domestic sewage and septic tank effluent.
- B. Liner material shall meet the requirements of ASTM F1216, ASTM F1743, or ASTM F2019.
- C. The fabric tube shall consist of one or more layers of absorbent non-woven felt fabric, felt/fiberglass, felt/carbon fiber, carbon fiber, or fiberglass.

- D. The resin shall be a corrosion resistant polyester or vinyl ester resin and catalyst system or epoxy and hardener system that when properly cured within the tube composite meets the requirements of ASTM F1216, ASTM F1743, or ASTM F2019.
- E. The completed liner shall be continuous, seamless, and jointless from manhole to manhole or the full length of the point repair.
- F. Liner shall be sized to provide a tight fit to the host pipe.
- G. The interior surface of the liner shall be a relatively light reflective color so that a clear detailed examination with closed circuit television equipment can be made.
- H. Liner thickness calculations are discussed in Part 1.
- I. The information on the existing pipeline(s) to be lined in the Contract Documents is provided for reference only and should be verified during CCTV inspection prior to lining. Any adjustments to the scope should be discussed with the Engineer prior to installation.
- J. All materials shall be stored and handled in accordance with the manufacturer's recommendations and consistent with the type or curing method to be used.

## 2.2 MANHOLE END SEALS

- A. The manhole end seals shall be a single-component, hydrophilic mastic water stop.

## 2.3 SERVICE CONNECTION GROUTING

- A. The grout materials and equipment used to seal service connections shall be in accordance with ASTM F2454.

# PART 3 - EXECUTION

## 3.1 GENERAL

- A. All work shall be done in compliance with all current OSHA safety regulations.

## 3.2 BEFORE INSTALLATION

- A. Prior to conducting any work, Contractor shall deliver notices to all residents and/or building owners within the area of the pipe lining. Notice shall indicate when the work will take place and who to call with questions or in the event of an emergency. Notice to be accepted by the Owner prior to distribution.
- B. Contractor to control sewer flow and bypass pump per Section 02751.
- C. Prior to lining the sewer main, the sewer shall be cleaned in accordance with Section 02752 and inspected with CCTV equipment per Section 02753. Contractor to verify that the conditions of the sewers are acceptable for the methods of liner installation required. Prior to lining of pipe, Contractor shall trim back any protruding pipes/services extending into the pipe. Pipes shall be trimmed back to within ½-inch of the pipe wall, or as close as possible to avoid damaging the host pipe and also to prevent bulges in the liner to be installed.
- D. Active leaks shall be stopped prior to lining if they could, in the opinion of the Engineer, create pockets of trapped water or heat sinks which could cause improper curing of the liner.
- E. Contractor shall inspect the liner for any defects and if it had prematurely started to cure during transportation and storage.

- F. Install odor mitigation devices per submitted odor mitigation plan to deflect odors for both workers and general public.

### 3.3 LINING METHOD AND CURING

- A. The resin impregnated tube shall be installed in accordance with manufacturer's instructions using an air inflated tube or other method acceptable to the Engineer.
- B. The resin shall be cured in accordance with the resin manufacturer's instructions using circulated steam. Maintain a continuous log of temperature and pressure during curing.
- C. The use of water to cure the CIPP is not approved for this application.
- D. After liner installation and curing, Contractor shall cool the liner down to at least 100 degrees Fahrenheit prior to commencing service reinstatement and collection of samples. Liner temperature during curing and cool-down shall be monitored by a thermocouple or temperature monitoring strip and recorded at least at 15-minute intervals.
- E. Cure water from steam to cure the CIPP shall be discharged to a sanitary sewer with adequate flow for dilution.

### 3.4 POST LINING INSTALLATION

- A. After liner installation, curing, and cool down, the Contractor shall reinstate the existing service connections, using remote controlled equipment including a television camera meeting the requirements of Section 02753. The opening created for the service lateral shall be at least 95% of the original opening. After creating the hole in the liner, polish the edges of the hole to remove sharp edges and improve flow conditions from the service pipe into the lined sewer main. Coupons of the lining material removed during service reinstatement shall be collected at the downstream manhole and shall not be left within the sewer system.
  - 1. The Contractor shall grout and seal each service connection to prevent leakage between the existing pipe, the existing service connection, and the new liner.
  - 2. After grouting each service, the Contractor shall use a CCTV camera with a lateral camera launch to inspect each service beyond the first wye/elbow fitting. The purpose is to confirm the service connection has not been obstructed with grout beyond the mainline camera's view.
    - a. If grout is obstructing more than 10 percent of the service connection cross sectional area, the service(s), the Contractor shall remove the grout from the service(s) at no additional cost to the Owner.
- B. Any connections to the sewer main that are not to be reinstated after liner installation shall be coordinated with the Owner. It is the Contractor's sole responsibility to confirm with the Owner that a connection is to be abandoned and not reinstated to the main. For each connection not reinstated, the Contractor shall obtain a sign-off from the Owner, using the form included at the end of this Section.
- C. Provide a watertight seal at the insertion and termination points in the manholes. Seal any annular space between the liner and host pipe in the manholes and provide for smooth merging of flows from other pipelines entering the manhole.

### 3.5 TESTING

- A. For every 2,500 linear feet of liner installed, two samples shall be processed and tested. If the project will have less than 2,500 linear feet of liner installed, a minimum of two

samples shall be processed and tested.

1. For pipe diameters less than 18-inches, restrained end samples shall be utilized and tested.
  2. For pipe diameters 18-inches and larger, flat plate samples shall be utilized and tested.
  3. The CIPP physical properties shall be tested in accordance with ASTM F1216, Section 8, using either allowed sampling method. The flexural properties must meet or exceed the values listed in Section 1.3 of this Specification and the values submitted to the Owner by the Contractor for this project's CIPP wall design, whichever is greater.
  4. The installed CIPP thickness shall be measured.
    - a. For pipe diameters less than 18-inches, the restrained end samples shall be measured for thickness.
    - b. For pipe diameters 18-inches and larger, two-inch cores sample shall be removed from the CIPP liner at the 12 o'clock position to check thickness. The core hole shall be repaired as recommended by the manufacturer.
  5. Testing shall be completed by an accredited, independent laboratory. Testing results shall be provided to the Owner and the Engineer within 7 days of receipt of such results.
- B. Following liner installation, leakage testing shall be performed on the liner.
1. For pipe diameters less than 15-inches that were cured by steam, air testing shall be performed.
  2. For pipe diameters less than 15-inches that were cured by water, exfiltration leakage testing shall be performed on the liner according to the requirements of ASTM F1216.
  3. For pipe diameters between 15-inches and 30-inches, air testing or exfiltration leakage testing shall be performed on the liner according to the requirements of ASTM F1216.
  4. For pipe diameters larger than 30-inches, visual inspection of leakage is acceptable.
- C. After completion of the work, perform post-installation CCTV inspection of the completed liner and the restored service connections per the requirements of Section 02753. Any of the following defects that are observed shall be repaired immediately at the expense of the Contractor in accordance with the liner manufacturer's recommendations:
1. Visible leaks, weeping or pinholes
  2. Fins, bulges, wrinkles or other obstructions located:
    - a. Outside of the flow line of the pipe that are 5% or greater of the cross-sectional area of the host pipe shall be repaired.
    - b. In the lower third of the pipe or inside the flow line and in circumferential configuration that are 3% or greater of the cross-sectional area or 0.5-inches, whichever is smaller.
  3. Soft or uncured sections of the liner
  4. Visual discoloration or other visual anomalies
- D. During the one-year warranty period, any defects which will affect the integrity, the strength and/or leak resistance of the liner shall be repaired at the expense of the

Contractor.

- E. At a time approaching the end of the one-year warranty period, the Contractor shall pay for a third party (approved by the Owner) to clean and CCTV inspect up to 100% of the total lined sewers in the contract. During the one-year warranty period, any defects which will affect the integrity, or the strength of the liner shall be repaired at the expense of the Contractor.



**CONFIRMATION TO ABANDON AN EXISTING CONNECTION TO THE SEWER MAIN**

Complete this form for each connection to the sewer main that is not reinstated after lining.

**Connection Location:**

Street Address: \_\_\_\_\_

\_\_\_\_\_ LF upstream/downstream (circle one) of MH \_\_\_\_\_ as indicated on CCTV inspection prior to lining of the main.

**Purpose for Abandonment (check all that apply):**

|                                 |                                  |
|---------------------------------|----------------------------------|
| _____ Service No Longer Active  | _____ Served by Separate Lateral |
| _____ Connection to Storm Drain | _____ Other: _____               |

**Method of Determining Connection can be Abandoned:**

|                              |                            |
|------------------------------|----------------------------|
| _____ Dye Test               | _____ Direction from Owner |
| _____ CCTV Inspection Visual | _____ Inspection           |
| _____ Building Inspection    | _____ Other: _____         |

**Confirmation that Connection is to be Abandoned (not reinstated):**

|                |                     |
|----------------|---------------------|
| _____<br>Owner | _____<br>Contractor |
| _____<br>Date  | _____<br>Date       |

Submit copy of the signed form to the Engineer.

END OF SECTION

## SECTION 02756C

### PIPE LINING USING UV CURING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Provide all equipment necessary for the lining of sanitary sewer lines by the cured-in-place-pipe (CIPP) method and the reinstatement of sewer services.
- B. The system shall provide for the rehabilitation of pipes by the installation of a resin impregnated fiberglass or polyester tube patch inserted against the inside of the existing pipe utilizing air pressure (manhole-to-manhole lining) or an inflatable element and air pressure (short lining). Curing shall be accomplished by passing a UV light through the liner to cure the resin into a hard, impermeable pipe within a pipe. The CIPP should extend over the length of the repair in a continuous, tight-fitting, watertight pipe within a pipe.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

##### 1.3 QUALITY ASSURANCE

- A. Standards:
  - 1. Cured-in-place pipe (CIPP) shall meet all the requirements of the following standards:
    - a. ASTM F1216 – Standard Practice for rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube
    - b. ASTM F1743 – Standard Practice for rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured-in-place thermosetting resin pipe
    - c. ASTM F2019 – Standard Practice for rehabilitation of existing pipelines and conduits by the pulled-in-place installation of glass reinforced plastic cured-in-place thermosetting resin pipe
    - d. ASTM D790 – Standard test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials
    - e. ASTM F2454 – Standard Practice for Sealing Lateral Connections and lines from the mainline Sewer Systems by the Lateral Packer Method, Using Chemical Grouting
- B. References:
  - 1. NASSCO (National Association of Sewer Service Companies) Recommended Specifications for Sewer Collection System Maintenance and Rehabilitation.
- C. Acceptable Contractors:
  - 1. Inliner Solutions (manhole-to-manhole lining and short lining)
  - 2. Vortex Companies (manhole-to-manhole lining and short lining)
  - 3. Insituform Technologies, Inc. (only manhole-to-manhole lining)

4. Or qualified equivalent contractor with a minimum of 5 years experience in sewer pipe lining using UV curing method and a minimum of 100,000 feet of installed CIPP liner that was cured by UV.
- D. Contractor's Staff
1. The CIPP superintendent shall have a minimum experience of 3 years.
  2. The CIPP lateral reinstatement operator shall have a minimum experience of 1 year.
  3. If the above minimum years of experience for both roles cannot be met, an acceptable alternative is to have a manufacturer representative onsite during the lining work.

#### 1.4 SUBMITTALS

- A. The Contractor shall submit to the Owner and/or Engineer, complete design calculations for the liner that meet the requirements of ASTMs F1216, F1743, or F2019, whichever is applicable for the installation and curing methods to be used. The design shall be based on the following physical conditions of the existing pipe to be rehabilitated:
1. All pipes shall be considered fully deteriorated and no bonding to the existing pipe shall be assumed.
  2. All pipes are subjected to a soil load of 120 lbs/cf with an H-20 live traffic load.
  3. The water table is assumed to be 3 feet below the ground surface.
  4. Pipe lengths and depths are shown on the Plans and shall be verified by the Contractor during the pre-installation inspection.
  5. The minimum pipe ovality is 2%, unless documented, measured by the Contractor and submitted to the Engineer.
  6. The minimum wall thickness for a felt tube CIPP liner is 6 mm. The minimum wall thickness for a fiberglass reinforced tube CIPP liner is 2.8 mm.
  7. The minimum flexural modulus of elasticity of the cured liner shall be 250,000 psi, with a flexural strength of 4,500 psi, as tested in accordance with ASTM D-790.
  8. The calculations shall account for a 50-year design life and include a documented factor of safety.
- B. Contractor to submit materials and installation procedures for review by Owner and/or Engineer, including information on resin, tube material including certifications, internal and exterior liner coatings, a pre-liner layer if required, manhole and service sealants, an installation schedule, the manufacturer's recommended curing schedule, means of obtaining and collecting samples for testing, method of monitoring liner temperature during curing, and other quality management programs, plans for by-passing or handling of sewer flows, and traffic control.
- C. Contractor to submit video format with electronic video files on external hard drives of pre-installation CCTV inspection and post-lining CCTV inspection, and a 1-year warranty inspection as specified in Section 02753.
- D. Contractor shall provide the location of the wet-out facility to manufacturer the liner, and include documentation of its permitting status and QA/QC controls. If requested in writing by the Engineer, the Contractor shall assist the Engineer in setting up an inspection of the wet-out facility in advance of the manufacturing of the liner.

- E. Contractor to submit an outreach plan to the Engineer at least 1 week prior to the commencement of lining activities, this plan shall at minimum include a schedule for 1-week and 24-hour advance notices to residents who will be affected by the pipe lining, samples of notices to be provided to residents, and an odor and noise mitigation plan.
- F. Contractor to submit documentation relative to the qualifications, training and experience of the installers.
- G. Contractor to supply an equipment listing including redundant tools and spare parts to be on site during the lining work.
- H. Contractor to submit an odor mitigation plan to be implemented during the liner installation.
- I. Contractor to supply information on proposed or potential repair and/or rehabilitation methods based on manufacturer's recommendations in the event of a failed liner installation including step-by-step repair procedure and how the finished product will meet the requirements of this contract specification.
- J. Prior to liner installation, Contractor shall supply wet-out logs, saturation charts, and curing schedules.
- K. During liner installation, Contractor shall supply wet-out logs; curing schedules, including curing logs from the light train quality control software; and collected samples for testing.

## PART 2 - PRODUCTS

### 2.1 PIPE LINER

- A. The liner shall be fabricated from materials that are chemically resistant to exposure to domestic sewage and septic tank effluent.
- B. The resin, tube and curing methods shall be compatible with each other and the installation method to be used, in accordance with manufacturer's recommendations.
- C. The completed liner shall be continuous, seamless, and jointless from manhole to manhole.
- D. Liner shall be sized to provide a tight fit to the host pipe.
- E. The interior surface of the liner shall be a relatively light reflective color so that a clear detailed examination with closed circuit television equipment can be made.
- F. Interior and exterior liners shall be provided to mitigate styrene migration. The interior and exterior liners shall be included as part of the pipe design, or removed as part of the installation.
- G. Liner thickness calculations are discussed in Part 1.
- H. Liner material shall meet the requirements of ASTM F1216, F1743, or F2019, whichever is applicable based on the materials, installation and curing methods to be used.
- I. Short liners are small sections of liner meant to repair smaller sections of defects within the existing pipe. These short liner locations are noted in the Contract Documents with approximate length of liners and the distance from upstream manhole and/or downstream manhole.

- J. The information on the existing pipeline(s) to be lined in the Contract Documents is provided for reference only and should be verified during CCTV inspection prior to short lining. Any adjustments to the scope should be discussed with the Engineer prior to installation.
- K. All materials shall be stored and handled in accordance with the manufacturer's recommendations and consistent with the type or curing method to be used.

## 2.2 MANHOLE END SEALS

- A. The manhole end seals shall be a single-component, hydrophilic mastic water stop.

## 2.3 SERVICE CONNECTION GROUTING

- A. The grout materials and equipment used to seal service connections shall be in accordance with ASTM F2454.

# PART 3 - EXECUTION

## 3.1 GENERAL

- A. All work shall be done in compliance with all current OSHA safety regulations.

## 3.2 BEFORE INSTALLATION

- A. Prior to conducting any work, Contractor shall deliver notices to all residents and/or building owners within the area of the pipe lining. Notice shall indicate when the work will take place and who to call with questions or in the event of an emergency. Notice to be approved by the Owner prior to distribution.
- B. Contractor to control sewer flow and bypass pump per Section 02751.
- C. Prior to lining the sewer main, the sewer shall be cleaned in accordance with Section 02752 and inspected with CCTV equipment per Section 02753. Contractor to verify that the conditions of the sewers are acceptable for the methods of liner installation required. Prior to lining of pipe, Contractor shall trim back any protruding pipes/services extending into the pipe. Pipes shall be trimmed back to within ½-inch of the pipe wall, or as close as possible to avoid damaging the host pipe and also to prevent bulges in the liner to be installed. All debris from cleaning and trimming operations shall be removed from the sewer system and not flushed downstream.
- D. Active leaks shall be stopped prior to lining if they could, in the opinion of the Engineer, create pockets of trapped water or heat sinks which could cause improper curing of the liner.
- E. Contractor shall inspect the liner for any defects and if it had prematurely started to cure during transportation and storage.
- F. Install odor mitigation devices per submitted odor mitigation plan to deflect odors for both workers and general public.

## 3.3 LINING METHOD AND CURING

- A. The Contractor shall install and UV cure the liner per the method recommended by the liner manufacturer and as submitted in the shop drawing.
- B. Following liner installation and curing, leakage testing shall be performed on the liner according to the requirements of ASTM F1216.

- C. After liner installation and curing, Contractor shall cool the liner down to at least 100 degrees Fahrenheit prior to commencing service reinstatement and collection of samples. Liner parameters during curing and cool-down shall be monitored, and recorded from the quality control software guiding the light-train.

### 3.4 POST LINING INSTALLATION

- A. After liner installation, curing, and cool down, the Contractor shall reinstate the existing service connections, using remote controlled equipment including a television camera meeting the requirements of Section 02753. The opening created for the service lateral shall be at least 95% of the original opening. After creating the hole in the liner, polish the edges of the hole to remove sharp edges and improve flow conditions from the service pipe into the lined sewer main. Coupons of the lining material removed during service reinstatement shall be collected at the downstream manhole and shall not be left within the sewer system.
  - 1. The Contractor shall grout and seal each service connection to prevent leakage between the existing pipe, the existing service connection, and the new liner. After grouting each service, the Contractor shall use a CCTV camera with a lateral camera launch to inspect each service beyond the first wye/elbow fitting. The purpose is to confirm the service connection has not been obstructed with grout beyond the mainline camera's view.
    - a. If grout is obstructing more than 10 percent of the service connection cross sectional area, the service(s), the Contractor shall remove the grout from the service(s) at no additional cost to the Owner.
- B. Any connections to the sewer main that are not to be reinstated after liner installation shall be coordinated with the Owner. It is the Contractor's sole responsibility to confirm with the Owner that a connection is to be abandoned and not reinstated to the main. For each connection not reinstated, the Contractor shall obtain a sign-off from the Owner, using the form included at the end of this Section.
- C. Provide a watertight seal at the insertion and termination points in the manholes. Seal any annular space between the liner and host pipe in the manholes and provide for smooth merging of flows from other pipelines entering the manhole.
- D. The use of the video from the light train shall not be used for post-inspection documentation purposes.

### 3.5 TESTING

- A. For every 2,500 linear feet of liner installed, two samples shall be processed and tested. If the project will have less than 2,500 linear feet of liner installed, a minimum of two samples shall be processed and tested.
  - 1. For pipe diameters less than 18-inches, restrained end samples shall be utilized and tested.
  - 2. For pipe diameters 18-inches and larger, flat plate samples shall be utilized and tested.
  - 3. The CIPP physical properties shall be tested in accordance with ASTM F1216, Section 8, using either allowed sampling method. The flexural properties must meet or exceed the values listed in Section 1.3 of this Specification and the values submitted to the Owner by the Contractor for this project's CIPP wall design, whichever is greater.

4. The installed CIPP thickness shall be measured.
    - a. For pipe diameters less than 18-inches, the restrained end samples shall be measured for thickness.
    - b. For pipe diameters 18-inches and larger, two-inch cores sample shall be removed from the CIPP liner at the 12 o'clock position to check thickness. The core hole shall be repaired as recommended by the manufacturer.
  5. Testing shall be completed by an accredited, independent laboratory. Testing results shall be provided to the Owner and the Engineer within 7 days of receipt of such results.
- B. Following liner installation, leakage testing shall be performed on the liner.
1. For pipe diameters less than 15-inches that were cured by steam, air testing shall be performed.
  2. For pipe diameters less than 15-inches that were cured by water, exfiltration leakage testing shall be performed on the liner according to the requirements of ASTM F1216.
  3. For pipe diameters between 15-inches and 30-inches, air testing or exfiltration leakage testing shall be performed on the liner according to the requirements of ASTM F1216.
  4. For pipe diameters larger than 30-inches, visual inspection of leakage is acceptable.
- C. After completion of the work, perform post-installation CCTV inspection of the completed liner and the restored service connections per the requirements of Section 02753. Any of the following defects that are observed shall be repaired immediately at the expense of the Contractor in accordance with the liner manufacturer's recommendations:
1. Visible leaks, weeping or pinholes
  2. Fins, bulges, wrinkles or other obstructions located:
    - a. Outside of the flow line of the pipe that are 5% or greater of the cross-sectional area of the host pipe shall be repaired.
    - b. In the lower third of the pipe or inside the flow line and in circumferential configuration that are 3% or greater of the cross-sectional area or 0.5-inches, whichever is smaller.
  3. Soft or uncured sections of the liner
  4. Visual discoloration or other visual anomalies
- D. During the one-year warranty period, any defects which will affect the integrity, the strength and/or leak resistance of the liner shall be repaired at the expense of the Contractor.
- E. At a time approaching the end of the one-year warranty period, the Contractor shall pay for a third party (approved by the Owner) to clean and CCTV inspect up to 15% of the total lined sewers in the contract. During the one-year warranty period, any defects which will affect the integrity, or the strength of the liner shall be repaired at the expense of the Contractor.

**CONFIRMATION TO ABANDON AN EXISTING  
CONNECTION TO THE SEWER MAIN**

Complete this form for each connection to the sewer main that is not reinstated after lining.

**Connection Location:**

Street Address: \_\_\_\_\_

\_\_\_\_\_ LF upstream/downstream (circle one) of MH \_\_\_\_\_ as indicated on CCTV inspection prior to lining of the main.

**Purpose for Abandonment (check all that apply):**

|                                 |                                  |
|---------------------------------|----------------------------------|
| _____ Service No Longer Active  | _____ Served by Separate Lateral |
| _____ Connection to Storm Drain | _____ Other: _____               |

**Method of Determining Connection can be Abandoned:**

|                           |                            |
|---------------------------|----------------------------|
| _____ Dye Test            | _____ Direction from Owner |
| _____ CCTV Inspection     | _____ Visual Inspection    |
| _____ Building Inspection | _____ Other: _____         |

**Confirmation that Connection is to be Abandoned (not reinstated):**

|                |                     |
|----------------|---------------------|
| _____<br>Owner | _____<br>Contractor |
| _____<br>Date  | _____<br>Date       |

Submit copy of the signed form to the Engineer.

END OF SECTION



SECTION 02758MANHOLE REHABILITATIONPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: The work includes the rehabilitation of sewer manholes, including but not limited to:
  - 1. the removal of roots, mineral build-up and debris;
  - 2. the grouting of sources of infiltrations;
  - 3. the sealing and lining of various manhole components;
  - 4. the cementitious lining of manhole;
  - 5. the removal of steps;
  - 6. the installation of interior chimney seal;
  - 7. The construction of inside drop pipe connections as needed.
- B. The locations of the manholes to be rehabilitated are shown in Summary of Work or in the appendices. The table below describes the manholes that will be rehabilitated and the types of rehabilitation that will be required:
- C. The intent of the manhole rehabilitation work is to correct the observed defect and prevent future deterioration using various products and procedures and methods either singularly or in combination.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 DESCRIPTION OF METHODS

- A. Cleaning: Miscellaneous manhole cleaning is typically incidental to other rehabilitation work and includes pressure washing, debris removal and other necessary work to properly prepare surfaces and manholes for the work to be performed. Protect pipe inlets and outlets to prevent debris from entering the collection system.
- B. Patch manhole: Cementitious/non-shrink grout patching in manholes is typically incidental to other rehabilitation work and is used to fill large voids in manhole and/or stop running water in manhole.
- C. Plug abandoned pipe connections: Non-shrink material to plug abandoned pipes.
- D. Grout manhole: Manhole grouting involves injection grouting to stop leakage includes surface preparation where required, drilling through the manhole walls, bench or table as identified, injecting grout material into the voids and earthen materials outside the structure; patching of the drill and grouting holes; and other associated work to stop leaks.
- E. Cementitious lining of manhole: Cementitious liner for precast, block or brick manholes includes the pressure washing of manhole and removal of all roots, deposits and loose debris and the lining of the manhole through the spray application and/or centrifugally spin-casting a cementitious-based liner to the inside of the manhole.

- F. Repair/replacement of manhole chimney: This work includes saw-cutting the existing pavement, removing the frame and cover and chimney, installing new bricks and mortar to rebuild the chimney, disposal of chimney (bricks/rings), adjusting the manhole frame and cover to grade and restoring the disturbed area to grade by matching the existing pavement depth, or loaming and seeding.
- G. Interior Chimney Seal: This work includes surface preparation, furnishing and installing the applied urethane seal to the chimney to create a uniform barrier to prevent leakage of water into manhole.
- H. Internal mechanical seals: Install manufactured products that seal leaks within a manhole from frame to top of concrete walls via rubber seals held in place with extendable mechanical bands. Installing these seals includes the pressure washing of manhole and removal of all roots, deposits and loose debris and the sealing of the manhole through the installation of the mechanical seal.
- I. Removal and disposal of manhole steps: Removal and disposal of steps in sewer manholes, including surface preparation, cutting the step, patching the step wall penetration and removal of debris.
- J. Repair/replacement of manhole bench, channel, and/or invert: Replacement or construction of manhole bench, channel, and/or inverts in sewer manholes including surface preparation, masonry work and disposal of excess materials.
- K. Repair/replacement of inside drop piping: Repair or replacement of the inside drop piping includes removing and disposing of the existing defective piping, furnishing and installing new piping, fittings, and supports per the detail, and ensuring a smooth flow transition from the sewer pipe into the manhole channel.
- L. Replacement of manhole frame and cover: Replacement of the manhole frame and cover includes saw cutting the pavement, removing and disposing of the frame and cover, and installing a new frame and cover to grade including any required chimney adjustments, and restoring the disturbed area to grade by matching the pavement depth, or loaming and seeding.
- M. Adjust (raise or lower) manhole frame and cover: Adjustment to grade of manhole frame and cover includes saw cutting the existing pavement, removing the frame and cover, and reinstalling the frame and cover to grade including any required chimney adjustments, and restoring the disturbed area to grade by matching the existing pavement depth, or loaming and seeding.
- N. Final acceptance: After the rehabilitation work has been completed, the manholes shall be visually inspected by the Engineer and tested (as required) in the presence of the Owner and/or Engineer.

#### 1.4 REFERENCES

- A. ASTM F2414-03 Standard Practice for Sealing Sewer Manholes Using Chemical Grouting
- B. ASTM F2551 Standard Practice for Installing a Protective Cementitious Liner System in Sanitary Sewer Manholes
- C. ASTM C150 Standard Specification for Portland Cement Type I
- D. ASTM C33-86 Standard Specification for Concrete Aggregates
- E. ASTM C78 Standard Test Method for Flexural Strength of Concrete; Using Simple Beam with Third Point Loading

- F. ASTM C109/C109M-05 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
- G. ASTM C157/C157M-06 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
- H. ASTM C267 Test Methods for Chemical Resistance of Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
- I. ASTM C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- J. ASTM C293-02 Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)
- K. ASTM C321-00(2005) Standard Test Method for Bond Strength of Chemical-Resistant Mortars
- L. ASTM C348-02 Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
- M. ASTM C494-86 Standard Specification for Chemical Admixtures for Concrete
- N. ASTM C496/C496M-04e1 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- O. ASTM C666/C666M-03 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
- P. ASTM C882-05 Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
- Q. ASTM C923-07 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
- R. ASTM D412-06a Standard Test Methods for Vulcanized Rubber and Thermoplastic S. Elastomers -Tension
- T. ASTM D638-03 Standard Test Method for Tensile Properties of Plastics
- U. ASTM D395-03 Standard Test Methods for Rubber Property - Compression Set
- V. ASTM - D790 Standard Test Methods for Flexural Properties of Un-reinforced and
- W. Reinforced Plastics and Electrical Insulating Materials
- X. ASTM D695-02a Standard Test Method for Compressive Properties of Rigid Plastics
- Y. ASTM D2240-05 Standard Test Method for Rubber Property - Durometer Hardness
- Z. ASTM D-638-03 Standard Test Method for Tensile Properties of Plastics
- AA. ASTM D790-07 Standard Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials
- BB. ASTM D2344/D2344M-00(2006) Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
- CC. ASTM: D-3039 ASTM D3039/D3039M-00(2006) Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
- DD. ASTM D543 - Resistance of Plastics to Chemical Reagents.
- EE. ASTM D638 - Tensile Properties of Plastics.
- FF. ASTM D695 - Compressive Properties of Rigid Plastics.
- GG. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.
- HH. ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness  
ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abrader

- II. ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages
- JJ. ASTM D-4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- KK. ASTM D7234 - Pull-off Strength of Coatings Using a Portable Adhesion Tester.
- LL. SSPC SP-13/NACE No. 6 – Surface Preparation of Concrete
- MM. NACE SP0188 - For performing holiday detection
- NN. CIGMAT - Evaluation of Liner System for Wastewater Concrete and Clay Brick Facilities
- OO. ASTM G210 - Severe Wastewater Analysis Test

#### 1.5 QUALITY ASSURANCE

- A. All work shall be performed in accordance with the National Association of Sewer Service Companies (NASSCO) Specification Guidelines, latest edition. Handiwork shall be first-class in all respects.
- B. Contractor shall have at least five years experience with the rehabilitation technology and completed the rehabilitation technology on a minimum of 50 manholes.
- C. Contractor's personnel involved in the installation of material shall be certified by the manufacturer that they have successfully completed training in handling, applying and finishing the materials being used.
- D. Contractor shall inspect pre-rehabilitation work, surface preparation, rehabilitation operations, and post-rehabilitation work.

#### 1.6 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions of the Contract Documents and Section 01340 - Submittals.
- B. Contractor to submit materials and installation procedures for review by Owner and/or Engineer including: manufacturer information on materials; safety data sheets; ASTM references; an installation schedule; manufacturer's recommended installation; the manufacturer's recommended curing schedule; chemical resistance; means of obtaining and collecting samples for testing; quality management programs; odor mitigation plan (in addition to or part of the project-wide health and safety plan); noise mitigation plan; plans for by-passing or handling of sewer flows; and traffic control.
- C. Submit detailed descriptions of the recommended procedures for handling and storing materials including a proposed method for monitoring temperatures of the storage location.
- D. Submit a detailed description of all required field-testing processes and procedures as applicable from the manufacturer.
- E. Contractor to supply information on proposed or potential repair and/or rehabilitation methods in the event of a failed rehabilitation component system installation including step-by-step repair procedure and how the finished product will meet the requirements of this contract specification.
- F. Submit a certified statement from the manufacturer that the contractor / installer is an approved installer and tester of the rehabilitation product with certificates of completed training for each crew member involved in each rehabilitation component.

- G. Submit the contact information and documentation for the third-party National Association of Corrosion Engineers (NACE) accredited inspector or manufacturer's representative who shall perform holiday (spark) testing on the manhole liner.
- H. Submit manufacturer's "Certification of Conformance" that lining materials meet or exceed the requirements of these Specifications.
- I. Submit a minimum of five recent verifiable references for similar project work in the United States indicating the successful application of the manhole rehabilitation as specified herein or to be furnished by the Contractor and applied in a similar project environment as included in these contract specifications.
- J. Submit documentation of a minimum of a five-year successful installation history of the products to be used.
- K. Submit other documents as specified in the appropriate Sections of this Division.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Rehabilitation component materials are to be kept dry, protected from weather and stored under cover and in accordance with manufacturer's recommendations.
- B. Cementitious protective lining materials and components are to be stored at temperatures as recommended by the manufacturer to prevent freezing and handled according to their SDS. Do not store near flame, heat, or strong oxidants.

PART 2 - PRODUCTS

2.1 PATCH MANHOLE

- A. Equipment – trowel
- B. Materials – The mortar used shall be a non-shrink hydraulic cement.

2.2 GROUT MANHOLE

- A. Equipment: The basic equipment shall consist of pumps, containers, injection packers, hoses, valves, and all necessary equipment and tools required to seal manhole joints and leak and/or seal the exterior surface. The chemical grout injection pumps shall be equipped with pressure meters that will provide for monitoring pressure during the injection of the chemical sealants. When necessary, liquid bypass lines equipped with pressure-regulating bypass valves will be incorporated into the pumping system.
- B. Materials:
  - 1. Hydrophilic polyurethane chemical grout for crack injections: consists of premeasured, prepackaged polyurethane chemical grout with root inhibitor. The grout is designed for crack injections to react with water and form a water impermeable foam or gel mass unaffected by mildly corrosive environments. The grout shall be non-toxic, non-flammable, high flash point (225° F) hydrophilic polymer of the type which is applied in a crack or open joint. When mixed with water, the material shall expand up to 4 times its original volume and cure to a closed cell polyurethane foam.

2. Hydrophobic polyurethane chemical grout for crack injections: consists of premeasured, prepackaged polyurethane chemical grout with root inhibitor. The grout is designed for crack injections to form flexible gasket or plugs. The grout shall be non-toxic, non-flammable, high flash point (225° F) hydrophobic polymer of the type which is applied in a crack or open joint. When mixed with water, the material shall expand up to 4 times its original volume and cure to a tough, flexible, closed cell polyurethane foam.
  3. Hydrophobic polyurethane chemical grout for large voids consists of premeasured, prepackaged polyurethane chemical grout with root inhibitor that when mixed and makes contact with the water shall fill large voids in rock fissures, gravel layers and cracks in concrete structures and for the stopping of gushing water. The grout shall be non-toxic, non-flammable, high flash point (225° F) hydrophobic polymer of the type which is applied in a crack or open joint by use of a packer.
  4. Water: Potable from municipal/public water supply.
  5. Filler Gaskets: Oakum, use strong fibrous jute material, saturated with grout for use in plugging larger openings in combination with the polyurethane grout.
  6. Utilize proper grout for the intended application as recommended by the manufacturer. Grout conditions may be adjusted for catalyzing the reaction, inhibiting the reaction, lowering the freezing temperature of the grout solution, adding fillers, providing strength, or for inhibiting root growth according to the instructions of the grout manufacturer and in the specified quantities as recommended by the grout manufacturer.
  7. Utilize non-shrink grout for patching holes and filling gaps around pipe connections or left behind by drilling holes for injection.
- C. Acceptable Sealant Grout Manufacturers and Products are:
1. Hydrophilic polyurethane chemical grout for crack injections
    - a. Avanti International AV-202 LV or AV-330
    - b. Sika Corporation SikaFix HH Hydrophilic
    - c. or equal
  2. Acrylamide chemical grout for crack injection
    - a. Avanti International AV-100
    - b. Or equal
  3. Hydrophobic polyurethane chemical grout for crack injections
    - a. Avanti Grouts AV-248 Flexseal LV with AV-249 Catalyst LV
    - b. Sealing Systems, Inc. (S.S.I.) Aqua Seal
    - c. Alchemy- Spetec PUR F400
    - d. or equal
  4. Hydrophobic polyurethane chemical grout for large voids
    - a. Avanti Grouts AV-275
    - b. Sika Corporation SikaFix HH+
    - c. Sealing Systems, Inc. (S.S.I.) Aqua Seal
    - d. Alchemy-Spetec PUR H100
    - e. or equal

## 2.3 CEMENTITIOUS LINER

- A. Equipment: The basic equipment shall consist of pumps, containers, packers, hoses, nozzles, valves, and all necessary equipment and tools required to line manholes as required by the manufacturer.
- B. Materials: The liner mix shall be cement-based, fiber-reinforced calcium aluminate mortar specifically designed to prevent infiltration and restore structural integrity, and to be spray applied to form a structurally enhanced, monolithic cementitious liner covering all interior manhole surfaces. Minimum applied thickness shall be ½ inch but application thickness must provide a structurally stable manhole and form a barrier to water and gases. Material shall be premixed and specially formulated to resist hydrogen sulfide bacterial corrosion and abrasion in municipal sanitary sewer systems.

The lining material shall meet the following minimum requirements at 28 days:

|                          |           |                                         |
|--------------------------|-----------|-----------------------------------------|
| Compressive Strength     | ASTM C109 | 9,000 psi                               |
| Flexural Strength        | ASTM C293 | 700 psi                                 |
| Shrinkage @ 90% Humidity | ASTM C596 | 0%                                      |
| Tensile Strength         | ASTM C496 | >600 psi                                |
| Sulfide Resistance       | ASTM C267 | no visible attack at<br>pH 2 or greater |

- C. Acceptable manufacturers and products are:
  - 1. Strong Systems, Inc. - Strong Seal QSR
  - 2. AP/M Permaform - Permacast Process
  - 3. Quadex - QM-1s Restore
  - 4. Or approved equal

## 2.4 REPLACEMENT OF MANHOLE CHIMNEY

- A. Equipment
  - 1. Refer to Section 02601.
- B. Materials
  - 1. Refer to Section 02601.

## 2.5 INTERIOR CHIMNEY SEAL

- A. Equipment
  - 1. The basic equipment shall consist of pumps, containers, injection packers, hoses, nozzles, brushes, valves, and all necessary equipment and tools required to apply urethane chimney seal as required by the manufacturer.
- B. Materials
  - 1. The urethane chimney seal materials shall be corrosion resistant.
  - 2. Mil thickness shall be determined by the manufacturer.
  - 3. The material shall have a minimum of 600% elongation per ASTM D412.
  - 4. The urethane chimney seal may require a primer resin applied to the entire surface before application. The sealing system shall line the interior of the adjustment area from the cone / top of the manhole and onto the inside of the casting.

- a. If the manhole has been relined prior to the seal installation, the seal shall cover a maximum of 6 vertical inches to cover casting cone interface.
- C. Acceptable Manufacturers and Products include:
  - 1. Sealing Systems, Inc. FLEXSEAL
  - 2. Epoxytex International, Inc. Uro Seal 45V
  - 3. CladLiner Cladseal
  - 4. Or equal

## 2.6 INTERNAL MECHANICAL SEALS

- A. Equipment
  - 1. The basic equipment shall be pressure washing equipment and suitable tools to install the mechanical seals.
- B. Materials
  - 1. Flexible sleeve:
    - a. Shall be a single piece of high-quality rubber suitable for a sewer environment of a sufficient size and flexibility to completely cover the area to be sealed and allow for post-installation expansion.
    - b. Sleeves shall have a minimum thickness of 3/16-inch.
  - 2. Expansion bands:
    - a. Shall be stainless steel with a minimum thickness of 16 gauge.
    - b. Bands shall be sized properly to be able to expand to the appropriate size of the area to be sealed and create sufficient pressure to create a watertight seal.
    - c. Bands shall be permanently held in place with a positively locking mechanism.
  - 3. Acceptable Manufacturers and Products include:
    - a. S.S.I. – Internal Uni-band
    - b. Trelleborg – NPC Flex Rib Chimney Seal
    - c. Or equal

## 2.7 REMOVAL AND DISPOSAL OF MANHOLE STEPS

- A. Equipment
  - 1. Refer to Sections 02601 and 03604.
- B. Materials
  - 1. Non-shrink grout. Refer to Section 03604.

## 2.8 REPAIR/REPLACEMENT OF MANHOLE BENCH, CHANNEL AND/OR INVERT

- A. Equipment
  - 1. Refer to Sections 02601.
- B. Materials
  - 1. Refer to Section 02601.

## 2.9 REPAIR/REPLACEMENT OF INSIDE DROP PIPING

- A. Equipment
  - 1. Refer to Sections 02622.
- B. Materials
  - 1. Drop piping – Shall be in accordance with Sections 02601 and 02622



2. Pipe supports – Shall be all stainless steel strap-type hangers with stainless steel expansion anchors.

### PART 3 - EXECUTION

#### 3.1 MANHOLE PRE-REHABILITATION INSPECTIONS

- A. Prior to rehabilitation of manholes, the Contractor and Engineer will inspect each manhole to determine or confirm the scope of rehabilitation as outlined herein:
  1. Open each manhole with the Engineer present and look for visible cracks, leaks, or evidence of past leaks. Areas of particular interest are manhole section joints and pipe openings.
    - a. If available compare to the existing inspection and note any condition changes or discrepancies.
  2. Clean each manhole as outlined subsequently. After cleaning, again look for visible cracks, leaks or evidence of past leaks, and general condition of the manhole.
  3. Provide Engineer a written list of manhole defects at least three weeks before the scheduled work.
  4. The Engineer shall review and confirm the scope of required rehabilitation prior to work commencing. The Owner and Engineer reserve the right to modify the scope at each manhole as needed to obtain the proper rehabilitation. The Engineer shall provide written direction to the Contractor for any scope changes.

#### 3.2 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the Manufacturer. Do not apply the products to frozen surfaces.
- B. Do not apply coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the Manufacturer.

#### 3.3 MANHOLE SURFACE PREPARATION

- A. Temporarily bypass pump wastewater around manholes, use flow through plugs, or otherwise divert flows as necessary.
- B. Clean interior surfaces of manhole of debris, dirt, oil, grease, remains of old coating materials, and any other extraneous materials.
- C. Pressure wash manhole walls to remove loose mortar, concrete and debris. Pressure washing levels, used for cleaning, shall be as recommended by the manufacturer. Other surface preparation methods may include hydro blasting, abrasive blasting, grinding, detergent water cleaning and shall be suited to provide a surface compatible for installation of the liner system.
- D. Repair irregularities and repair leakage in manhole using materials compatible with proposed resurfacing material, specified in these contract specifications.
- E. Trim and grout laterals and pipes as required and/or specified.
- F. Remove manhole steps by cutting the steps flush with manhole surface. The holes shall be plugged with non-shrink hydraulic cement (See 3.3 below).
- G. Remove debris and roots from manhole and sewer connections.

- H. Handle cleaning water to prevent water and residue from causing damage.
- I. Do not discharge debris downstream through the sewer system.
- J. Filter solids-laden water through a de-silting device.
- K. Properly dispose of debris and residue from cleaning and other construction operations in a manner satisfactory to Owner and authority having jurisdiction over area where work site is located.

### 3.4 MANHOLE PATCHING

- A. Patching Procedures for Precast, Brick and Block Manholes:
  - 1. Each hole shall be manually filled with mortar and troweled flush with the surface of the manhole walls or other surfaces. The mortar used shall be a non-shrink hydraulic cement.

### 3.5 MANHOLE GROUTING

- A. All surface preparations must be performed to meet or exceed manufacturer's recommendations prior to application.
- B. The grout shall be applied when temperatures are greater than 45 °F. If the temperature is less than 45 °F, contact the manufacturer and follow their recommendations. Temperature will affect grout cure times.
- C. Do not grout when ice is present in the area.
- D. To prevent spalling of concrete or unnecessary damage to manhole structures, the crack injection method of Variable Pressure Application Technique (VPAT) for sealing water infiltration is not allowed.
- E. For grouting to remove infiltration from cracks or manhole joints, the following shall apply:
  - 1. At each point of leakage within the manhole structure (including at pipe penetrations), a hole shall be carefully drilled from within the manhole and shall extend through the entire manhole wall. The holes shall be drilled adjacent to the crack or joint.
    - a. In cases where there are multiple leaks around the circumference of the manhole, fewer holes may be drilled, providing all leakage is stopped from these holes.
    - b. For grouting joints, drill the holes at 90° (degree) intervals.
  - 2. Grout ports or sealant injection devices shall be placed in these previously drilled holes in such a way as to provide a watertight seal between the holes and the injection device.
  - 3. A hose, or hoses, shall be attached to the injection device from an injection pump. Chemical sealing materials as specified shall then be pumped through the hose until material refusal is recorded on the pressure gage mounted on the pumping unit or a predetermined quantity of sealant has been injected. Ensure that chemical grout fills entire circumference of each manhole joint or pipe penetration, or other identified leakage point. Care shall be taken during the pumping operation to ensure that excessive pressures do not develop and cause damage to the manhole structure.
  - 4. Upon completion of the injection, the ports shall be removed, and the remaining holes filled with mortar and troweled flush with the surface of the manhole walls or other surfaces. The mortar used shall be a non-shrink hydraulic cement.

- F. For curtain grouting to seal the exterior surface of the manhole to stop/prevent infiltration, the following shall apply:
1. Holes shall be carefully drilled from within the manhole and shall extend through the entire manhole wall. The holes shall be drilled at 90° (degree) intervals in multiple, vertical locations of the manhole. The minimum injection hole spacing shall be 12" (1 foot) to a maximum 36" (3 feet) in any direction. The highest set of grout ports shall be a few feet from the ground surface to prevent the ground from heaving.
  2. The drilled holes should be flushed with clean water before receiving packers.
  3. Grout ports or sealant injection devices shall be placed in these previously drilled holes in such a way as to provide a watertight seal between the holes and the injection device.
  4. Grout shall typically be injected through the lowest holes first, working the grout higher until the manhole is externally sealed with grout.
  5. Additional holes may be required to verify that the grout has encompassed the entire outside of the manhole.
  6. A hose, or hoses, shall be attached to the injection device from an injection pump. Chemical grouting (sealing) materials as specified shall then be pumped through the hose until material refusal is recorded on the pressure gage mounted on the pumping unit or a predetermined quantity of grout has been injected. Ensure that chemical grout fills entire circumference of each manhole joint or pipe penetration, or other identified leakage point. Care shall be taken during the pumping operation to ensure that excessive pressures do not develop and cause damage to the manhole structure.
  7. Upon completion of the grout injection,
    - a. The ports shall be removed.
    - b. Grout shall be removed as to be flush with the surface. Any extraneous grout on the surrounding surface will be removed.
    - c. The remaining holes filled with mortar and troweled flush with the surface of the manhole walls or other surfaces. The mortar used shall be a non-shrink hydraulic cement.

### 3.6 CEMENTITIOUS MANHOLE LINING

- A. Lining Procedures: Liner materials shall be mixed per manufacturer's written specifications and applied by either troweling, spray applying, and/or centrifugally spin-casting using equipment specifically designed to meet required thickness and application requirements as set forth by the manufacturer.
- B. All surface preparations must be performed to meet or exceed manufacturer's recommendations prior to application.
- C. Any active sewer flows shall be dammed, plugged or diverted as required to ensure that the liquid flow is maintained below the surfaces to be lined.
- D. Any active infiltration sources must be identified and stopped or handled in accordance with manufacturer recommendations prior to lining operations.
- E. Repair and lining materials must be applied by an experienced Applicator of the specified cementitious material and in accordance with the manufacturer's recommendations.

- F. Minimum placement thickness shall be ½-inch or manufacturer's recommendation, whichever is thicker.
- G. Immediately following application, the cementitious liner material shall be troweled or brushed to achieve an even consistent surface.
- H. Cementitious liner material shall be permitted to cure according to manufacturer recommendations.
- I. In locations where only the bench and channel area are identified to be lined, the lining shall extend up the walls of the manhole a minimum of 6-inches in order to provide a uniform coating to line the entire junction of the manhole wall and table.
- J. In areas where the manhole walls are identified to be lined, the lining shall extend up beyond the top of the manhole chimney and onto the manhole frame, unless an internal mechanical seal is to be applied, in which case the lining shall continue to a point contained within the mechanical seal. At the lower extent, the manhole should be lined to the junction of the manhole wall and bench.
- K. Curing will take place once the manhole cover has been replaced. It is important that the manhole cover is replaced no more than 10-20 minutes after troweling is complete to avoid moisture loss in the material due to sunlight and winds.
- L. Material shall not be applied during freezing weather conditions. Material shall not be placed when the ambient temperature is 37 degrees Fahrenheit and falling or when the temperature is anticipated to fall below 32 degrees Fahrenheit for 24 hours.

#### INTERIOR CHIMNEY SEAL

- M. All loose and protruding mortar and brick that would interfere with the chimney seal's performance shall be removed.
- N. All surface preparations must be performed to meet or exceed manufacturer's recommendations prior to application.
- O. Active leaks (infiltration) shall be sealed by a method as recommend by the urethane chimney seal manufacturer prior to installing the chimney seal.
- P. The Contractor shall obtain from the urethane chimney seal manufacturer in writing the material's compatibility and the recommended time required for the mortar to properly cure prior to installing the polymer chimney seal.
- Q. Preparation of the chimney surface and casting using sandblasting as described by the manufacturer to ensure a clean surface. The surface shall be wiped with acetone. The substrate surface must be dry and free of sand, loose debris, dust, oil, grease, or chemical contamination. A blower may be required to completely dry the substrate surface or as recommended by manufacturer.
- R. The urethane chimney seal shall require the proper mixing of several components.
- S. If a primer is required, the primer shall cure properly before applying the urethane seal. The urethane chimney seal may be applied evenly by brush over the entire chimney area, including the frame joint area and the area above the manhole cone including all extensions to the chimney area.
- T. If the manhole has been relined prior to the seal installation, the seal shall cover a maximum of 6 vertical inches to cover casting-cone interface.
- U. Installation procedures shall be in accordance with the manufacturer's recommended instructions.

3.7 INTERNAL MECHANICAL SEALS

- A. Prior to the installation, the Contractor is required to pressure wash (minimum of 3,000 psi) and thoroughly clean the inside of the manhole including frame, chimney, and walls. Remove all roots, deposits and loose debris.
- B. If manhole surface is rough or uneven to the extent that it will not allow a watertight seal, a single component quick set repair mortar shall be applied to create a smooth surface prior to installation.
- C. If there is an offset of more than 3" between the manhole frame and chimney, or manhole chimney and the manhole walls, the offset shall be corrected prior to installing the mechanical seal.
- D. Bands and rubber sleeve shall be reasonably clean, smooth, circular and free of debris, voids or other flaws that may prevent a watertight seal.
- E. Installation shall be in accordance with manufacturer's recommendations.
- F. The internal mechanical seal shall extend up onto the manhole frame. At the lower extent it shall extend to the lesser of 6" below the junction of the manhole wall or to the angle point on the cone section. If no angle point exists, the chimney to wall joint shall be sealed per the manhole sealing procedures described herein, and the internal mechanical seal shall extend to that joint.
- G. Following installation, the seal shall not impede or restrict access to the manhole.

3.8 REMOVAL AND DISPOSAL OF MANHOLE STEPS

- A. Remove and dispose of steps.
- B. Clean and prepare surface around removed steps to allow for adhesion of new grout to existing concrete. Any step material left in manhole wall shall also be prepared to allow for patching.
- C. Repair holes with hydraulic non-shrink grout.

3.9 REPAIR/REPLACEMENT OF MANHOLE BENCH, CHANNEL AND/OR INVERT

- A. Temporarily bypass pump wastewater around manholes, use flow through plugs, or otherwise divert flows as necessary. Refer to Section 02751.
- B. Remove damaged parts of table, channel, and invert or the entire table, channel and invert from manhole and clean surfaces.
- C. Prepare and install brick invert, channel, and table.
  - 1. Invert bench and channels: Construct per Section 02601.
  - 2. Masonry:
    - a. Laying Brick: Refer to Section 02601.
    - b. Curing: Refer to Section 02601.

3.10 REPLACEMENT OF INSIDE DROP PIPING

- A. Temporarily bypass pump wastewater around manholes, use flow through plugs, or otherwise divert flows as necessary. Refer to Section 02751.
- B. Prior to the repairing the drop piping, the Contractor is required to pressure wash (minimum of 3,000 psi) and thoroughly clean the inside of the manhole including walls and invert bench.
- C. Remove all drop piping and properly clean pipe to allow for proper connection of new piping. Dispose of any piping, supports, and appurtenances that are not being reused.

- D. Install new piping, ensuring a watertight connection to existing pipe. Install stainless steel strap hanger supports and expansion anchors in accordance with the drop piping detail and manufacturer's requirements.
- E. Provide overflow relief at top of internal drop piping connection.
- F. At channel, install drop piping to convey sewer flows directly into manhole channel, not onto bench. As required, provide brick and grout to support fittings and create a flow path to convey the flow from the drop piping into the channel.
- G. When complete, new piping shall provide a fully supported system that maintains a controlled flow of the sewer into the manhole channel without uncontained drops or undue splashing.

### 3.11 PLUG PIPE CONNECTIONS

- A. Pipe connections to manholes called to be plugged under this contract shall have a watertight plug installed into the connection.
- B. Plug shall be installed, mounted and braced such that no leaks are present under the current condition and that the plug can maintain a watertight seal under the conditions of hydrostatic pressure of water within the upstream pipe.

### 3.12 TESTING

- A. General
  - 1. The Contractor shall test 10 percent of each type of installed rehabilitation component system using the testing procedures described below. If more than 5 percent of the tested rehabilitation component systems fail, an additional 10 percent of the manholes shall be selected by Engineer for further testing by the Contractor. The process continues until the rehabilitation component system tested meets the requirements of the Contractor Documents to the satisfaction of the Engineer.
  - 2. All manholes shall be visually inspected in the presence of the Engineer. Any leakage into the manholes in areas where a rehabilitation component system was installed by the Contractor shall be identified.
  - 3. All visible leaks and defects observed during inspection and testing shall be repaired to the Engineer's satisfaction and at no additional cost to the Owner.
  - 4. All touch-up/repair procedures for defects identified and/or areas where destructive testing samples were taken shall follow the manufacturer's recommendations and at no additional cost to the Owner.
  - 5. Upon final completion of the work, the manufacturer shall provide a written certification to Owner and Engineer that the tests, test results, and repair materials were applied per the manufacturer's recommendations.
- B. Testing Methods
  - 1. pH Test
    - a. The Contractor shall test the pH of the surface material.
  - 2. Cup Test
    - a. For acrylic grout resin
      - i. Fill a cup ¼ full of the solution from Tank A and fill a second cup ¼ full of the solution from Tank B.
      - ii. Pour contents of one cup into the other cup.

- iii. Time how long it takes for the mixed solution to become a solid gel.  
Normal gel time is approximately 20 – 40 seconds.
  - b. For hydrophilic grout resin
    - i. Stir into a cup, equal parts of water from the site and grout resin.
    - ii. Time how long it takes for the mixed solution to become a solid.  
Normal time to become is a solid is approximately 30 – 60 seconds.
  - c. For hydrophobic grout resin
    - i. Fill a cup 5% full of water from the site.
    - ii. Stir in grout resin into the water.
    - iii. Time how long it takes for the mixed solution to become a solid.  
Normal time to become is a solid is approximately 30 – 60 seconds.
- 3. Slump Test
  - a. Perform a slump test on the cementitious material for each sample.
- 4. Standard Cube Test for Cementitious Materials
  - a. Where specified, one 2-inch x 2-inch sample cube shall be taken for every 50 bags of cement material used. Samples shall be sprayed from nozzle. The samples shall be sent to an independent test laboratory for compression strength testing as described in ASTM C-109.
- 5. Wet Film Thickness Test
  - a. Wet film thickness gauge shall be used in accordance with ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gauges
- 6. Adhesion Test
  - a. Adhesion testing is to verify the adhesion/mechanical bond of the coating to the substrate. Tests shall be conducted in accordance with ASTM D-4541, ASTM D-7234, or National Association of Corrosion Engineers (NACE) SP018.
  - b. Number of dollies and locations:
    - i. For manhole lining, a minimum of three 50-mm dollies shall be affixed to the coated surface at the cone area, mid-section and at the bottom of the structure or in areas suspect from non-destructive evaluation and testing.
    - ii. For chimney lining, a minimum of two 50-mm dollies shall be affixed to the coated surface at the chimney area or in areas suspect from non-destructive evaluation and testing.
  - c. The adhesive used to attach the dollies to the coating shall be rapid setting with tensile strengths in excess of the coating product and permitted to cure in accordance with manufacturer recommendations. The coating and dollies shall be adequately prepared to receive the adhesive.
  - d. Failure of the dolly adhesive shall be deemed a non-test and require re-testing. Prior to performing the pull test, the coating shall be scored to the substrate by mechanical means without disturbing the dolly or bond within the test area.
  - e. Two of the three adhesion pulls shall exceed 300 psi or concrete failure with more than 50% of the subsurface adhered to the coating.

- f. Should a structure fail to achieve two successful pulls as described above, additional testing shall be performed at the discretion of the Engineer. Any areas detected to have inadequate bond strength shall be evaluated by the Engineer.
    - g. Further bond tests may be performed in that area to determine the extent of potentially deficient bonded area and repairs shall be made by the Contractor.
  - 7. Holiday (Spark) Test
    - a. The Contractor shall use an approved third-party NACE accredited inspector or manufacturer's representative to perform holiday (spark) tests in accordance with the coating manufacturer's recommendations and check for voids. These tests shall be performed in the presence of the Engineer.
    - b. After the epoxy coating product has properly set and cured in accordance with manufacturer instructions, all surfaces shall be inspected for holidays with high-voltage holiday detection equipment. Reference NACE RPO 188-99 for performing holiday detection.
    - c. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional coatings can be hand applied to the repair area.
  - 8. Leakage Test
    - a. Following the expansion of the lower band, a quality assurance test shall be performed to ensure effective sealing by pulling the upper section of the seal or extension inward to create a recess behind the seal where water can be poured. Pour the water behind the seal and observe the lower sealing area for any visible leaks. The sealing shall be considered effective if no water leaks from behind the seal at the lower sealing area.
- C. Testing Methods per Rehabilitation Component System
  - 1. Grouting
    - a. Visual inspection – throughout installation
    - b. Cup test – before installation
  - 2. Cementitious Liner
    - a. Visual inspection – throughout installation
    - b. Slump test – before installation
    - c. Standard cube test – before installation
    - d. Film thickness measurement – after installation
    - e. Adhesion test – after installation
  - 3. Mechanical Frame Seal
    - a. Visual inspection – throughout installation
    - b. Leakage test – after installation
  - 4. Applied Chimney Seal
    - a. Visual inspection – throughout installation
    - b. Film thickness measurement
    - c. Adhesion test – after installation
    - d. Holiday test – after installation



5. Physical repairs such as drop pipe connections and plugging pipe openings.
  - a. Visual inspection – throughout installation

3.13 WARRANTY INSPECTIONS

- A. The Engineer and Owner reserve the right to inspect the rehabilitated manholes during the warranty period (including during periods when the groundwater table is higher than at the time the work is completed). The Owner and/or Engineer shall notify the Contractor prior to inspection, and the Contractor shall be present during the inspection.
- B. Ten (10) percent of manholes rehabilitated shall be inspected, at locations randomly selected, by the Owner and/or Engineer.
  1. No infiltration or inflow shall be visible in the renewed manhole.
  2. If any rehabilitation component system fails the warranty inspection, the Owner shall inspect all rehabilitation component systems installed in the contract, together with Contractor.
- C. Any leakage or defects in the work found by this inspection shall be corrected by the Contractor at no additional cost to the Owner within one month.

END OF SECTION

SECTION 03604NON-SHRINK GROUTPART 1 - GENERAL1.1 SECTION INCLUDES

- A. Cementitious non-shrink grout
- B. Epoxy non-shrink grout

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 REFERENCES

- A. ASTM C33/C33M - Specification for Concrete Aggregates
- B. ASTM C109/C109M - Test Method for Compressive Strength of Hydraulic Cement Mortars
- C. ASTM C827 - Test Method for Changes in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
- D. ASTM C1107/C1107M - Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- E. CRD-C611 - Test Method for Flow of Grout Mixtures
- F. CRD-C621 - Specification for Non-Shrink Grout

1.4 SUBMITTALS

- A. Submit product data and Safety Data Sheets for products to be used.
- B. Submit test data when required.
- C. Submit manufacturers installation instructions for products used.
- D. Submit a list of at least five (5) similar installations of the product during the last 5 years.

1.5 QUALITY ASSURANCE

- A. The grout manufacturer shall be ISO 9001 certified and have been in business of manufacturing similar products for over ten (10) years. The manufacturer shall maintain a strict quality assurance program, offer technical services and provide a representative at the jobsite for product training, prior to product installation, upon written request.
- B. Conform to Army Corps of Engineers Specification CRD-C621 and ASTM C1107/C1107M (Grades B or C).
- C. Grouts shall exhibit non-shrink characteristics when tested according to ASTM C827.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver in original sealed packages or containers, labeled with the manufacturer's identification, printed instructions and batch code.
- B. Store in dry conditions above freezing and below 90°F.
- C. Keep unused portions of opened containers dry and warm.

- D. Store aggregate covered and protected from the elements.

## 1.7 ENVIRONMENTAL CONDITIONS

- A. Do not place grout when exposed to precipitation.
- B. Place grout when temperature of substrate and ambient air are above 40°F and below 90°F.
- C. Place grout outside these limits when approved by heating substrates, enclosing work, shading, cooling or other measure to mitigate adverse weather conditions.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cementitious grout: consists of premeasured, prepacked flowable cement based grouting material with aggregate requiring only the addition of water.
- B. Epoxy grout: consists of premeasured, prepacked epoxy based grouting material consisting of an epoxy resin, hardener and specially blended aggregates. The ratio of the weight of aggregate to the weights of the combined resin and hardener (fill ratio) shall be maintained.
- C. Aggregates: ASTM C33/C33M fine aggregate, washed.
- D. Pea Stone: ASTM C33/C33M coarse aggregate, size number 8 (max. size 0.375 inches), washed.
- E. Water: Potable, from municipal water supply.
- F. Epoxy resins shall not contain non-reactive diluents. Resins containing butyl glycidyl ether (BGE) or other volatile and hazardous diluents are not permitted.
- G. Utilize proper grout for the intended application as recommended by the manufacturer.

### 2.2 TESTS

- A. All grouts shall achieve a minimum 28 day strength of 6,000 psi according to ASTM C109/C109M.
- B. Grouts when tested by flow cone according to CRD-C 611 shall take more than 20 seconds to flow as a maximum limit on fluidity.
- C. Test grout when requested.

### 2.3 ACCEPTABLE PRODUCTS

- A. Cementitious Grout
  - 1. Five Star Grout - Five Star Products, Inc
  - 2. Masterflow 928 - BASF / Master Builders
  - 3. NS Grout - Euclid Chemical Company
  - 4. Crystex - L&M Construction Chemical, Inc.
  - 5. Harris Construction Grout – A.H. Harris & Sons, Inc.
  - 6. Or equal
- B. Epoxy Grout
  - 1. HP Epoxy Grout - Five Star Products, Inc.
  - 2. Masterflow 648 CP Plus - BASF / Master Builders
  - 3. E3-HP - Euclid Chemical Company
  - 4. EpogROUT 758 - L&M Construction Chemicals, Inc.

5. Or equal

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Unless otherwise indicated, Follow manufacturer's written instructions.
- B. Concrete surfaces shall be a minimum 28 days old.
- C. Completely remove all loose concrete, aggregate, dust, laitance, dirt, oil, grease and other contaminants by bush-hammering, chipping, brushing, concrete cleaners or degreasers.
- D. Use acceptable mechanical means to obtain clean, sound and rough concrete surfaces, exposing coarse aggregate. Blow surfaces clean of dust and debris using oil-free compressed air.
- E. Surface moisture:
  - 1. Cementitious grout: Soak concrete surfaces thoroughly for a minimum of 8 hours with potable water. Concrete shall be saturated and free of standing water at time of grout placement.
  - 2. Epoxy grout: Do not pre-soak concrete surfaces prior to grout placement. Surfaces shall be visibly dry.
- F. Follow manufacturer's cold and hot weather grouting procedures to maintain all materials and surfaces that contact grout within acceptable temperature ranges. Heat the substrate and surrounding environment to a minimum of 40° F.

3.2 FORMS

- A. Formwork shall be constructed of rigid nonabsorbent materials, securely anchored, watertight and strong enough to resist forces developed during grout placement.
- B. Formwork shall be constructed so that the grout is placed across the shortest distance whenever possible. The clearance between formwork and baseplate shall be sufficient to allow for headbox. The clearance for remaining sides shall be one to three inches.
- C. Height of formwork shall extend a minimum of one inch above the highest point to be grouted.
- D. All formwork shall be coated with a form release agent or plastic sheeting for easy removal. Care should be taken not to contaminate grouting surfaces where bond is required.

3.3 MIXING

- A. Provide an adequate number of mortar mixers in good operating condition for uninterrupted placement. Do not exceed one-half the maximum capacity of the mortar mixer.
- B. Cementitious grout:
  - 1. Pre-wet mortar mixer directly prior to mixing. Empty excess water.
  - 2. Start by adding the minimum amount of premeasured potable water to mixer. While mixing, slowly add grout and mix to a uniform consistency.
  - 3. Mix thoroughly for approximately four to five minutes. To achieve desired consistency, add remaining water as necessary. Do not exceed maximum water content as stated on product packaging or add an amount that will cause segregation.

4. For pours requiring aggregate extension, add clean, damp coarse aggregate before final water adjustment.
  5. Do not mix more material than can be placed within the working time of the grout. Do not retemper the mix by adding additional water.
- C. Epoxy grout:
1. Combine resin and hardener into pail containing resin. Mix thoroughly by hand with a paddle or by slow speed mixer until a uniform color (no streaks) is obtained. Avoid air entrapment while mixing. Immediately pour all mixed liquids into mortar mixer. While mixing at a slow speed, slowly add aggregate and mix only until aggregate is completely wet.
  2. Do not mix more material than can be placed within the working time of the grout.

### 3.4 PLACING

- A. Pouring (Cementitious and Epoxy Grout):
1. A headbox or similar device is required for a continuous pour to avoid air pockets under baseplate. All grouting shall take place from one side to the other, maintaining contact with the bottom of the plate at all times.
  2. When pouring through grout holes, placement shall proceed continuously with a headbox until the grout has risen in the next hole. Maintain head pressure at initial hole so that grout stays in contact with the bottom of the baseplate at all times.
  3. Commence grouting at the next hole with an additional headbox. Continue process, alternating headboxes until grouting is complete.
  4. When pouring into the headbox, grout shall be introduced in a manner to avoid air entrapment. Care must be taken during grouting to keep the headbox at least half full of material to ensure even grout flow. If necessary to assist the flow, a plunger may be used. This procedure shall continue until the grout rises above the bottom edge of the baseplate on the opposite side.
  5. Throughout the pour, forms shall be constantly checked for leaks. All leaks shall be sealed immediately.
- B. Pumping (Cementitious Grout):
1. The type and size of pump and discharge line used are dependent on the parameters of each installation. Contact the pump and grout manufacturers for recommendations.
  2. Pumping raises the grout temperature and shortens the working time while reducing its consistency. Keep mix temperature as cool as necessary, except in cold weather.
  3. The grout shall be mixed to a consistency that will not segregate while pumping.
  4. The grout shall be passed through a #4 screen prior to placement into the pump hopper.
  5. Before pumping, determine the working time under jobsite conditions. Pumpability shall be determined by field testing.
  6. The pump shall be positioned to minimize the pumping distance. Keep the discharge line as close to horizontal as possible. All hose connections must be watertight.

7. Immediately prior to pumping, the pump and lines shall be primed with a priming slurry leaving hopper empty to prevent overwatering.
  8. Once the pumping has begun, it is important not to use any of the priming slurry from the discharge lines. Grout shall not be used until a uniform consistency is obtained at the discharge nozzle.
  9. Provide an adequate volume of mixed grout to keep the pump hopper at least half full. The grout shall be placed into pump hopper in a manner to prevent air entrapment.
  10. The discharge nozzle shall be withdrawn only while pumping, keeping it submerged within the grout at all times.
  11. When a pump is needed to transport grout and the nozzle cannot be inserted into the cavity being grouted, a headbox is required. The headbox will allow the pour to be continuous, avoiding air pockets under the plate. The grout shall be discharged from the nozzle into the headbox in a manner to avoid air entrapment. The headbox shall be kept at least half full at all times.
  12. All grouting shall take place from one side of the plate to the other. Maintain contact with the bottom of the plate at all times to maximize the effective bearing area (EBA).
  13. When pouring through grout holes, placement shall proceed continuously until the grout has risen in the next hole. Maintain head pressure at initial hole so that grout stays in contact with the bottom of the baseplate at all times. Commence grouting at the next hole with an additional headbox. Continue process, alternating head boxes until grouting is complete.
- C. Dry pack (Cementitious Grout):
1. A dry-pack consistency is achieved when the mixed grout can be squeezed into a ball by hand without crumbling. Only enough water should come to the surface to moisten the hands.
  2. Use a ram with a square cut end and hammer to evenly compact the grout against solidly braced backing boards, combining each layer (approximately 1/2 inch thick) to the previously placed layer over its entire surface.
  3. Each placed layer shall be visually inspected for placement uniformity.
  4. Striking force should be sufficient for compaction of the grout without affecting plate alignment.
  5. Placement shall be continuous until grouting is complete.

### 3.5 FINISHING AND CURING

- A. Finishing:
1. Cut grout back from bottom of baseplate to the foundation at approximately a 45° angle. Formwork can be removed for cutback when grout offers stiff resistance, or when cut with a steel trowel, stands up without support. Epoxy grout may be finished flush with the edge of the base plate.
  2. Provide smooth finish to exposed grout surfaces.
  3. Grout shall not be allowed to remain above the bottom edge of the baseplate.
- B. Curing:
1. Cementitious grout shall be moist cured for a minimum of three days. Epoxy grout does not require curing agents.

2. Cementitious Grout shall be protected from excessive evaporation with wet rags prior to set.
3. Grout shall be protected from wind, rain, freezing and vibration until a minimum compressive strength of 1000 psi is achieved.
4. Maintain temperature above 45° F until a minimum compressive strength of 1000 psi is achieved.

END OF SECTION

## SECTION 15094

### PREFABRICATED PIPE HANGERS, SUPPORTS AND BRACING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Design, furnish and install prefabricated pipe hangers, supports, and braces to support pipes, maintain the necessary pitch, minimize vibration, prevent movement, and allow expansion and contraction of the pipes shown on the Drawings, as specified in Section 15050, as specified herein and as referenced. Supports shall be designed for all tributary gravity loads and lateral loads from operating pressures, seismic forces, and startup/shutdown water hammer thrust. This Specification covers hangers, supports, and braces for process and mechanical piping systems including ductile iron, carbon steel, galvanized steel, stainless steel, fiberglass, PVC and copper piping.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Requirements Specified Elsewhere: Additional requirements are specified elsewhere including, but not limited to General Conditions, Supplementary Conditions, and Division 1.
1. Section 15050 – Pipe & Pipe Fittings – General

##### 1.3 REFERENCES

- A. This section contains references that are applicable to this Specification Section. The applicable edition of the indicated references shall be the version that was the most current at the time of the Advertisement of Bids.
- B. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
1. MSS SP-58 Pipe Hangers and Supports – Materials, Design and Manufacture
  2. MSS SP-69 Pipe Hangers and Supports – Selection and Application
  3. MSS SP-89 Pipe Hangers and Supports – Fabrication and Installation Practices
  4. MSS SP-90 Guidelines on Terminology for Pipe Hangers and Supports
- C. ASTM A123/A123M - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron & Steel Products
- D. ASTM A153/A153M - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- E. ASTM C881/C881M - Specification for Epoxy-Resin-Base Bonding Systems for Concrete



- F. ASCE 7 – Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers – Version identified on the Drawings
- G. Building Code of the Project State – Version identified on the Drawings.

#### 1.4 DESIGN REQUIREMENTS

- A. Contractor shall provide all necessary hangers, supports and braces as needed to provide a fully functional and adequately supported and restrained system.
- B. Prefabricated pipe supports shall be provided for all pipes shown on the Contract Drawings. Unless otherwise indicated, the terms “pipe support”, “pipe hanger” and “pipe guide” shall refer to prefabricated pipe supports, hangers, guides, and braces specified herein.
- C. The term “Pipe Support Design Engineer” shall refer to the Professional Engineer hired by the General Contractor to design the pipe support system.
- D. All structural steel pipe support frames and shop fabricated pipe support assemblies shown on the Contract Drawings are specified elsewhere and not required as part of this Specification.
- E. Pipes supports shall be classified as one of the following:
  - 1. Type 1 – Supported from an overhead structural member using overhead hangers, guides, clevises, rollers, clamps or other means as specified herein.
  - 2. Type 2 - Supported from a structural member below the pipe using guides, rollers, clamps, saddles or other means as specified herein.
  - 3. Type 3 – Supported from an adjacent wall or other vertical structural member using brackets with either Type 1 supports or Type 2 supports or other means as specified herein.
  - 4. Type 4 – Miscellaneous Pipe Hangers, Supports and Braces not specifically identified above.
  - 5. Additionally, each pipe support shall be classified as one of the following based on function:
    - a. Type S - Simple Support
    - b. Type G - Guide Support
    - c. Type F - Fixed Support
- F. Where flexible joints or couplings are indicated on the Contract Drawings at equipment, tanks, etc., the end opposite to the piece of equipment, tank, etc., shall be rigidly supported, to prevent transfer of system forces to the equipment. No fixed or restraining supports shall be installed between a flexible joint or coupling and the piece of equipment.
- G. All pipe and appurtenances connected to the equipment shall be supported in a manner to prevent any strain or load from being imparted on the equipment or piping system.
- H. Pipe supports shall be provided to minimize forces through valves, split and sleeve type couplings, flexible expansion joints and to minimize all pipe forces on equipment housings. Equipment housings shall not be utilized to support connecting pipes.
- I. Unless otherwise indicated on the Drawings, maximum hanger and support spacing shall not exceed the following:
  - 1. Copper Pipe:
    - a. 1” diameter and smaller – 5 feet
    - b. 1 1/4”, 1 1/2” and 2” diameter – 7 feet
    - c. Greater than 2” diameter – 9 feet

## PREFABRICATED PIPE HANGERS, SUPPORTS AND BRACING

2. Steel and Stainless Steel Pipe:
    - a. 2" diameter and smaller – 7 feet
    - b. 2 ½" - 4" diameter – 11 feet
    - c. 5" – 8" diameter – 16 feet
    - d. Greater than 10" diameter – 22 feet
  3. Ductile and Cast Iron Pipe:
    - a. All diameters – 10 feet
  4. PVC and FRP Pipe:
    - a. Hanger and support spacing shall be as recommended by the pipe manufacturer based on pipe size and service temperature. Individually supported PVC pipes shall be supported as recommended by the manufacturer except that support-spacing shall not exceed 3-feet.
  5. The maximum support spacings listed above are based on the specific pipes being full of liquid without any additional vertical loads or thrusts. The actual required support spacings may be limited to the hangers selected or the presence of additional loads.
  6. Supports shall be spaced such that the resulting concentrated load at any suspended (Type 1) support does not exceed 2,000 pound maximum and combined load shall not exceed 25 pounds per square foot over each slab panel the supports extend into, or as indicated on the Structural Drawings.
  7. Pipe alignment guides shall not be used as vertical support of the piping.
  8. Wall penetration sleeves (link-seal type or equivalent) shall not be used as support of the piping.
- J. Contractor shall provide pipe supports at the following locations:
1. At all locations indicated on the Contract Drawings.
  2. At all locations such that the maximum support spacing listed above are not exceeded.
  3. At all locations such that the allowable load capacity of the prefabricated hangers are not exceeded.
  4. At the end of all pipe runs.
  5. At all changes in pipe direction greater than 22 degrees.
  6. Within 1 foot of all valves, couplings, expansion joints and pipe joints.
  7. All other locations deemed necessary by the Contractor, Pipe Support Design Engineer or pipe manufacturer.
  8. Spaced such that the deflection in the pipe under operating conditions does not exceed  $L/360$ , where L is the distance between supports.

- K. All drilled anchors used in suspended Type 1 and Type 3 pipe supports shall meet the following requirements:
  - 1. All supports shall have a minimum of 2 anchors per support.
  - 2. Anchors shall be sized such that the ultimate capacity of the anchor is a minimum of 5 times greater than the anticipated design forces (Minimum Factor of Safety of 5).
  - 3. Anchors shall have a minimum embedment depth of 6 inches, minimum spacing of 6 inches and a minimum edge distance of 6 inches.
  - 4. Concrete anchors shall either be the epoxy adhesive or expansion anchor type, except expansion anchors are not permitted in exterior or wet service applications.
  - 5. Masonry anchors shall either be the epoxy adhesive or expansion anchor type, except expansion anchors are not permitted in exterior or wet service applications. Masonry cells shall be grouted at the anchors. Drop-in, Toggle or epoxy anchors with screen tubes shall not be permitted.
- L. All pipe supports shall be designed for the following loads:
  - 1. Dead loads (including cement lining, insulation, etc)
  - 2. Liquid Density – use a liquid specific gravity of 1.10 for water, wastewater and sludges and use the appropriate liquid specific gravity for chemicals, unless otherwise noted
  - 3. Operational Thrust – refer to Pipe Schedule for change in operating pressure
  - 4. Water Hammer Thrust refer to Pipe Schedule and the Drawings for necessary information
  - 5. Thermal forces – refer to Pipe Schedule for change in operating temperature
  - 6. Wind Load – In accordance with ASCE 7. Refer to the Structural Drawings for wind design parameters
  - 7. Snow Load – In accordance with ASCE 7. Refer to the Structural Drawings for snow design parameters
  - 8. Ice Load – In accordance with ASCE 7

## 1.5 SUBMITTALS

- A. Submit a complete set of shop drawings of all items to be furnished under this Section and as required by Section 01340 and 15050.
- B. Technical submittals for all projects shall include the following information:
  - 1. Layout drawings with all pipe supports clearly labeled, located, and coordinated with the tabulated list noted below. Layout drawings shall include both Plan and Section views with the pipe supports clearly labeled in each view. All pipe layout changes proposed by the General Contractor shall be incorporated in the layout and identified as a proposed modification. Layout drawings shall address gravity loads and dynamic loads including thermal effects, pressure thrusts and seismic forces.
  - 2. Summary of Pipe Hangers, Supports and Bracing: Submit a tabulated list of pipe support information which includes the following information at a minimum:
    - i. Hanger/Support/Brace Number
    - ii. Location
    - iii. Pipe Diameter (nominal ID)

- iv. Pipe centerline elevation
  - v. Pipe material
  - vi. Additional dead weight (Cement lining, insulation, etc)
  - vii. Lineal foot dead weight of pipe
  - viii. Contents of pipe
  - ix. Total lineal foot weight (dead weight and live weight)
  - x. Length of pipe tributary to support
  - xi. Total gravity and dynamic load at support
  - xii. Type of support (as identified in Section 1.3.B above)
  - xiii. Fixity of support (as identified in Section 1.3.B above)
  - xiv. Structure supporting pipe support (Section 1.3.F above)
- 3. Representative catalog cut for each different type of pipe hanger, brace, or support indicating the materials of construction, material finishes, pipe sleeve or insulation information, protective shields, important dimensions and range of pipe sizes for which that hanger is suitable. Where standard hangers and/or supports are not suitable, submit detailed drawings showing materials and details of construction for each type of special hanger and/or support.
  - 4. Representative catalog cuts for accessories (e.g., threaded rod, insulation shields and saddles, never-seize compound, etc.)
  - 5. Letter from the General Contractor stating that the following has been coordinated:
    - i. Each pipe support system will not interfere with the other pipe support or seismic bracing systems.
    - ii. Components from the pipe support systems shall not extend within any means of egress or walking pathways in building spaces or at tanks.
    - iii. Components from the pipe support systems shall not interfere with the normal maintenance or operation of a component or equipment.
    - iv. The manufacturer has reviewed the proposed supports and taken no exception.
- C. Supplemental technical submittals for projects which require a Pipe Support Design Engineer, as identified in Section 15050, shall include the following information:
    - 1. Completed Certificate of Design (included at the end of this Section).
    - 2. Dead weight and dynamic load analysis, including system thermal effects and pressure thrusts. Computer-based software system equivalent to ADLPIPE or Autopipe . Each piping system shall be presented in an isometric graphic and shall show the resolved and resultant force and moment systems, as well as all recommended hangers, supports, anchors, restraints and expansion/flexible joints.
    - 3. After the work is installed, but before it is filled for start-up and testing, the Pipe Support Design Engineer shall inspect the work and shall certify its complete adequacy. Submit documentation for each piping system to demonstrate the inspection and certification of adequacy.
  - D. After the installation is completed and certified, submit as-built drawings for record purposes.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. All uninsulated non-metallic piping such as PVC, CPVC, etc., shall be protected from local stress concentrations at each support point. Protection shall be provided by pipe insulation shields or other methods after review with no exceptions taken by the Engineer. All shields shall cover the pipe where it is in contact with the support.
- B. All insulated pipe shall be furnished with a pipe insulation shield and/or saddle at each pipe support location as specified herein.
- C. Where pipe hangers and supports come in contact with copper piping, provide protection from galvanic corrosion by wrapping pipe with 1/16-inch thick neoprene sheet and galvanized protection shield; isolators similar to Eleen, Figure No. 228; or PVC-coated hangers and supports. All stainless steel piping shall be isolated from all ferrous materials, including galvanized steel, by use of neoprene sheet material and protection shields, similar to above methods.
- D. Pipe supports PVC piping:
  - 1. Pipe supports for multiple PVC plastic piping shall be continuous wherever possible.
  - 2. Multiple, suspended, horizontal plastic PVC pipe runs, where possible, shall be supported by ladder type cable trays.
  - 3. Ladder shall be of galvanized steel construction.
  - 4. Rung spacing shall be 12 inches.
  - 5. Tray width shall be approximately 6 inches for single runs and 12 inches for double runs.
  - 6. Ladder type cable trays shall be furnished complete with all hanger rods, rod couplings, concrete inserts, hanger clips, etc., required by a complete support system.
  - 7. Acceptable manufacturers:
    - a. Electray Ladder by Husky-Burndy;
    - b. Globetray by the Metal Products, a division of United States Gypsum,
    - c. Or equal.
  - 8. Individual plastic pipes shall be secured to the rungs of the cable tray by strap clamps or fasteners similar to Globe, Model M-CAC; Husky-Burndy, Model SCR or equal.
  - 9. Spacing between clamps shall not exceed 9 feet. The cable trays shall provide continuous support along the length of the pipe. Individual clamps, hangers and supports in contact with plastic PVC pipe shall provide firm support but not so firm as to prevent longitudinal movement due to thermal expansion and contraction.
- E. All vertical pipes shall be supported at each floor or at intervals of not more than 12 feet (whichever is less) by approved pipe collars, clamps, brackets, or wall rests and at all points necessary to ensure rigid construction. All vertical pipes passing through pipe sleeves shall be secured using a pipe collar.
- F. Link-seal compression type wall penetration sleeves shall not be used to support static or dynamic loads. Additional supports shall be provided such that static gravity loads and horizontal dynamic loads are not transferred to these penetration sleeves.

## 2.2 MATERIALS

- A. Unless otherwise specified herein, pipe hangers and supports shall be standard catalogued components, conforming to the requirements of MSS-SP-58, MSS SP-69 and MSS SP-89.
- B. Pipe hangers, supports, braces and accessories shall be standard catalogued components as manufactured by Anvil International, Inc, Carpenter & Peterson, Inc. or equivalent (metallic pipe) or Jove (non-metallic pipe). Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product and shall not be considered as proprietary.
- C. Materials of all prefabricated pipe hangers, supports, braces and accessories (including bolts, nuts, washers) shall be as follows:
  - 1. For steel, stainless steel, ductile iron, HDPE, FRP and PVC piping:
    - a. Exposed interior spaces subjected to a damp or corrosive environment including the following spaces shall be Type 316 stainless steel.
      - i. Air Release Valve Manholes
      - ii. Drain Manholes
- D. Type 1
  - 1. Non-Metallic pipe (HDPE, FRP and PVC):
    - a. Adjustable Clevis Type (Type S):
      - i. Jove (Model FS-11)
      - ii. Or equal
    - b. Pipe Clamp (Type F):
      - i. Jove (Model FS-4)
      - ii. Or equal
- E. Type 2
  - 1. Non-Metallic pipe (HDPE, FRP and PVC):
    - a. Pipe Slide Assembly (w/ welded clamp) (Type G or F)
      - i. Jove (Model FS-8)
      - ii. Or equal
    - b. Floor Mounted Stanchions w/ Adjustable Saddles (Type S)
      - i. Jove (Model FS-7 with stanchion)
      - ii. Or equal
    - c. Concrete cradles
      - i. Provide as detailed on the Structural Drawings
- F. Type 3 (Type S) (all pipes)
  - 1. Wall Bracket
    - a. Anvil International, Inc. (Fig 194, Fig 195 or Fig 199)
    - b. Carpenter & Patterson Inc. (Fig 69, Fig 84 or Fig 139)
    - c. Or equal
    - d. Fabricated brackets may be used in lieu of pre-fabricated brackets. Material shall conform to Part C above.
- G. Accessories:
  - 1. Threaded Rods
    - i. Anvil International, Inc. (Fig 140, 142 or 146)
    - ii. Carpenter & Patterson Inc. (Fig 94 or 133)
    - iii. Or equal

2. Pipe Insulation Shield
  - i. Anvil International, Inc. (Fig 167 or Fig 168)
  - ii. Carpenter & Patterson Inc. (Fig 265GS or Fig 265P)
  - iii. Or equal
3. Pipe Insulation Saddle
  - i. Anvil International, Inc. (Figs 160-166A)
  - ii. Carpenter & Patterson Inc. (Figs 351-357Z)
  - iii. Or equal
4. Anti-seize compound
  - i. Never Seez by Bostik, Inc.
  - ii. Or equal
- H. Miscellaneous Pipe Hangers, Supports and Braces (Type 4 or Custom):
  1. Contractor shall provide additional hangers, supports and braces as required that are not classified as Types 1, 2 or 3 above.
  2. Materials shall conform to Part C above.
- I. Concrete Anchorage:
  1. Epoxy anchors. ASTM C881, non-expanding, two-component epoxy resin with AISC Type 316 Stainless Steel threaded rod with washer nut. Manufactured by Hilti Fastening Systems (HIT RE500SD); Ramset Fastening Systems (Chemset Capsule Series); Power Fasteners (T308 Plus); or equivalent.
  2. Expansion anchors. Stainless steel AISI Type 316 for galvanized and aluminum fabrications; cadmium plated for painted steel fabrications. Manufactured by Hilti Fastening Systems (Kwik Bolt III); Ramset Fastening Systems (Tru Bolt Stud Anchor); Power Fasteners (Power Stud); or equivalent.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install prefabricated hangers and supports in accordance with the pipe support shop drawings, in accordance with MSS SP-89 and as specified herein. Deviations from the shop drawings shall not be permitted without written approval from the Pipe Support Design Engineer.
- B. Hangers shall be used for their intended purpose only. They shall not be used for rigging or erection purposes.
- C. General Contractor shall coordinate the installation of field run conduit, piping and other utilities to avoid interference with the pipe supports.
- D. All pipe supports shall include features to permit adjustments of pipe elevations. Once all piping is properly aligned and at the correct elevations, the supports shall be locked into place. Locking nuts, cotter pins, temporary locking devices and other locking means should be properly engaged. Tack welding shall not be utilized to lock supports in place.
- E. Type 1 hangers using threaded rods shall be attached to the building structure or supplemental framing. Connections to the building structure shall be with beam clamps, welded angles or embedded concrete weld plates or threaded inserts.
- F. Install all drilled anchors in accordance with the anchor Manufacturer's instructions.
- G. Secure Type 2 pipe support to structural supporting member. All pipe supports shall be rigidly anchored to their structural supporting members.
- H. PVC Piping and Fiberglass Piping: Support in strict accordance with the manufacturer's instructions and recommendations for the conditions of operation, temperature and size of pipe. Support in a manner which will prevent subsequent visible sagging of the pipe between supports due to plastic deformation.
- I. All surfaces of steel and aluminum in contact with or embedded in concrete or masonry shall be coated with epoxy paint (min 5 mils dry film thickness).
- J. Drain, waste, and vent piping: Support by adjustable hangers.
- K. Valves, Fittings & Specialties: Independently support pipe connected to pumps, equipment and piping systems.
- L. Temporary pipe supports:
  - 1. General Contractor shall be responsible for providing all temporary pipe supports and rigging.
  - 2. Lay out each section of pipeline and make connections while the pipe is held in temporary supports.
  - 3. After the completion of connections in each section of pipeline, hold the section in place with temporary clamps.
  - 4. Do not remove the temporary clamps until the piping is correctly installed on the permanent supports.

### 3.2 TESTING

- A. All permanent pipe supports shall be installed prior to testing.
- B. Demonstrate compliance with the requirements of this section with respect to support, pitch, vibration, movement, and expansion and contraction during start-up testing of the equipment and associated piping systems as indicated in Section 01800.



## PREFABRICATED PIPE HANGERS, SUPPORTS AND BRACING

- C. Systems which do not meet the requirements of this section with respect to support, pitch, vibration, lateral movement, and expansion and contraction shall be supplemented with additional braces as required and re-demonstrated until compliance is achieved.

### 3.3 COATINGS

- A. Provide shop coatings in accordance with Section 09905.
- B. Provide field coatings for steel items in accordance with Section 09900.
- C. Provide touch-up field galvanizing for hot dipped galvanized items in accordance with Section 09900.
- D. Provide field coatings on surfaces with dissimilar metals. Utilize epoxy paint (minimum 5 mil thickness) in accordance with Section 09900.
- E. Provide temporary support or bracing as necessary to allow complete and continuous coats.

END OF SECTION

## SECTION 15100

### VALVES & SPECIALTIES – GENERAL

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Furnish, install, support, and test valves, gates, hydrants, cocks, stops, and faucets, when applicable, (hereinafter referred to as "valves") in the location(s) and of the size(s) and quantities shown on the Drawings and/or as specified herein.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Requirements Specified Elsewhere: Additional requirements are specified elsewhere including, but not limited to General Conditions, Supplementary Conditions, and Division 1.
  - 1. Section 01010 – Summary of Work (construction sequencing requirements that affect number and duration of equipment startups and certifications)
  - 2. Section 01340 – Submittals
  - 3. Section 01600 – Delivery, Storage and Handling
  - 4. Section 15050 – Pipe & Pipe Fittings – General
  - 5. Section 15094 – Prefabricated Pipe Hangers, Supports and Bracing
  - 6. Valves specified in Division 15.

##### 1.3 QUALITY ASSURANCE

- A. Provide valves of proven reliability manufactured by reputable manufacturers.
- B. Acceptable manufacturers are listed in each section of this Division. Substitute or "or-equal" valves will be allowed only when indicated.
- C. All valves in contact with potable water, or water being processed to become potable water, shall be NSF 61 compliant and shall be constructed of "Lead-free" material in compliance with NSF 372.

##### 1.4 SUBMITTALS

- A. Provide shop drawings in accordance with the requirements of the General Conditions, Section 01340 and as specified herein. Shop drawings shall contain the following information at a minimum:
  - 1. Completed Submittal Certification Form. Shop drawing submittals will be returned unreviewed without this form.
  - 2. Certified shop drawings.
  - 3. Manufacturer's literature and illustrations for all equipment to be installed to supplement certified shop drawing information.
  - 4. Short-term and long-term storage requirements.
  - 5. Seismic analysis, design and calculations as specified herein.
  - 6. Shop preparation and shop coatings.
  - 7. Proposed valve identification tag information

- B. Provide Operation and Maintenance Manuals in accordance with the requirements of Section 01340.

#### 1.5 DELIVERY AND HANDLING

- A. Shipping:
  - 1. Prepare valves and accessories for shipment as required for complete protection.
  - 2. Seal valve ends to prevent entry of foreign matter into valve body.
  - 3. Box, crate, completely enclose, and protect valves and accessories from accumulations of foreign matter.
- B. Storage:
  - 1. Store valves and accessories in an area on the construction site protected from weather, moisture, or possible damage.
  - 2. Do not store valves or accessories directly on the ground.
- C. Handling: Handle valves and accessories to prevent damage of any nature to the interior and the exterior surfaces.

#### 1.6 INSPECTION

- A. Carefully inspect all materials for:
  - 1. Defects in workmanship and materials.
  - 2. Removal of debris and foreign material in valve openings and seats.
  - 3. Proper functioning of all operating mechanisms.
  - 4. Tightness of all nuts and bolts.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Materials are specified in appropriate Sections in this Division.
- B. The specifications direct attention to certain required features of the valves and gates but do not purport to cover all details entering into their design and construction. Nevertheless, the Contractor shall furnish the valves and gates complete in all details and ready for operation for the intended purpose.

#### 2.2 BOLTS, ANCHOR BOLTS AND NUTS

- A. Furnish all necessary bolts, anchor bolts, nuts, washers, lock washers or locking nuts, plates and bolt sleeves in accordance herewith. Anchor bolts shall have suitable washers, lock washers and, where so required, their nuts shall be hexagonal.
- B. All bolts, anchor bolts, nuts, washers, lock washers, plates, and bolt sleeves shall be carbon steel unless otherwise indicated below or as specified elsewhere.
  - 1. Stainless steel hardware (minimum of Type 304, unless otherwise indicated) is required in all corrosive atmospheres, exterior areas, and/or areas with NEMA 4X or NEMA 7 rating.

2. Stainless steel hardware (minimum of Type 316, unless otherwise indicated) is required in all submerged applications as well as in wetwells, headworks, dewatering rooms, chemical rooms, clarifiers, aeration basins, splitter structures, equalization or storage tanks, high chloride conditions, etc. For additional description and definition of submerged surfaces refer to Specification Section 09900.
- C. Unless otherwise specified, stud, tap, and machine bolts shall be of the best-quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to AN Standard B 1.1-1974 for Unified Inch Screw Threads (UN and UNR Thread Form).
- D. All bolts shall be suitable size for the intended purpose, with direct input from the product manufacturer.

### 2.3 SURFACE PREPARATION AND SHOP COATINGS

- A. Provide surface preparation and shop coatings in accordance with the applicable section of Division 9.

### 2.4 VALVE LOCK-OUT/ TAG-OUT HARDWARE

- A. Provide accessory hardware for the purpose of locking out valves utilizing standard padlock. Lockout hardware shall be provided [ for all valves provided for the project. /for specific valves, where indicated on the Drawings or specified elsewhere.

### 2.5 VALVE ACTUATORS

- A. Unless otherwise specified or shown on the Drawings, all valves shall be manually actuated. All valves shall have an operating handwheel or a handle/lever mounted on the operator. Valves with operating nuts shall be of non-rising stem design and be provided with an AWWA 2 inch square operating nut. The valves shall be provided with handwheel actuators on all manually actuated valves 8 inch and larger in size unless otherwise specified or shown on the Drawings.
- B. The valve Manufacturer shall supply and factory mount all actuators; including any type of manual or powered actuators. The valves and actuators shall be shipped as a single unit. All valve actuators shall be sized to operate the associated valve for the full range of pressures and velocities. Position indicators shall be provided for all interior valves.
- C. The force in a manual actuator shall not exceed 40 pounds of rim-pull under any operating condition, including initial breakaway. The actuator shall be equipped with gear reduction when force exceeds 40 pounds of rim-pull. All manual actuators shall be self-locking type or shall be equipped with a self-locking device. The actuators shall be capable of moving the valves from a fully open to a fully closed position and a fully closed position to a fully open position. The actuator shall be capable of holding the valve at any position in between the fully open and fully closed positions. A position indicator shall be supplied on quarter-turn valves. Each actuating device shall have the word "OPEN" permanently cast as well as an arrow indicating the direction of operation. Handwheels shall be cast iron or cast aluminum.

- D. Unless otherwise specified or shown on the Drawings chainwheel actuators shall be provided for all valves 3 inches and larger with the valve center line located 6 feet or greater above the operating floor. All chainwheel actuators shall be provided complete with chain guides and hot dipped galvanized or cadmium-plated steel chain. The chain loop shall extend to within 4 feet from the operating floor level. Where chains hang in normally traveled areas, appropriate "L" type tie-back anchors shall be used.
- E. All chainwheel actuators of the same type, style, and duty shall be supplied by a single Manufacturer. Where applicable and whenever possible, chainwheel actuators shall be provided by the Manufacturer of the valve being served.

## 2.6 GEAR ACTUATORS

- A. Unless otherwise specified or shown on the Drawings, all valves larger than 6 inches shall be provided with gear actuators (totally enclosed type). All manually actuated valves with a rim pull greater than 40 ft-lbs shall also be provided with gear actuators. Worm and gear actuators shall be a one-piece design with worm-gears of gear bronze or machine cut steel material. Worm shall be hardened alloy steel with the thread ground and polished. Traveling nut type actuators shall have threaded steel reach rods with an internally threaded bronze or ductile iron nut.
- B. The output shaft shall be perpendicular to the valve shaft and be provided with a removable handwheel. Unless otherwise noted or specified all gear actuators shall conform to AWWA C504 standards. All gear actuators shall be removable from the valve without removing the valve from the line or dismantling the valve.
- C. All gear actuators shall indicate the valve position and have adjustable stops. The maximum handwheel size shall be 24 inches in diameter. All position indicators shall be of the embossed, stamped, engraved, etched, or raised types.
- D. Unless otherwise specified or shown on the Drawings, all gear actuated valves 3 inches and larger shall be provided with position indication at the point of operation. Valves smaller than 3 inches shall have position indication on their respective handwheels or lever actuators.

## 2.7 FLOOR STANDS

- A. Provide floor stands where required on the Drawings.
- B. Floor stands shall be of the non-rising stem, indicating type, and designed for counterclockwise operation. The distance from the base flange to the handwheel shall not be less than 34".
- C. The pedestal shall be cast of ductile iron grade 65-45-12 and meet ASTM-A536. The pedestal shall have a vertical indicating slot. The word "OPEN" shall be cast in the pedestal at the top of the indicating slot. A "CLOSED" tag will be field mounted to the pedestal, to indicate the closed position of the valve. A bronze indicator shall travel on a carbon steel threaded stem to indicate the position of the valve.
- D. The stem shall be Xylan coated to prevent corrosion.
- E. The floor stand shall be coated in a two-part epoxy for corrosion resistance.
- F. Where a floor is not directly over the valve and extension stem, the floor stands shall be supported by a ductile iron wall bracket mounted to the side wall. Wall brackets shall contain a carbon steel plate designed to support the floor stand.

- G. Stem guides with corrosion resistant bushing shall be provided as recommended by the floor stand Manufacturer.
- H. Provide intermediate shaft supports as recommended by the Manufacturer based on shaft length.
- I. The floorstand shall be operated by a cast iron handwheel of no less than 12" in diameter.
- J. Floorstands shall be as manufactured by:
  - 1. Trumbull Industries, Youngstown, Ohio.
  - 2. Troy Valve, Troy, Pennsylvania.
  - 3. Or Equivalent

## 2.8 VALVE IDENTIFICATION TAGS

- A. All valves in piping including individual valves provided with equipment shall be tagged in accordance with that shown on the Drawings. The tags shall be provided with identifying numbers and letters to match those shown on the Drawings. Identification tag numbering shall be reviewed/confirmed with the Engineer and Owner through the submittal process prior to ordering any tags. Refer to Section 11000 for additional information regarding valve tagging.
- B. All identification tags shall be provided with sufficient lengths of chain for attachment to the respective valve.
- C. Tags shall conform to the following specifications:
  - 1. The tags shall be 2.5-inch diameter, 1/16" thick, rigid, multi-layered sandwich laminate with contrasting inner and outer colored acrylic plastic layers. Top hole size is 5/32" for hanging tags.
  - 2. Tags shall be available in 7 different outside colors. Owner and Engineer shall select up to 4 different colors for the project.
  - 3. Tags shall have up to three lines engraved on a side and eight characters per line of identification information. Tags shall be engraved one side.
  - 4. Tags shall be secured to valves with nylon cable ties or adjustable metal bead chain. Securing method shall be selected by the Owner and Engineer.
  - 5. Tags secured to equipment shall be fastened to a flat visible surface by a minimum of two SS screws or SS pop rivets.
  - 6. Tags shall have a service temperature of -40°F to 175°F
  - 7. Manufactured by Seton Name Plate Corporation, New Haven, CT, Brimar Industries, Garfield, NJ or equal.
- D. All buried valves shall be provided with tags embedded in a concrete pad surrounding the valve box.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install valves and accessories in strict accordance with manufacturer's instructions and recommendations, as shown on the Drawings and/or as specified herein.

- B. Install valves with stems pointed up in vertical position, or horizontally on high valve for chain wheel use, but in no case with stems pointed downward of the horizontal plane. Allow sufficient room for maintenance, removal and proper operation. All valves shall be located and oriented to permit easy access to the valve operator, and to avoid interferences.
- C. Valve Orientation: The stem of a manual valve shall be installed in a vertical position when the valve is installed in horizontal runs of pipe having centerline elevations of 4.5 feet or less above finished floor, unless otherwise shown on Contract Drawings. The stem of a manual valve shall be installed in a horizontal position in horizontal runs of pipe having centerline elevations between 4.5 feet and 6 feet above the finish floor, unless otherwise shown on Contract Drawings. All manually actuated valves 3 inches and smaller shall have the valve indicators and operators located to display toward the normal operational locations.
- D. Carefully erect all valves and support them in their respective positions free from distortion and strain.
- E. Independently support all valves connected to pumps and equipment, and in piping systems that cannot support valves.
- F. Repair any scratches, marks and other types of surface damage etc. with original coating as supplied by the factory.
- G. Install valves such that "open" and "close" position indicators are easily visible.
- H. All valves (and actuators where specified) shall be installed in a manner that will provide for proper clearances and ease of operation. In addition, valve actuators must be capable of being rotated in 90° increments to facilitate field installation.
- I. Check and adjust all valves and accessories for smooth operation.

### 3.2 TESTING

- A. The Contractor shall test all valves and gates in the presence of the Engineer to demonstrate that each valve and gate complies with specified requirements and allowable leakage rates.
- B. The contractor shall test all valves visually for leaks and proper operation under pressure. The contractor shall also test the valves to ensure proper valve function and actuation.
- C. Valves may either be tested while testing pipelines, or as a separate step. It shall be demonstrated that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, and in both directions for two-way valve applications. The Contractor shall count and record the number of turns required to open and close each valve and account for any discrepancies with the Manufacturer's data.
- D. Air and vacuum relief valves shall be examined as the associated pipe is being filled to verify venting and seating is fully functional. The Contractor shall set, verify, and record set pressures for all relief and regulating valves. Self-contained automatic valves shall be tested at both maximum and minimum operating ranges, and reset upon completion of test to the design value.
- E. The contractor shall take care not to overpressure any valve and appurtenances during testing.

3.3 RETESTING

A. If the equipment does not successfully pass the tests listed above, the Manufacturer/Contractor shall repair the equipment and perform the tests again until passing the tests successfully. If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests shall be re-conducted at no additional cost to the Owner.

3.4 CLEANING

A. All items, including but not limited to all valves and valve interiors, shall be thoroughly cleaned prior to installation, testing, and final acceptance. All dirt, debris, and other foreign materials shall be removed.

3.5 FIELD COATINGS

A. In accordance with Section 09900.

END OF SECTION



## SECTION 15101

### GATE VALVES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Furnish, install and test gate valves of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Requirements Specified Elsewhere: Additional requirements are specified elsewhere including, but not limited to General Conditions, Supplementary Conditions, and Division 1.
  - 1. Section 15100 – Valves & Specialties – General

##### 1.3 QUALITY ASSURANCE

- A. All gate valves of same type and style shall be manufactured by one manufacturer.
- B. Acceptable Manufacturers: as noted herein.

#### PART 2 - PRODUCTS

##### 2.1 VALVE, LOCATION AND USE

- A. Type, location and use as shown on the Drawings.
- B. Bolts, nuts, washers, fasteners shall be as defined in Section 15100.
- C. For Water Supply Piping:
  - 1. Buried: AWWA Type, NRS.
  - 2. Exposed: AWWA Type **[OS&Y]** **[NRS]**.
- D. For General Service Piping (liquids containing solids):
  - 1. Includes plant water, and liquids containing solids.
  - 2. 2-1/2 inches and smaller: 125 bronze.
  - 3. 3 inches and larger Buried: NRS, resilient wedge.
  - 4. 3 inches and larger Exposed: **[OS&Y]** **[NRS]**.
- E. Accessories: As shown on the Drawings and required for proper operation.

##### 2.2 MATERIALS

- A. General Service - 3 inches and larger NRS valves:
  - 1. Wedge shall be constructed of ductile iron, fully encapsulated in synthetic rubber, except for guide and wedge nut areas.
  - 2. Non-rising stem (NRS).
  - 3. 125 class body.
  - 4. Meet or exceed AWWA C-509.
  - 5. Face to Face dimensions: ANSI B16.1.
  - 6. Water working pressure:
    - a. 12 inches and smaller: 200 psi.
    - b. 14 inches and larger: 150 psi.

7. End Connections
    - a. Exposed valves
      - i. Flanged and bolted joints in conformance with ANSI/ASME B16.1 and AWWA standards for appropriate pipe material.
  8. Operation:
    - a. Exposed valves
      - i. Manual – Refer to 15100
        - (1) Handwheel, Chainwheel where required based on height above operating floor.
        - (2) Floor stand actuators where indicated on the Drawings.
        - (3) Floor boxes where indicated on the Drawings.
      - ii. Automatic – Refer to 15120.
    - b. Opening Direction – counterclockwise (open left)
  9. Acceptable Manufacturers:
    - a. American Flow Control
    - b. Kennedy/McWane
    - c. Clow/McWane
    - d. Mueller
    - e. Or equal.
- B. General Service– 3 inches and larger OS&Y valves:
1. Equal in all respects to non-rising stem valve specified above under general service except as required for OS&Y operation.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install and test in accordance with Section 15100, AWWA C500 and AWWA C-509, latest revision.
- B. For horizontal piping, install valves with stem position between horizontal to vertical upward.

END OF SECTION

## SECTION 15106

### BALL VALVES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Work Included: Furnish, install and test ball valves of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

##### 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Requirements Specified Elsewhere: Additional requirements are specified elsewhere including, but not limited to General Conditions, Supplementary Conditions, and Division 1.
  - 1. Section 15100 – Valves & Specialties – General

##### 1.3 QUALITY ASSURANCE

- A. All ball valves of same type, style, and duty shall be of one manufacturer.
- B. All components in contact with potable water, or water being processed to become potable water, shall be compliant with NSF 61 and shall be constructed of “Lead-free” material in compliance with NSF 372.
- C. Acceptable Manufacturers:
  - 1. WKM Div. of ACF Industries
  - 2. Rockwood Ball Valves (E.W. Bliss Co.)
  - 3. Nibco
  - 4. Apollo
  - 5. Or equivalent.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. Type, location and use as shown on the Drawings.
- B. Bolts, nuts, washers, fasteners shall be as defined in Section 15100.
- C. General Services:
  - 1. Ball valves shall be of the non-lubricated free-floating ball type suitable for use with the applicable process fluid in the line.
  - 2. Port areas shall be full-bore (free area through valve not less than inside area of a pipe of the nominal valve size).
  - 3. Bodies shall be carbon or semi-steel suitable for 200 psi. water working pressure.
  - 4. Balls shall be made of steel, precision machined, and chrome plated.
  - 5. Valves shall be capable of seating in both directions. Seats shall be made of teflon or other acceptable material. Valves shall use upstream line pressure for effectively seating the valve.
  - 6. Stem packing shall be manually adjustable under pressure and of suitable material for the intended service.

7. Ball valves larger than 2½ inches shall have flanged ends faced and drilled in accordance with 125-lb. AN Standard.
8. Ball valves 2½ inches and smaller shall have screwed ends.
- D. Actuators (type as shown on the Drawings and specified herein):
  1. Operation
    - a. Exposed valves
      - i. Manual – Refer to 15100
        - (1) For 6-inch and smaller, level actuator. Chainwheel where required based on height above operating floor. Handwheel where valve location does not permit a level actuator.
        - (2) For 8-inch and larger, handwheel, chainwheel where required based on height above operating floor.
        - (3) Floor stand actuators where indicated on the Drawings.
        - (4) Floor boxes where indicated on the Drawings.
      - ii. Automatic – Refer to 15120.
    - b. Opening Direction – counterclockwise (open left)
- E. Accessories (When Applicable):
  1. Extension (for lever actuated valves):
    - a. Shall include extension pipe, bearing plate and couplings of the sizes as required.
  2. Extended Actuator Mounting: Supplied when actuators are extended above ground.
  3. Floor Boxes:
    - a. Iron body, size as required for valve.
    - b. Cast iron or bronze screwed cover plate.
    - c. Suitable for cast concrete floors of thickness as shown.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install valves in accordance with the "Valves and Specialties - General" Section in this Division.

END OF SECTION

SECTION 15127AIR RELEASE VALVESPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, install and test air release valves of the size (s) and the type (s) and in the location (s) shown on the Drawings and specified herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Requirements Specified Elsewhere: Additional requirements are specified elsewhere including, but not limited to General Conditions, Supplementary Conditions, and Division 1.
1. Section 15100 – Valves & Specialties – General

1.3 QUALITY ASSURANCE

- A. All air release valves, for the same service, shall be manufactured by one manufacturer.
- B. Acceptable Manufacturers:
1. Dezurik/APCO Valves
  2. Crispin
  3. A.R.I
  4. GA Industries
  5. Or equal.

PART 2 - PRODUCTS2.1 MATERIALS

- A. General:
1. All valves shall be suitable for the intended services.
  2. Valve sizing shall be as recommended by the manufacturer to suit the pressure and flow condition of each application.
  3. The valve manufacturer shall furnish installation and maintenance manuals with each valve.
- B. Sewage and Sludge Service:
1. Air valve assemblies are detailed on the drawings. All piping and fittings between the mainline pipe and air valve shall be schedule 40, 316 stainless steel pipe. All valves, including those specified below with the air valve, are to be 316 stainless steel.
  2. Air and Vacuum Release Valves:
    - a. Shall be float operated valves designed to release accumulated air or gas from a piping system while the system is in operation and under pressure.
    - b. Shall allow unrestricted venting or re-entry of air, through it, during filling or draining of the force main, to prevent water column separation or pipeline collapse due to vacuum.

- c. Valve shall incorporate one upper and one lower stainless steel float, connected by a common stainless steel float guide, thereby maintaining an air gap between the bottom float and top shut-off float. The air gap shall retard waste solids from fouling or clogging the top shut-off float.
- d. The internal baffle shall be fitted with a guide bushing and act to protect the shut-off float from direct air flow. The baffle shall retain the 45 Durometer Buna-N seat in place without distortion, for tight shut-off.
- e. Cast iron body, cover and baffle, brass internal parts.
- f. All internals shall be easily removed through the top covers without removing the main valve from the lines.
- g. Both floats shall withstand 500 psi or more.
- h. Furnished with inlet shutoff valve; outlet; blowoff/drain valve; shutoff valve with quick disconnect coupling and 5-feet of hose to permit backflushing without dismantling valve.
- i. The valve inlet shall have **2-inch N.P.T.** and the outlet **1-inch N.P.T.**
- j. Equal to Series ASC-**401** APCO sewage air and vacuum valves.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install valves in accordance with manufacturer's instructions and recommendations and as shown on the Drawings.
- B. Install all valves in the vertical position and allow sufficient clearance around valve for proper maintenance and removal.
- C. Provide gate valve between air release valve and pipeline.
- D. Inlet piping to the air valves shall be brass.
- E. The exhaust lines from the air valves shall terminate in down turned position 18 inches above the floor. For water applications, the end of the line shall be covered with a 24-mesh stainless steel screen attached with a stainless steel clamp.

END OF SECTION

**APPENDIX A**  
**Geotechnical Data Report**

GEOTECHNICAL AND ENVIRONMENTAL DATA REPORT  
FORCEMAIN AND GRAVITY SEWER REPLACEMENT  
CONCORD HEIGHTS  
CONCORD, NEW HAMPSHIRE

by  
Haley & Aldrich, Inc.  
Portland, Maine

for  
Wright-Pierce  
Bedford, New Hampshire

File No. 0208898-001  
May 2025







HALEY & ALDRICH, INC.  
75 Washington Avenue  
Suite 1A  
Portland, ME 04101  
207.482.4600

May 2, 2025  
File No. 0208898-001

Wright-Pierce  
10 Corporate Drive  
Suite 206  
Bedford, New Hampshire 03110

Attention: Kevin Garvey, P.E.

Subject: Geotechnical and Environmental Data Report  
Forcemain and Gravity Sewer Replacement  
Concord Heights  
Concord, New Hampshire

Ladies and Gentlemen:

This report presents the results of the subsurface investigation conducted for the proposed forcemain and gravity sewer replacement in Concord, New Hampshire (Figure 1, Project Locus). This work has been completed in accordance with our task order dated March 29, 2024, and your subsequent authorization.

## Elevation Datum

Elevations reported herein are in feet (ft) and reference the North American Vertical Datum of 1988. Existing ground surface elevations are shown on drawings titled "Contract Drawings for Concord Heights Sewer Collection Improvements, 30% Design Submittal" dated September 2024 provided by Wright-Pierce (W-P) on September 30, 2024.

## Existing Conditions

The project site runs along Grover Road, Pembroke Road, Branch Turnpike, and Loudon Road and ends at the proposed Steeplegate Mall pump station in Concord, New Hampshire (Figure 1).

The existing ground surface elevation along the proposed forcemain and gravity sewer replacement generally ranges from approximately Elevation (El.) 322 to El. 356. A highest elevation occurs near the southern end of Branch Turnpike and slopes gradually in both directions. A steeper slope occurs from the Steeplegate Mall access road (El. 340) to the pump station (El. 322).

## Proposed Site Development

Based on the plans provided by W-P, it is our understanding that the sewer collection improvements currently include the following:

- **Forcemain replacement:** The proposed forcemain starts at the proposed Steeplegate Mall pump station, extends to Loudon Road and Branch Turnpike, and ends at the intersection of Branch Turnpike and Hyacinth Drive. The forcemain generally slopes upward in the direction of flow (northeast to southwest) and is located 6 to 12 ft below grade. The forcemain is proposed to be approximately 3,200 ft long and consist of 10-inch-diameter high-density polyethylene (HDPE).
- **Gravity sewer replacement:** The proposed gravity sewer runs from approximately the intersection of Branch Turnpike and Hyacinth Drive to the intersection of Grover Road and Pembroke Road. The gravity sewer slopes downward in the direction of flow (from northeast to southwest) and is located 8 to 18 ft below grade. The gravity sewer is proposed to be approximately 5,700 ft long and consist of 18-inch-diameter SDR 35 (polyvinyl chloride [PVC]).

Please note that these dimensions and depths are approximate and are based on discussions with W-P and plans provided by W-P on September 30, 2024.

## Site Geology

The project site is located within the boundaries of the modern Soucook Valley and was part of glacial Lake Merrimack during the end of most recent ice age, approximately 12,000 to 10,500 years ago. The sediments from Glacial Lake Merrimack dominate the landscape as we see it today, except for Holocene age alluvium, wetland deposits, and some stream terrace deposits. The primary soil deposit mapped at the site is the Soucook deltaic deposits of the late Pleistocene age. The deltaic deposits are composed of sand and gravel and grade finer to the south. Recent test borings (borings) indicate a thin layer of artificial fill underlain by 30 to 40 ft of glaciodeltaic deposits primarily consisting of sand with varying amounts of silt and gravel.

The bedrock at the site is mapped as Concord Granite, and is Late Devonian (385 million years ago) in age depending on the location and mineral assemblages that are analyzed as part of the dating process. The unit is typically a gray two-mica granite which locally grades to tonalite. The unit is not well-exposed in the vicinity of the project site. The site is proximate to a mapped bedrock contact between the Concord Granite and the Upper part of the Rangeley Formation which is characteristically rusty-colored pelitic schist and metasandstone with common calc-silicate pods of Silurian (430 million years ago) in age.

## Subsurface Exploration Program

### PREVIOUS SUBSURFACE EXPLORATIONS BY OTHERS

Based on discussions with W-P, it is our understanding that no previous subsurface information for the existing pump station or forcemain is available.

## **2023 HALEY & ALDRICH, INC. SUBSURFACE EXPLORATIONS AT PROPOSED PUMP STATION**

During November 16 through 17, 2023, a subsurface investigation consisting of four borings (HA23-1 (OW), HA23-2, HA23-3 (OW), and HA23-4) was undertaken by Haley & Aldrich, Inc. (Haley & Aldrich). The borings were completed to assess general soil and groundwater conditions at the location of the proposed pump station locations. Drilling of each boring was completed by Terracon Consultants of Manchester, New Hampshire. A Haley & Aldrich geologist was on site to provide full-time technical monitoring of the drilling activities and to document the soil and groundwater conditions encountered in the borings.

The boring locations were laid out in the field by Haley & Aldrich using a handheld global positioning system (GPS) unit. As-drilled boring locations were surveyed by Doucet Survey, LLC (Doucet). Ground surface elevations at as-drilled boring locations were estimated based on the topographic information provided on the survey plan by Doucet.

Borings were generally advanced through the overburden soils using a 4-inch (HW-size) inside diameter (ID) steel casing using cased-washed boring drilling techniques. Geotechnical soil samples were collected at 2- to 5-ft intervals by driving a 1-3/8-inch ID split-spoon (SPT) sampler with a 140-pound hammer dropped from a height of 30 inches, as indicated on the boring logs. The number of hammer blows required to advance the sampler through each 6-inch interval was recorded and is provided on the boring logs. The uncorrected SPT N-value (N-uncorrected) is defined as the total number of blows required to advance the sampler through the middle 12 inches of the 24-inch sampling interval.

Soils samples were generally screened with a photoionization detector (PID) to determine the presence of volatile organic compounds (VOCs). No elevated VOC readings were measured with the PID and no visual or olfactory signs of contamination were observed during drilling. PID readings are shown on the boring logs provided in Appendix A.

Soil samples were preserved in glass jars. Soil samples that were not submitted for laboratory testing are available for review upon request and are located at the Haley & Aldrich storage facility in Bedford, New Hampshire.

An open-standpipe observation well was installed in completed borings HA23-1 (OW) and HA23-3 (OW) to provide information on static groundwater levels at the site. The wells consist of a 10-ft length of 2-inch ID, slotted PVC well screen and solid PVC riser pipe. The wells were screened from a depth of 13 to 23 ft (HA23-1) and 15 to 25 ft (HA23-3) below ground surface (bgs). The observation wells were protected by a steel locking cap. The observation well installation and groundwater monitoring reports are included in Appendix B.

The boring logs for the 2023 borings are provided in Appendix A. As-drilled boring locations are presented on Figures 21 and 22.

## 2024 HALEY & ALDRICH, INC. SUBSURFACE EXPLORATIONS

Between June 6 and 13, 2024, a subsurface investigation consisting of nine borings and 37 probes (designated HA24-1 through HA24-46) was undertaken by Haley & Aldrich. The nine borings were designated HA24-3, HA24-8, HA24-13, HA24-18, HA24-23, HA24-28, HA24-33, HA24-38, and HA24-43. The borings and probes were completed to assess the general soil and groundwater conditions at the forcemain and gravity sewer locations. The probes were drilled every 200 ft along the proposed forcemain and gravity sewer alignment, and the borings were drilled every 1,000 ft along the proposed forcemain and gravity sewer alignment. Drilling of borings and probes was completed by Terracon Consultants of Manchester, New Hampshire. A Haley & Aldrich geologist was on site to provide full-time technical monitoring of the drilling activities and to document the soil and groundwater conditions encountered in the borings.

The boring locations were laid out in the field by Haley & Aldrich using a handheld GPS unit. As-drilled boring locations were also captured by Haley & Aldrich using a handheld GPS unit. Ground surface elevations at as-drilled boring locations were estimated by W-P based on the topographic information provided on the survey plan.

Borings were generally advanced through the overburden soils using 2.25-inch-diameter hollow-stem augers. Geotechnical soil samples were collected at 2- to 5-ft intervals by driving a 1-3/8-inch ID SPT sampler with a 140-pound hammer dropped from a height of 30 inches, as indicated on the boring logs. The number of hammer blows required to advance the sampler through each 6-inch interval was recorded and is provided on the boring logs. The uncorrected SPT N-value (N-uncorrected) is defined as the total number of blows required to advance the sampler through the middle 12 inches of the 24-inch sampling interval. Probes were generally advanced using solid stem augers.

Soils samples were generally screened with a PID device to determine the presence of VOCs. No elevated VOC readings were measured with the PID and no visual or olfactory signs of contamination were observed during drilling. PID readings are shown on the boring logs provided in Appendix A.

Soil samples were preserved in glass jars. Soil samples that were not submitted for laboratory testing are available for review upon request and are located at the Haley & Aldrich storage facility in Bedford, New Hampshire.

The boring and probe logs for the 2024 subsurface investigation are provided in Appendix A. As-drilled boring and probe locations are presented in Figures 3 through 20.

## Subsurface Conditions

### SOIL CONDITIONS

Subsurface conditions encountered at the site generally consist of the following geologic units presented in order of increasing depth bgs: man-placed fill, glaciodeltaic deposits, weathered bedrock, and bedrock. A general description of each soil unit identified at the site is provided below. Detailed soil

descriptions are provided on the Haley & Aldrich boring logs included in Appendix A. A detailed summary of the subsurface conditions for each of the borings is provided in Table I.

Please note that soil descriptions provided on the boring logs and summarized below do not represent field conditions other than at the specific boring locations. The conditions between boring locations may vary from those described herein.

| Soil Unit              | Approximate Range in Encountered Thickness (ft) | Generalized Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fill                   | 0.2 to 20.0                                     | <p>Very loose to dense poorly graded SAND (SP), poorly graded SAND with silt (SP-SM), and/or silty SAND (SM) with varying amounts of gravel. Encountered in all borings except HA23-4 and HA24-3.</p> <p>The encountered fill thickness was typically 8 ft or less; however, a localized thick layer of fill (20 ft) was encountered in boring HA24-38, located in Loudon Road.</p> <p>A thin, 0.2-ft to 0.5-ft-thick, layer of topsoil was encountered at the ground surface in all HA23-series borings.</p> <p>A 0.5-ft to 0.8-ft thick layer of asphalt/binder base was encountered at the ground surface in all HA24-series borings.</p> |
| Glaciodeltaic Deposits | 29.5 to 43.0                                    | Very loose to very dense poorly graded SAND (SP), poorly graded SAND with silt (SP-SM), and/or silty SAND (SM) with varying amounts of gravel. Encountered in all borings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Weathered Bedrock      | 2.5                                             | Encountered in boring HA23-4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Bedrock was encountered in the HA23-series borings at depths ranging from 33.5 to 44.5 ft bgs (El. 279.5 to 288.5). The bedrock was generally described as GRANITE or SCHIST as part of the Concord Granite Formation and/or the Rangeley (Upper Part) Formation.

## GROUNDWATER CONDITIONS

Groundwater levels were measured in the observation wells installed in completed boreholes HA23-1 (OW) and HA23-3 (OW), located at the proposed pump station, between November 2023 and May 2024, including once after a large rain event. Measured groundwater levels varied between 10.9 and 14.2 ft bgs (El. 311.8 to El. 314.6; see Appendix B for all data). Groundwater was not observed during drilling the HA24-series borings and probes.

Groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography, and precipitation. Water levels encountered during construction may differ from those summarized above.

## Geotechnical Laboratory Testing Program

A geotechnical laboratory testing program was undertaken on soil samples collected during the field investigation to assist in soil classification/identification. In general, laboratory testing was performed on disturbed soil samples collected during SPT sampling. All laboratory soil testing was performed by GeoTesting Express of Acton, Massachusetts. Geotechnical laboratory testing was generally performed in accordance with applicable American Society for Testing Materials International (ASTM) testing procedures.

The laboratory test program included 26 grain-size analyses (sieve only, no hydrometer). A summary of the laboratory test results is provided in the tables below.

| Laboratory Test | ASTM Test Designation   | Soil Unit              | No. of Tests Completed | Range in Test Results                                                                    |
|-----------------|-------------------------|------------------------|------------------------|------------------------------------------------------------------------------------------|
| Grain Size      | ASTM D6913 (Sieve Only) | Fill                   | 4                      | USCS Classification:<br>SP, SP-SM, SM<br><br>Percent Passing No. 200 Sieve:<br>4% to 36% |
|                 |                         | Glaciodeltaic Deposits | 22                     | USCS Classification:<br>SP, SP-SM, SM<br><br>Percent Passing No. 200 Sieve:<br>1% to 16% |

Laboratory test results are provided in Appendix C.

## Analytical Laboratory Testing Program

During the field investigation, soil samples were submitted to Alpha Analytical (Alpha) of Westborough, Massachusetts for environmental testing. Analytical testing methods included VOCs by United States Environmental Protection Agency (EPA) Methods 8260D and 5035, semi-volatile organic compounds (SVOCs) by EPA Method 8270E/8270E with selected ion monitoring (SIM), polychlorinated biphenyls (PCBs) by EPA Method 8082A, total petroleum hydrocarbons (TPH) by EPA Method 8015D, total Resource Conservation and Recovery Act (RCRA)-8 metals by EPA Methods 6010D and 7471B, and waste characterization parameters, including total solids, ignitability, pH, reactive cyanide, and reactive sulfide.

A total of 14 samples were submitted to Alpha for analytical testing. The samples included six samples from fill material, two samples from the fill and native soil interface, and six samples from native glaciodeltaic deposits. The analytical testing results were compared to New Hampshire Code of Administrative Rules Env-Or 600 Soil Remediation Standards (SRS).

The results are summarized in Table II and indicate the following:

- VOCs and PCBs were not detected;
- Five SVOCs exceeded SRS values, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, with two or more of the SVOCs exceeding SRS values in five samples from borings HA24-3 (two samples), HA24-8, HA24-13, and HA24-28.
- RCRA-8 metals and TPH were either not detected or detected at concentrations less than SRS values.
- Total solids ranged from 85.9% to 98.3% and pH values ranged from 6.15 to 7.68.
- Reactive cyanide and reactive sulfide were not detected.
- The soil samples were not ignitable, which indicates the absence of combustible constituents.

Analytical test results are provided in Appendix D.

## Limitations

This report is prepared for the exclusive use of W-P relative to the forcemain and gravity sewer replacement to be constructed in Concord, New Hampshire. There are no intended beneficiaries other than W-P. Haley & Aldrich shall owe no duty whatsoever to any other person or entity on account of the Agreement or the report. Use of this report by any person or entity other than W-P for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from W-P and from Haley & Aldrich. Use of this report by such other person or entity without the written authorization of W-P such other person's or entity's sole risk, and shall be without legal exposure or liability to Haley & Aldrich.

This report can be made available to the Contractor, and is to be used solely at the Contractor's risk. The Engineer, Owner and Geotechnical Consultant assume no responsibility concerning the interpretation of the data by the Contractor.

## Closure

Geotechnical and environmental design recommendations for the proposed forcemain and gravity sewer replacement will be provided under separate cover.

We appreciate the opportunity to provide geotechnical engineering services on this project. Please do not hesitate to contact us if you have any questions or comments.

Sincerely yours,  
**HALEY & ALDRICH, INC.**



Eric M. Hunstein, EI (ME)  
Staff Geotechnical Engineer



Douglas C. Allen, P.G.  
Hydrogeologist



Erin A. Force, P.E.  
Senior Project Manager



Wayne A. Chadbourne, P.E.  
Principal

### Attachments:

Table I – Subsurface Exploration Subsurface Data  
Table II – Summary of Analytical Results

Figure 1 – Project Locus  
Figure 2 – Overall Site Plan  
Figure 3 through 22 – Site and Subsurface Exploration Location Plans

Appendix A – Test Boring Logs  
Appendix B – Groundwater Observation Well Installation and Groundwater Monitoring Reports  
Appendix C – Geotechnical Laboratory Test Results  
Appendix D – Analytical Laboratory Test Results

<https://haleyaldrich.sharepoint.com/sites/Wright-Pierce/Shared Documents/0208898.Steeplegate Mall Pump Station Replacement/001/Deliverables/Data Report/2025-0502-HAI-Concord Heights Data Report-F1.docx>



## TABLES

TABLE I  
SUBSURFACE EXPLORATION SUBSURFACE DATA  
FORCEMAIN AND GRAVITY SEWER REPLACEMENT  
CONCORD HEIGHTS  
CONCORD, NEW HAMPSHIRE

| Boring No. <sup>1</sup> | Estimated Ground Surface Elevation <sup>2</sup> (ft) | Stratigraphy Data <sup>2,3</sup> |                   |                |                           |                   |                |                        |                   |                |                   |                   |                |                   |                   | Bottom of Exploration Depth (ft) | Elevation of Bottom of Exploration <sup>2</sup> (ft) |
|-------------------------|------------------------------------------------------|----------------------------------|-------------------|----------------|---------------------------|-------------------|----------------|------------------------|-------------------|----------------|-------------------|-------------------|----------------|-------------------|-------------------|----------------------------------|------------------------------------------------------|
|                         |                                                      | Asphalt/Binder Base              |                   |                | Fill/Topsoil <sup>4</sup> |                   |                | Glaciodeltaic Deposits |                   |                | Weathered Bedrock |                   |                | Bedrock           |                   |                                  |                                                      |
|                         |                                                      | Depth to Top (ft)                | Elev. of Top (ft) | Thickness (ft) | Depth to Top (ft)         | Elev. of Top (ft) | Thickness (ft) | Depth to Top (ft)      | Elev. of Top (ft) | Thickness (ft) | Depth to Top (ft) | Elev. of Top (ft) | Thickness (ft) | Depth to Top (ft) | Elev. of Top (ft) |                                  |                                                      |
| HA23-1                  | 326.0                                                | NE                               | NE                | NE             | 0.0                       | 326.0             | 1.5            | 1.5                    | 324.5             | 43.0           | NE                | NE                | NE             | 44.5              | 281.5             | 50.0                             | 276.0                                                |
| HA23-2                  | 322.0                                                | NE                               | NE                | NE             | 0.0                       | 322.0             | 4.0            | 4.0                    | 318.0             | 29.5           | NE                | NE                | NE             | 33.5              | 288.5             | 44.3                             | 277.7                                                |
| HA23-3                  | 325.5                                                | NE                               | NE                | NE             | 0.0                       | 325.5             | 8.0            | 8.0                    | 317.5             | 30.5           | NE                | NE                | NE             | 38.5              | 287.0             | 45.0                             | 280.5                                                |
| HA23-4                  | 318.0                                                | NE                               | NE                | NE             | 0.0                       | 318.0             | 0.2            | 0.2                    | 317.8             | 35.8           | 36.0              | 282.0             | 2.5            | 38.5              | 279.5             | 45.0                             | 273.0                                                |
| HA24-3                  | 342.5                                                | 0                                | 342.5             | 0.8            | NE                        | NE                | NE             | 0.8                    | 341.7             | >20.2          | --                | --                | --             | --                | --                | 21.0                             | 321.5                                                |
| HA24-8                  | 342.5                                                | 0                                | 342.5             | 0.5            | 0.5                       | 342.0             | 1.5            | 2.0                    | 340.5             | >19.0          | --                | --                | --             | --                | --                | 21.0                             | 321.5                                                |
| HA24-13                 | 345.0                                                | 0                                | 345.0             | 0.5            | 0.5                       | 344.5             | 2.0            | 2.5                    | 342.5             | >18.5          | --                | --                | --             | --                | --                | 21.0                             | 324.0                                                |
| HA24-18                 | 348.0                                                | 0                                | 348.0             | 0.5            | 0.5                       | 347.5             | 1.5            | 2.0                    | 346.0             | >19.0          | --                | --                | --             | --                | --                | 21.0                             | 327.0                                                |
| HA24-23                 | 351.0                                                | 0                                | 351.0             | 0.5            | 0.5                       | 350.5             | 1.5            | 2.0                    | 349.0             | >19.0          | --                | --                | --             | --                | --                | 21.0                             | 330.0                                                |
| HA24-28                 | 352.0                                                | 0                                | 352.0             | 0.5            | 0.5                       | 351.5             | 4.0            | 4.5                    | 347.5             | >16.5          | --                | --                | --             | --                | --                | 21.0                             | 331.0                                                |
| HA24-33                 | 351.0                                                | 0                                | 351.0             | 0.5            | 0.5                       | 350.5             | 2.5            | 3.0                    | 348.0             | >18.0          | --                | --                | --             | --                | --                | 21.0                             | 330.0                                                |
| HA24-38                 | 350.0                                                | 0                                | 350.0             | 0.5            | 0.5                       | 349.5             | 19.5           | 20.0                   | 330.0             | >1.0           | --                | --                | --             | --                | --                | 21.0                             | 329.0                                                |
| HA24-43                 | 346.5                                                | 0                                | 346.5             | 0.5            | 0.5                       | 346.0             | 1.5            | 2.0                    | 344.5             | >19.0          | --                | --                | --             | --                | --                | 21.0                             | 325.5                                                |

**Notes:**

<sup>1</sup> Boring locations are shown on Figures 3 through 20, Site and Subsurface Exploration Location Plans.

<sup>2</sup> Ground surface elevations of the HA23-series borings estimated by Haley & Aldrich from grading plans provided by Wright-Pierce. Ground surface elevations of the HA24-series borings were estimated by Wright-Pierce from grading plans and were provided to Haley & Aldrich. Elevations are measured in feet (ft) and reference the North American Vertical Datum of 1988 (NAVD 88).

<sup>3</sup> NE indicates stratum was not encountered in test boring, ">20.2" indicates total thickness of stratum is greater than value shown; "--" indicates test boring was not drilled deep enough to determine presence of stratum.

<sup>4</sup> Topsoil was encountered in the upper 0.2 to 0.5 feet of the HA23-series borings.

|              |            |            |
|--------------|------------|------------|
|              | Individual | Date       |
| Prepared By: | EMH        | 8/2/2024   |
| Checked By:  | JAD        | 10/1/2024  |
| Reviewed By: | EAF        | 10/24/2024 |

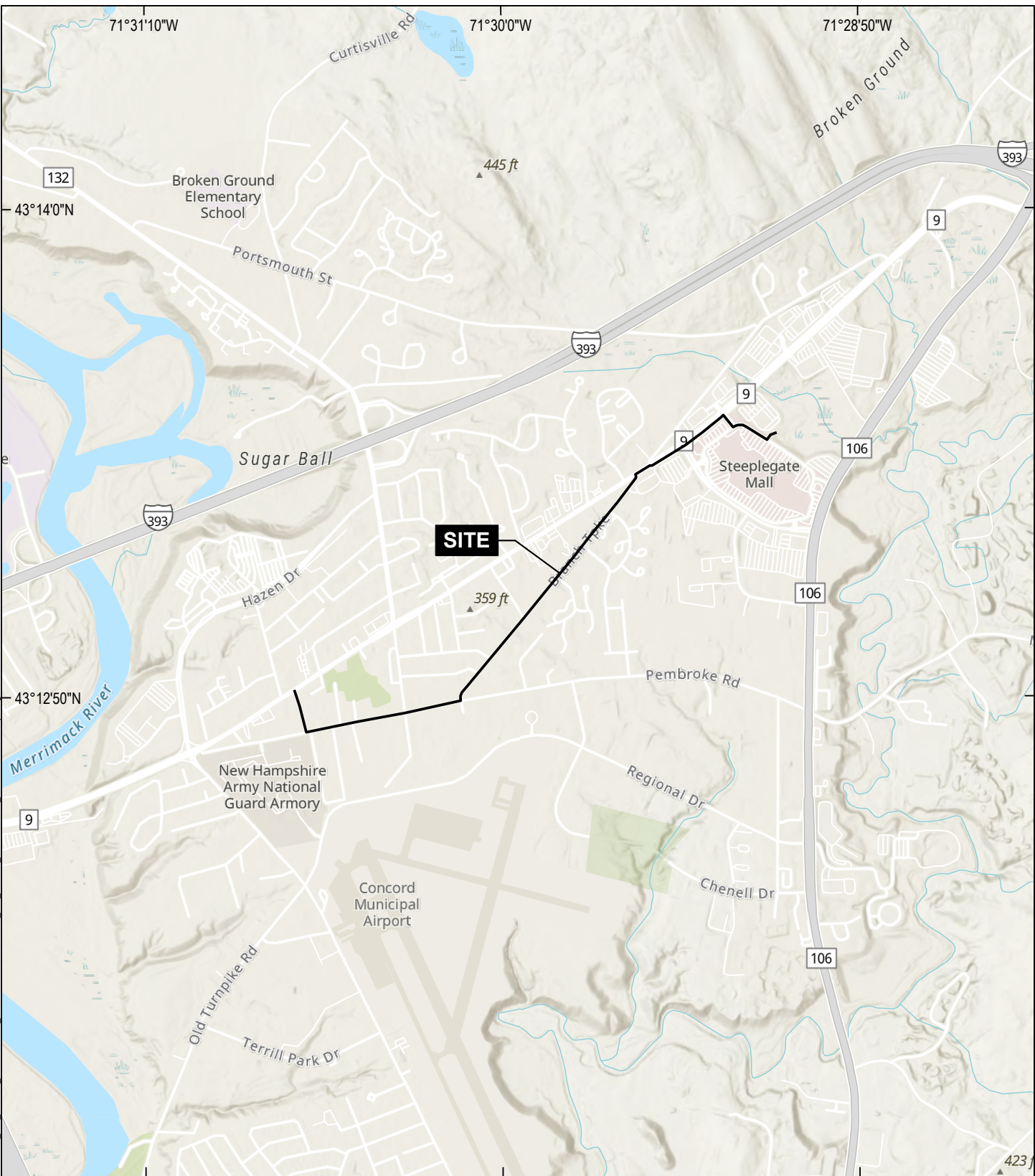
TABLE II  
SUMMARY OF ANALYTICAL RESULTS  
FORCEMAIN AND GRAVITY SEWER REPLACEMENT  
CONCORD HEIGHTS  
CONCORD, NEW HAMPSHIRE  
File No. 208898-001

| Location Name<br>Sample Name<br>Sample Date<br>Lab Sample ID<br>Sample Depth (bgs) | Action Level<br><br>NH ENV OR 600-<br>2 2015 | HA24-03                                               | HA24-03                                               | HA24-08                                               | HA24-13                                                        | HA24-13                                                        | HA24-18                                                        | HA24-23                                                        | HA24-23                                                        | HA24-28                                                        | HA24-33                                                        | HA24-33                                                        | HA24-38                                                        | HA24-43                                                | HA24-43                                                |
|------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|
|                                                                                    |                                              | HA24-3_1-3<br>06/06/2024<br>L2431573-01<br>1 - 3 (ft) | HA24-3_5-7<br>06/06/2024<br>L2431573-02<br>5 - 7 (ft) | HA24-8_2-5<br>06/06/2024<br>L2431573-03<br>2 - 5 (ft) | HA24-13_0.5-2.5<br>06/10/2024<br>L2432275-01<br>0.5 - 2.5 (ft) | HA24-13_2.5-4.5<br>06/10/2024<br>L2432275-02<br>2.5 - 4.5 (ft) | HA24-18_0.5-2.5<br>06/10/2024<br>L2432275-03<br>0.5 - 2.5 (ft) | HA24-23_0.5-2.5<br>06/11/2024<br>L2432632-01<br>0.5 - 2.5 (ft) | HA24-23_2.5-4.5<br>06/11/2024<br>L2432632-02<br>2.5 - 4.5 (ft) | HA24-28_0.5-2.5<br>06/11/2024<br>L2432632-03<br>0.5 - 2.5 (ft) | HA24-33_0.5-2.5<br>06/12/2024<br>L2432925-01<br>0.5 - 2.5 (ft) | HA24-33_2.5-4.5<br>06/12/2024<br>L2432925-02<br>2.5 - 4.5 (ft) | HA24-38_0.5-2.5<br>06/12/2024<br>L2432925-03<br>0.5 - 2.5 (ft) | HA24-43_1-3<br>06/13/2024<br>L2433315-01<br>1 - 3 (ft) | HA24-43_3-5<br>06/13/2024<br>L2433315-02<br>3 - 5 (ft) |
| Volatile Organic Compounds (mg/kg)                                                 |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| SUM of Volatile Organic Compounds                                                  | NA                                           | ND                                                    | ND                                                    | ND                                                    | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                     | ND                                                     |
| Semi-Volatile Organic Compounds (mg/kg)                                            |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| Carbazole                                                                          | NA                                           | 0.48                                                  | 0.28                                                  | ND (0.17)                                             | ND (0.88)                                                      | ND (0.17)                                                      | ND (0.88)                                                      | ND (0.18)                                                      | ND (0.17)                                                      | ND (0.19)                                                      | ND (0.18)                                                      | ND (0.17)                                                      | ND (0.17)                                                      | ND (0.17)                                              | ND (0.17)                                              |
| SUM of Semi-Volatile Organic Compounds                                             | NA                                           | 0.48                                                  | 0.28                                                  | ND                                                    | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                             | ND                                                     | ND                                                     |
| Total Petroleum Hydrocarbons (mg/kg)                                               |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| Petroleum hydrocarbons                                                             | 10000                                        | 457                                                   | 549                                                   | 68.1                                                  | 397                                                            | 34.5                                                           | 88.8                                                           | ND (35.8)                                                      | ND (32.5)                                                      | 97.6                                                           | ND (35.6)                                                      | ND (33.2)                                                      | ND (33.5)                                                      | ND (33.1)                                              | ND (34.1)                                              |
| Inorganic Compounds (mg/kg)                                                        |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| Arsenic                                                                            | 11                                           | 4.3                                                   | 4.26                                                  | 4.04                                                  | 4.68                                                           | 4.08                                                           | 3.96                                                           | 3.45                                                           | 4.16                                                           | 4.13                                                           | 4.98                                                           | 4.97                                                           | 7.26                                                           | 7.31                                                   | 4.54                                                   |
| Barium                                                                             | 1000                                         | 18.8                                                  | 17.1                                                  | 14.5                                                  | 14.9                                                           | 14.3                                                           | 19                                                             | 13.9                                                           | 12.7                                                           | 21.8                                                           | 15.6                                                           | 15.1                                                           | 27.1                                                           | 26.4                                                   | 17.7                                                   |
| Cadmium                                                                            | 33                                           | ND (0.767)                                            | ND (0.807)                                            | ND (0.772)                                            | ND (0.804)                                                     | ND (0.802)                                                     | ND (0.815)                                                     | ND (0.847)                                                     | ND (0.768)                                                     | ND (0.886)                                                     | ND (0.825)                                                     | ND (0.79)                                                      | ND (0.789)                                                     | ND (0.809)                                             | ND (0.82)                                              |
| Chromium                                                                           | NA                                           | 10.4                                                  | 6.59                                                  | 5.16                                                  | 5.48                                                           | 7.1                                                            | 7.81                                                           | 6.52                                                           | 5.24                                                           | 6.9                                                            | 7.82                                                           | 5.86                                                           | 8.76                                                           | 10.7                                                   | 6.15                                                   |
| Lead                                                                               | 400                                          | 5.65                                                  | 5.09                                                  | ND (3.86)                                             | 5.43                                                           | ND (4.01)                                                      | 7.26                                                           | 8.65                                                           | ND (3.84)                                                      | 17.5                                                           | 8.9                                                            | ND (3.95)                                                      | 5.09                                                           | 6.33                                                   | 8.5                                                    |
| Mercury                                                                            | 7                                            | ND (0.065)                                            | ND (0.066)                                            | ND (0.066)                                            | ND (0.067)                                                     | ND (0.066)                                                     | ND (0.069)                                                     | ND (0.07)                                                      | ND (0.064)                                                     | ND (0.074)                                                     | ND (0.07)                                                      | ND (0.065)                                                     | ND (0.066)                                                     | ND (0.074)                                             | ND (0.076)                                             |
| Selenium                                                                           | 180                                          | ND (1.53)                                             | ND (1.61)                                             | ND (1.54)                                             | ND (1.61)                                                      | ND (1.6)                                                       | ND (1.63)                                                      | ND (1.69)                                                      | ND (1.54)                                                      | ND (1.77)                                                      | ND (1.65)                                                      | ND (1.58)                                                      | ND (1.58)                                                      | ND (1.62)                                              | ND (1.64)                                              |
| Silver                                                                             | 89                                           | ND (0.384)                                            | ND (0.404)                                            | ND (0.386)                                            | ND (0.402)                                                     | ND (0.401)                                                     | ND (0.407)                                                     | ND (0.423)                                                     | ND (0.384)                                                     | ND (0.443)                                                     | ND (0.412)                                                     | ND (0.395)                                                     | ND (0.394)                                                     | ND (0.405)                                             | ND (0.41)                                              |
| PCBs (mg/kg)                                                                       |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| Aroclor-1016 (PCB-1016)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1221 (PCB-1221)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1232 (PCB-1232)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1242 (PCB-1242)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1248 (PCB-1248)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1254 (PCB-1254)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1260 (PCB-1260)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1262 (PCB-1262)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Aroclor-1268 (PCB-1268)                                                            | NA                                           | ND (0.0471)                                           | ND (0.0489)                                           | ND (0.0482)                                           | ND (0.0505)                                                    | ND (0.051)                                                     | ND (0.0527)                                                    | ND (0.0508)                                                    | ND (0.0486)                                                    | ND (0.0549)                                                    | ND (0.052)                                                     | ND (0.0473)                                                    | ND (0.048)                                                     | ND (0.047)                                             | ND (0.0488)                                            |
| Other                                                                              |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| Total Solids (%)                                                                   | NA                                           | 97.9                                                  | 97                                                    | 97.3                                                  | 94.3                                                           | 95.8                                                           | 93.2                                                           | 91.2                                                           | 98.3                                                           | 85.9                                                           | 90.9                                                           | 97.1                                                           | 96.9                                                           | 97                                                     | 96.4                                                   |
| Reactive Cyanide (mg/kg)                                                           | NA                                           | ND (130)                                              | ND (130)                                              | ND (130)                                              | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                                       | ND (130)                                               | ND (130)                                               |
| Reactive Sulfide (mg/kg)                                                           | NA                                           | ND (250)                                              | ND (250)                                              | ND (250)                                              | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                                       | ND (250)                                               | ND (250)                                               |
| Ignitability (Flashpoint)                                                          | NA                                           | NI                                                    | NI                                                    | NI                                                    | NI                                                             | NI                                                             | NI                                                             | NI                                                             | NI                                                             | NI                                                             | NI                                                             | NI                                                             | NI                                                             | NI                                                     | NI                                                     |
| pH (lab) (pH units)                                                                | NA                                           | 6.81                                                  | 6.77                                                  | 6.33                                                  | 7.68                                                           | 7.48                                                           | 6.84                                                           | 6.15                                                           | 6.18                                                           | 6.35                                                           | 7.37                                                           | 7.02                                                           | 7.04                                                           | 6.63                                                   | 6.59                                                   |
| Semi-Volatile Organic Compounds (SIM) (mg/kg)                                      |                                              |                                                       |                                                       |                                                       |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                                |                                                        |                                                        |
| Acenaphthylene                                                                     | 490                                          | 2.6                                                   | 2.4                                                   | 0.47                                                  | 3                                                              | 0.12                                                           | 0.27                                                           | 0.096                                                          | ND (0.0067)                                                    | 0.6                                                            | 0.16                                                           | 0.016                                                          | ND (0.0068)                                                    | ND (0.068)                                             | 0.036                                                  |
| Anthracene                                                                         | 1000                                         | 1.6                                                   | 1.1                                                   | 0.19                                                  | 0.93                                                           | 0.035                                                          | 0.13                                                           | 0.026                                                          | ND (0.0067)                                                    | 0.26                                                           | 0.082                                                          | 0.0075                                                         | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Benzo(a)anthracene                                                                 | 1                                            | 5.7                                                   | 4                                                     | 0.57                                                  | 5.7                                                            | 0.14                                                           | 0.37                                                           | 0.097                                                          | ND (0.0067)                                                    | 1.4                                                            | 0.25                                                           | 0.02                                                           | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Benzo(a)pyrene                                                                     | 0.7                                          | 6                                                     | 4.8                                                   | 0.9                                                   | 5.9                                                            | 0.23                                                           | 0.52                                                           | 0.12                                                           | ND (0.0067)                                                    | 1.5                                                            | 0.33                                                           | 0.026                                                          | ND (0.0068)                                                    | ND (0.068)                                             | 0.036                                                  |
| Benzo(b)fluoranthene                                                               | 1                                            | 8.4                                                   | 6.9                                                   | 1.2                                                   | 7.6                                                            | 0.3                                                            | 0.7                                                            | 0.15                                                           | ND (0.0067)                                                    | 1.9                                                            | 0.44                                                           | 0.033                                                          | ND (0.0068)                                                    | ND (0.068)                                             | 0.047                                                  |
| Benzo(g,h,i)perylene                                                               | NA                                           | 3.4                                                   | 2.8                                                   | 0.56                                                  | 2.9                                                            | 0.14                                                           | 0.3                                                            | 0.067                                                          | ND (0.0067)                                                    | 0.76                                                           | 0.22                                                           | 0.015                                                          | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Benzo(k)fluoranthene                                                               | 12                                           | 2.5                                                   | 1.8                                                   | 0.33                                                  | 2.6                                                            | 0.1                                                            | 0.24                                                           | 0.046                                                          | ND (0.0067)                                                    | 0.47                                                           | 0.11                                                           | 0.0093                                                         | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Chrysene                                                                           | 120                                          | 5                                                     | 3.6                                                   | 0.54                                                  | 5                                                              | 0.14                                                           | 0.34                                                           | 0.094                                                          | ND (0.0067)                                                    | 1.3                                                            | 0.25                                                           | 0.016                                                          | ND (0.0068)                                                    | ND (0.068)                                             | 0.036                                                  |
| Dibenz(a,h)anthracene                                                              | 0.7                                          | 0.76                                                  | 0.64                                                  | 0.14                                                  | 0.76                                                           | 0.032                                                          | 0.064                                                          | 0.016                                                          | ND (0.0067)                                                    | 0.19                                                           | 0.048                                                          | ND (0.0068)                                                    | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Fluoranthene                                                                       | 960                                          | 11                                                    | 5.5                                                   | 0.54                                                  | 8.4                                                            | 0.17                                                           | 0.72                                                           | 0.2                                                            | ND (0.0067)                                                    | 2                                                              | 0.35                                                           | 0.029                                                          | ND (0.0068)                                                    | ND (0.068)                                             | 0.054                                                  |
| Fluorene                                                                           | 77                                           | 0.26                                                  | 0.19                                                  | ND (0.034)                                            | ND (0.18)                                                      | 0.0071                                                         | ND (0.035)                                                     | ND (0.0072)                                                    | ND (0.0067)                                                    | 0.049                                                          | ND (0.036)                                                     | ND (0.0068)                                                    | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Indeno(1,2,3-cd)pyrene                                                             | 1                                            | 4.4                                                   | 3.7                                                   | 0.74                                                  | 3.8                                                            | 0.18                                                           | 0.36                                                           | 0.081                                                          | ND (0.0067)                                                    | 0.98                                                           | 0.26                                                           | 0.018                                                          | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Naphthalene                                                                        | 5                                            | ND (0.17)                                             | ND (0.17)                                             | ND (0.034)                                            | ND (0.18)                                                      | ND (0.0069)                                                    | ND (0.035)                                                     | ND (0.0072)                                                    | ND (0.0067)                                                    | 0.081                                                          | ND (0.036)                                                     | ND (0.0068)                                                    | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Phenanthrene                                                                       | NA                                           | 3.7                                                   | 1.8                                                   | 0.16                                                  | 0.81                                                           | 0.039                                                          | 0.17                                                           | 0.048                                                          | ND (0.0067)                                                    | 0.63                                                           | 0.12                                                           | ND (0.0068)                                                    | ND (0.0068)                                                    | ND (0.068)                                             | ND (0.034)                                             |
| Pyrene                                                                             | 720                                          | 8.7                                                   | 4.8                                                   | 0.57                                                  | 7.5                                                            | 0.18                                                           | 0.73                                                           | 0.18                                                           | ND (0.0067)                                                    | 1.8                                                            | 0.36                                                           | 0.03                                                           | ND (0.0068)                                                    | ND (0.068)                                             | 0.064                                                  |
| SUM of Semi-Volatile Organic Compounds (SIM)                                       | NA                                           | 64.02                                                 | 44.03                                                 | 6.91                                                  | 54.9                                                           | 1.8131                                                         | 4.914                                                          | 1.221                                                          | ND                                                             | 13.92                                                          | 2.98                                                           | 0.2198                                                         | ND                                                             | ND                                                     | 0.273                                                  |

Notes and Abbreviations:  
mg/kg: milligram per kilogram  
umhos/cm: micromhos per centimeter  
  
-: Not Analyzed  
bgs: below ground surface  
ft: feet  
NA: Not Applicable  
ND (2.5): Not detected, number in parentheses is the laboratory reporting limit  
NI: Not Ignitable  
  
- Analytes detected in Volatile and Semi-Volatile Organics for at least one sample are reported herein.  
- For a complete list of analytes see the laboratory data sheets.  
- For test methods used, see the laboratory data sheets.  
- Bold values indicate an exceedance of the **OR 600-2** criteria.

## FIGURES

GIS: \\haleyaldrich.com\share\CF\Projects\0208898\GIS\208898\_001\_SEWER\_COLLECTION\_IMPROVEMENTS.aprx - pville - 10/22/2024 10:08 AM



MAP SOURCE: ESRI  
SITE COORDINATES: 43°13'08"N, 71°29'48"W

**HALEY  
ALDRICH**

FORCEMAIN AND GRAVITY SEWER REPLACEMENT  
CONCORD HEIGHTS  
CONCORD, NEW HAMPSHIRE

**PROJECT LOCUS**

APPROXIMATE SCALE: 1 IN = 2000 FT  
MAY 2025

**FIGURE 1**



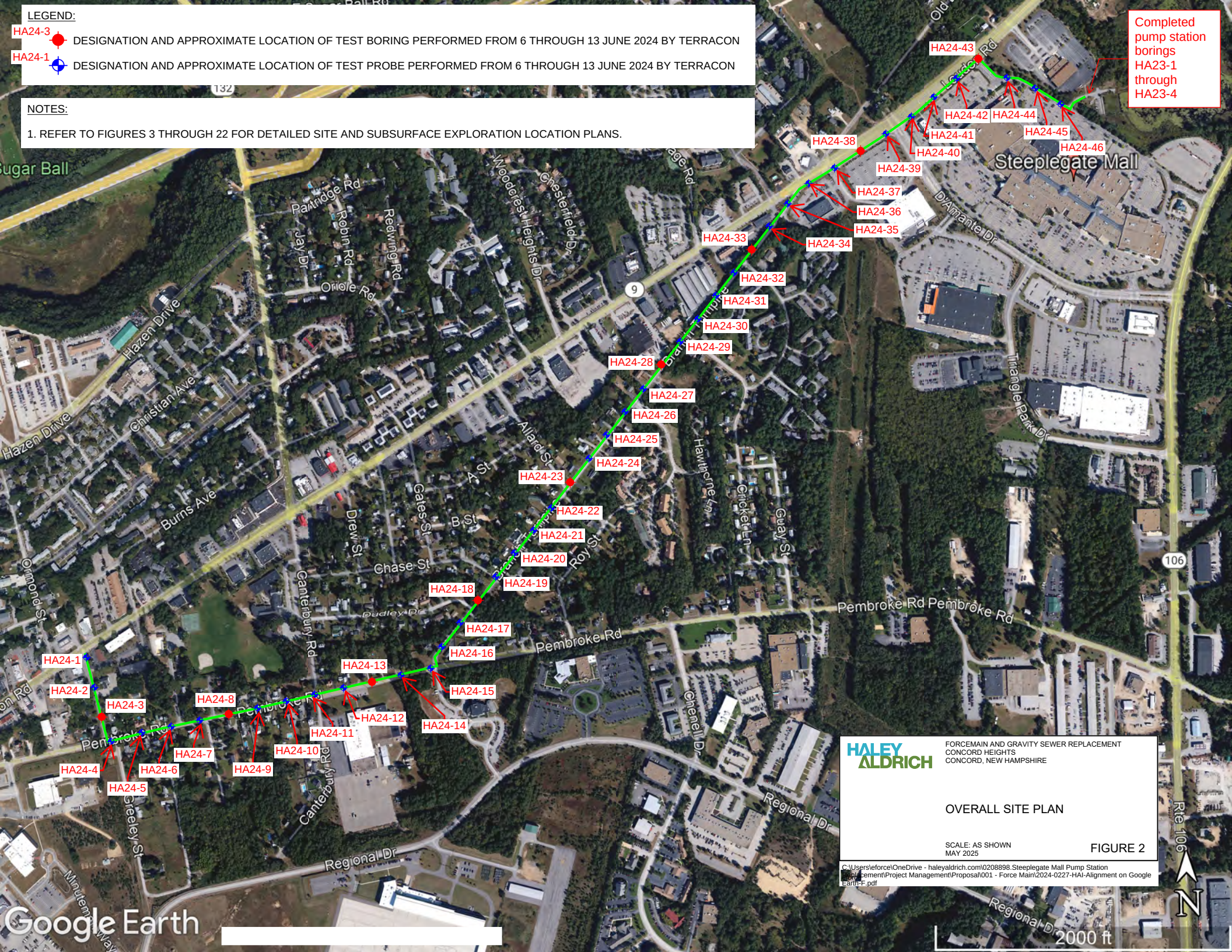
**LEGEND:**

HA24-3  DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING PERFORMED FROM 6 THROUGH 13 JUNE 2024 BY TERRACON

HA24-1  DESIGNATION AND APPROXIMATE LOCATION OF TEST PROBE PERFORMED FROM 6 THROUGH 13 JUNE 2024 BY TERRACON

**NOTES:**

1. REFER TO FIGURES 3 THROUGH 22 FOR DETAILED SITE AND SUBSURFACE EXPLORATION LOCATION PLANS.



Completed pump station borings  
HA23-1 through HA23-4



FORCEMAIN AND GRAVITY SEWER REPLACEMENT  
CONCORD HEIGHTS  
CONCORD, NEW HAMPSHIRE

OVERALL SITE PLAN

SCALE: AS SHOWN  
MAY 2025

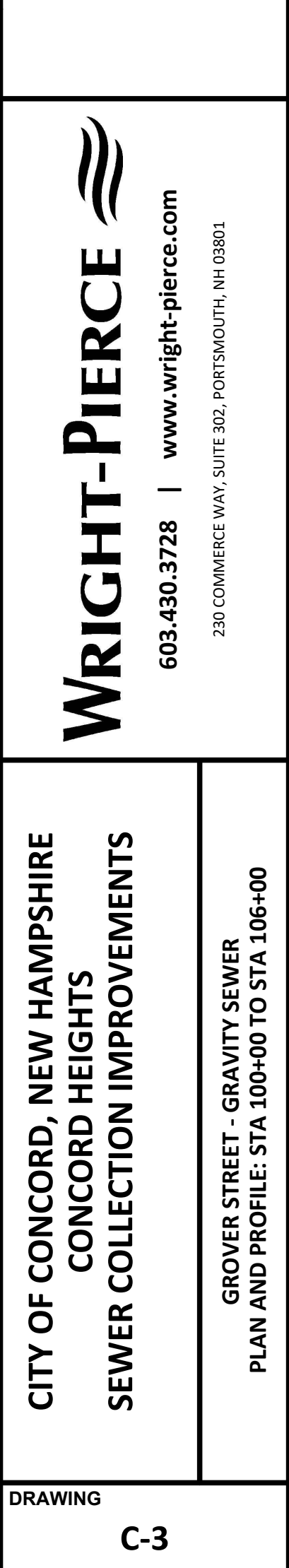
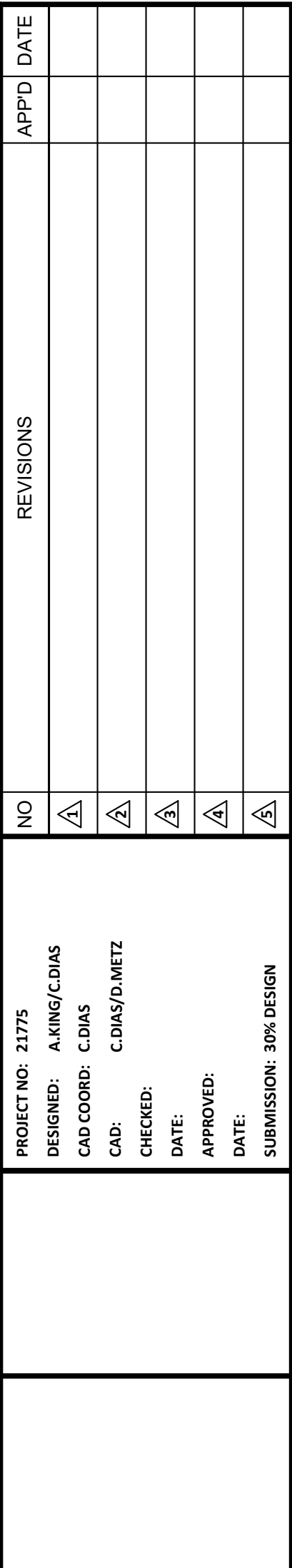
FIGURE 2

C:\Users\forOneDrive - haleyaldrich.com\0208998.Steeplegate Mall Pump Station  
Replacement\Project Management\Proposals\001 - Force Main\2024-0227-HAI-Alignment on Google  
Earth-F.pdf

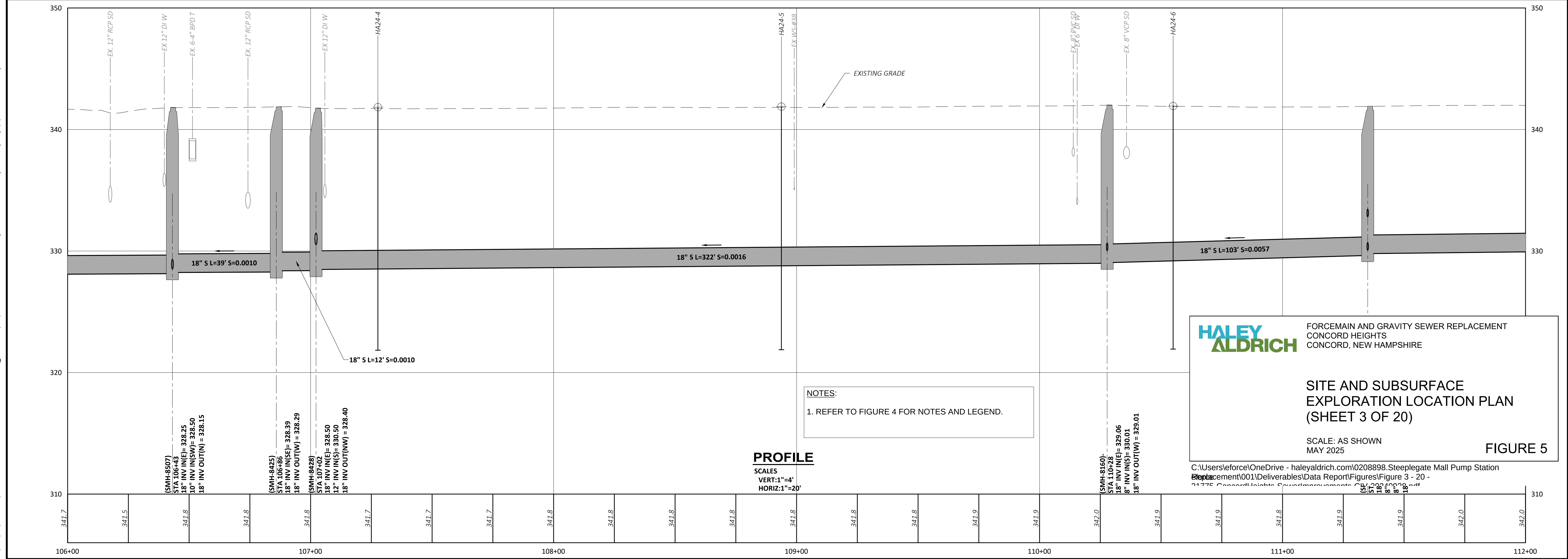


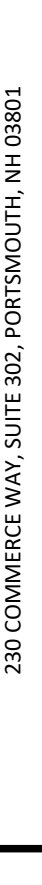




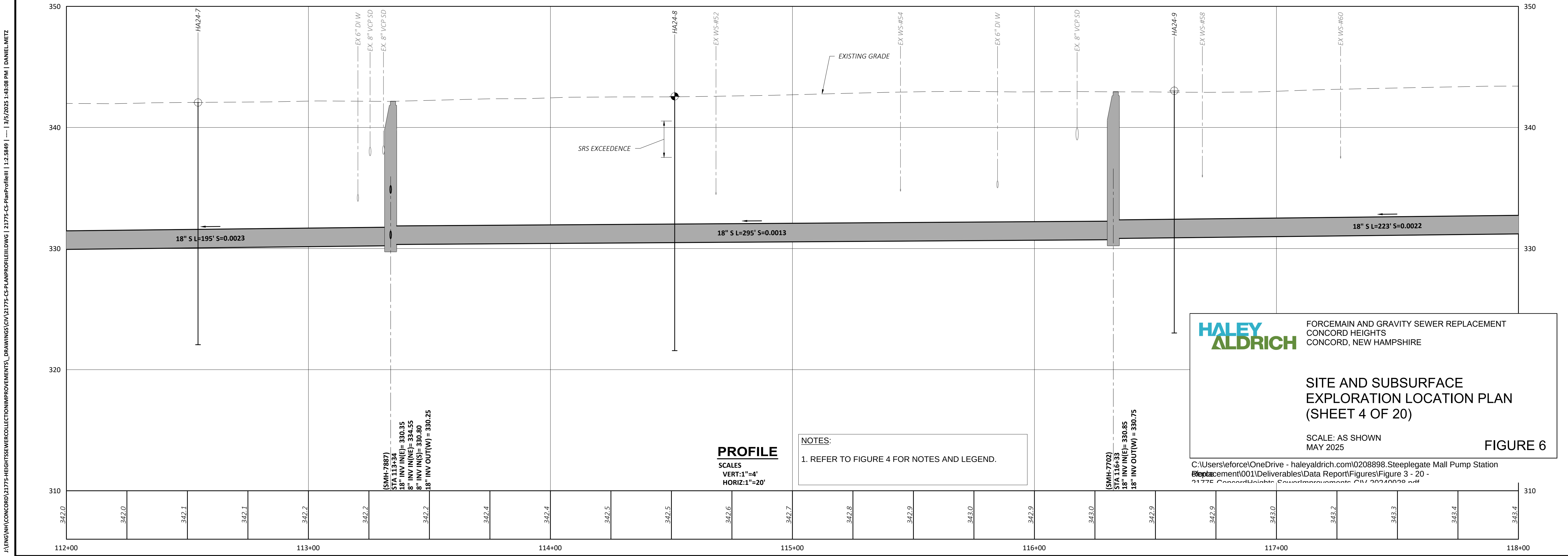
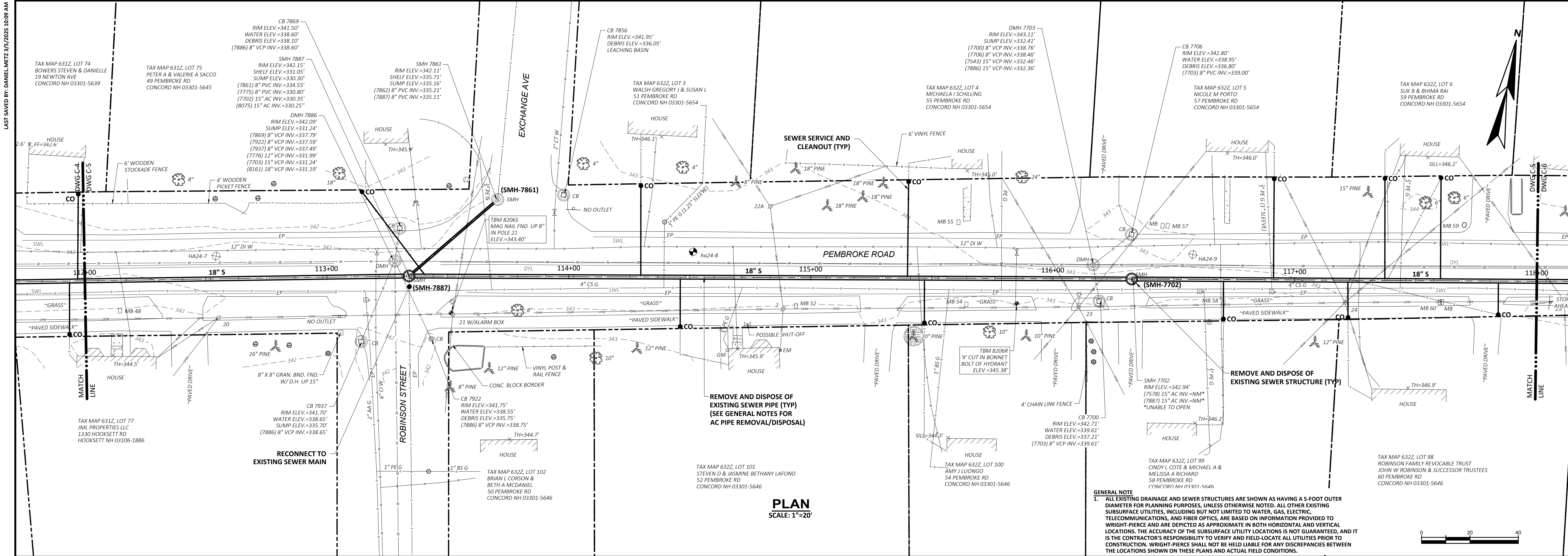






|         |                                                                                    |                                                                                                                                                                                                                                                                     |  |  |                         |    |           |       |      |
|---------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-------------------------|----|-----------|-------|------|
| DRAWING | CITY OF CONCORD, NEW HAMPSHIRE<br>CONCORD HEIGHTS<br>SEWER COLLECTION IMPROVEMENTS | <div><br/><b>WRIGHT-PIERCE</b><br/>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a><br/>230 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801</div> |  |  | PROJECT NO.: 21775      | NO | REVISIONS | APP'D | DATE |
|         |                                                                                    |                                                                                                                                                                                                                                                                     |  |  | DESIGNED: A KING/C DIAS | △  |           |       |      |
|         | CAD COORD: C DIAS                                                                  |                                                                                                                                                                                                                                                                     |  |  |                         |    |           |       |      |
|         | CAD: C DIAS/D METZ                                                                 |                                                                                                                                                                                                                                                                     |  |  | △                       |    |           |       |      |
|         | CHECKED:                                                                           |                                                                                                                                                                                                                                                                     |  |  |                         |    |           |       |      |
|         | DATE:                                                                              |                                                                                                                                                                                                                                                                     |  |  | △                       |    |           |       |      |
|         | APPROVED:                                                                          |                                                                                                                                                                                                                                                                     |  |  |                         |    |           |       |      |
|         | DATE:                                                                              |                                                                                                                                                                                                                                                                     |  |  | △                       |    |           |       |      |
|         | SUBMISSION: 30% DESIGN                                                             |                                                                                                                                                                                                                                                                     |  |  | △                       |    |           |       |      |





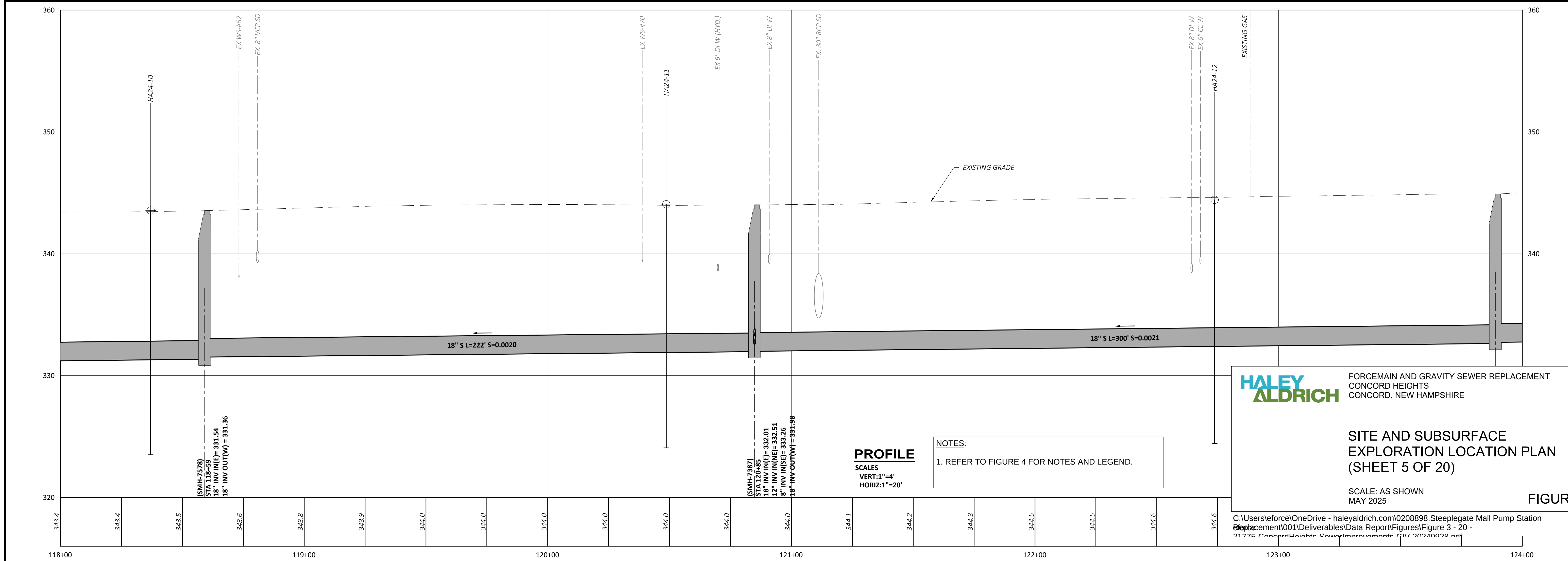
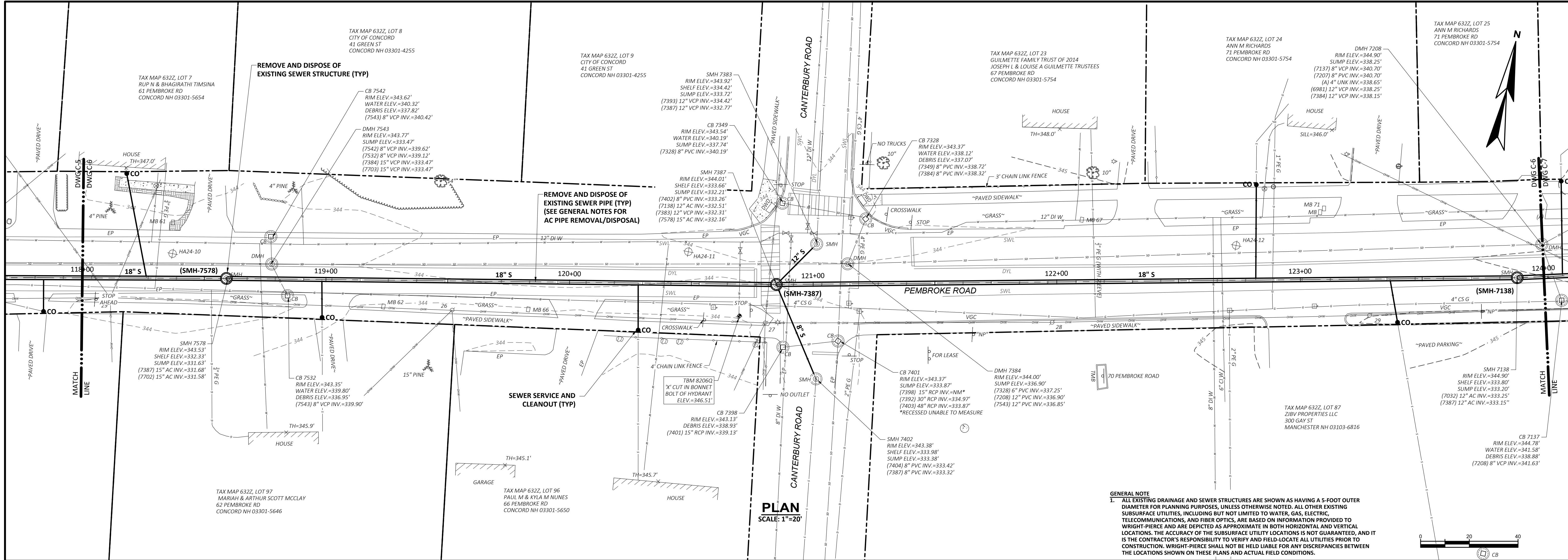
| REVISIONS |  | APPRO | DATE |
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| NO        |  |       |      |

|                        |                        |
|------------------------|------------------------|
| PROJECT NO: 21775      | DESIGNED: A KING/CDIAS |
| CAD COORD: CDIAS       | CAD: CDIAS/D.METZ      |
| CHECKED:               | DATE:                  |
| APPROVED:              | DATE:                  |
| SUBMISSION: 30% DESIGN |                        |

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|                                                                                    |                                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| CITY OF CONCORD, NEW HAMPSHIRE<br>CONCORD HEIGHTS<br>SEWER COLLECTION IMPROVEMENTS | PEMBROKE STREET - GRAVITY SEWER<br>PLAN AND PROFILE: STA 112+00 TO STA 118+00 |
|                                                                                    |                                                                               |

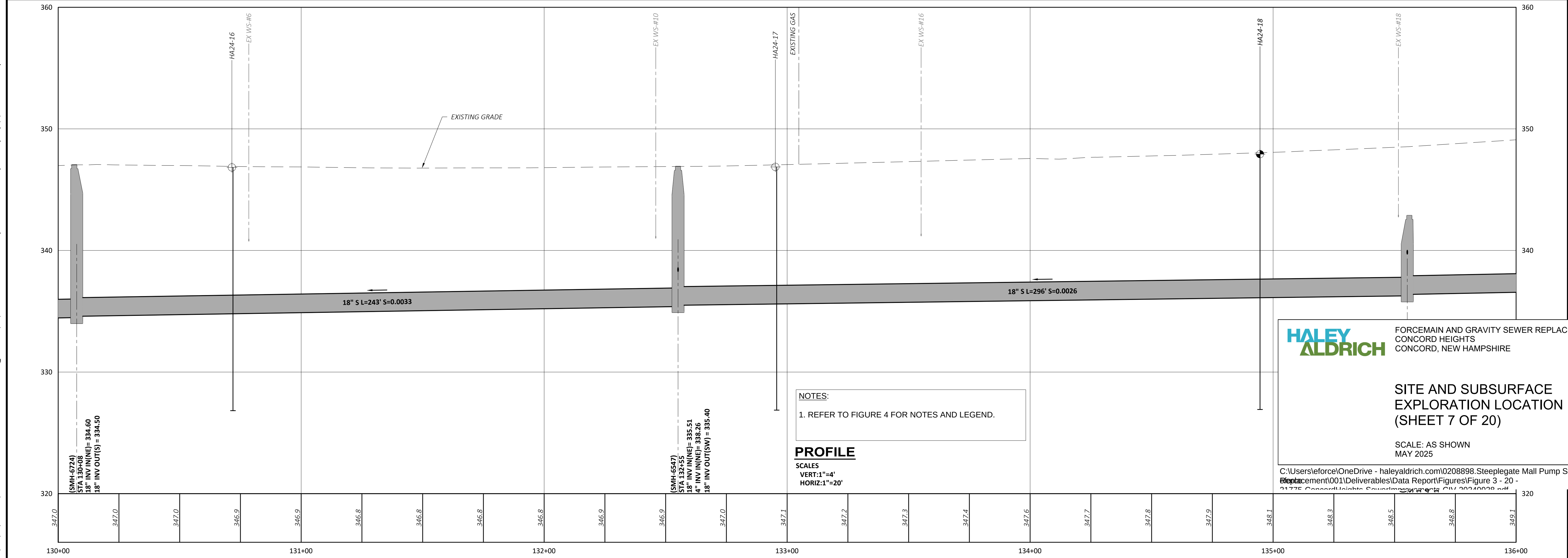






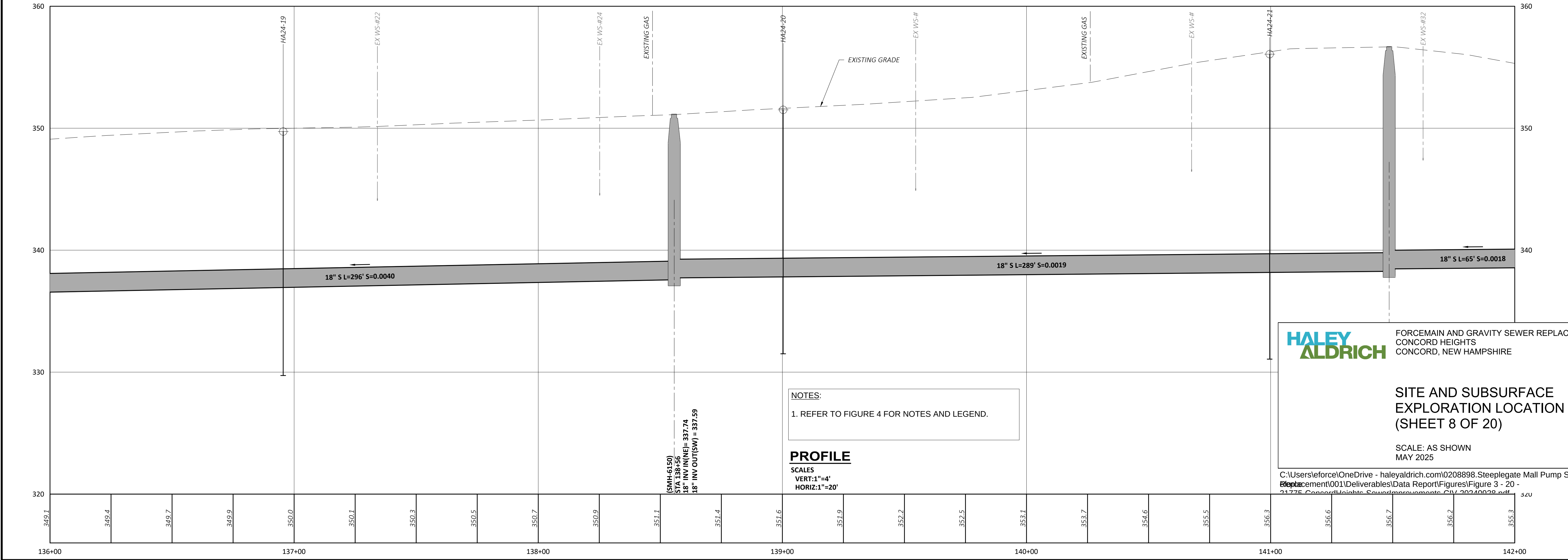
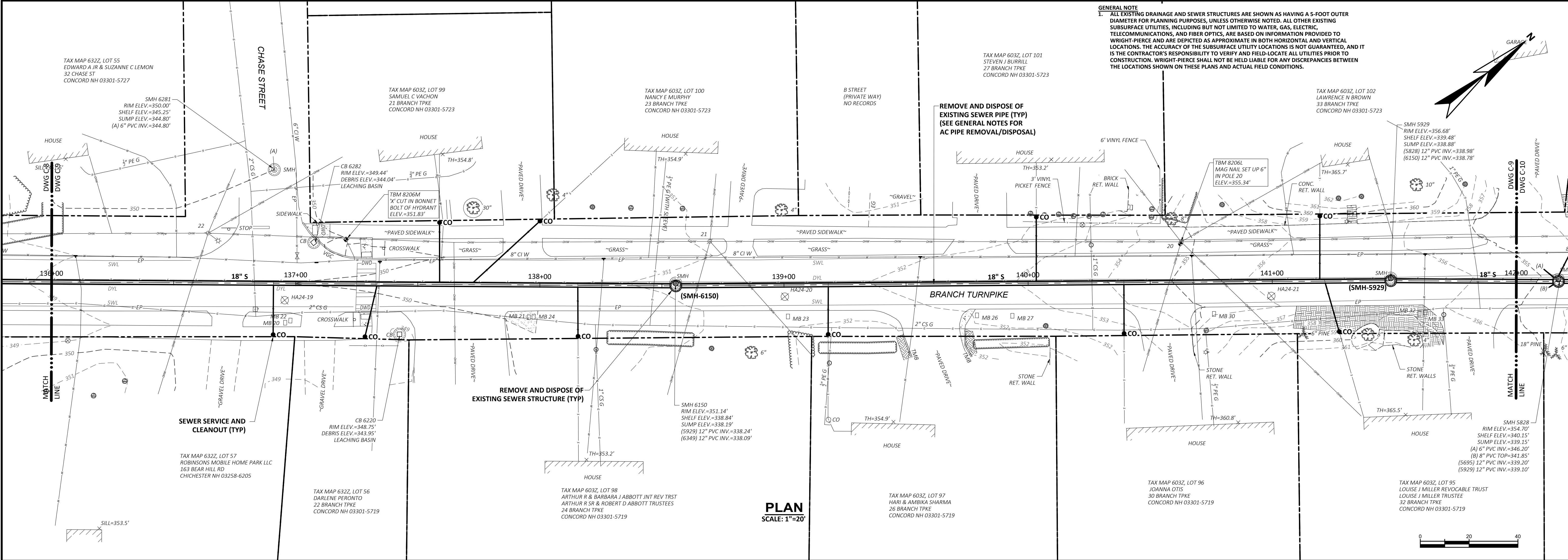






|         |     |    |    |          |      |         |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                   |    |           |            |   |
|---------|-----|----|----|----------|------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------|------------|---|
| DRAWING | C-8 | CL | SE | FIGURE 9 | PLAN | ELEMENT | <div><div><b>WRIGHT-PIERCE</b></div><div>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></div><div>239 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801</div></div> | PROJECT NO.: 21775<br>DESIGNED: A KING / C DIAS<br>CAD COORD: C DIAS<br>CAD: C DIAS / D METZ<br>CHECKED:<br>DATE:<br>APPROVED:<br>DATE:<br>SUBMISSION: 30% DESIGN | NO | REV/SIONS | APPD. DATE |   |
|         |     |    |    |          |      |         |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                   |    |           |            | △ |
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| REVISIONS |  | APPROVED | DATE |
|-----------|--|----------|------|
| NO        |  |          |      |

| PROJECT NO. | 21775        |
|-------------|--------------|
| DESIGNED BY | A.KING/CDIAS |
| CAD COORD.  | CDIAS        |
| CAD         | CDIAS/D.METZ |
| CHECKED     |              |
| DATE        |              |
| APPROVED    |              |
| DATE        |              |
| SUBMISSION  | 30% DESIGN   |

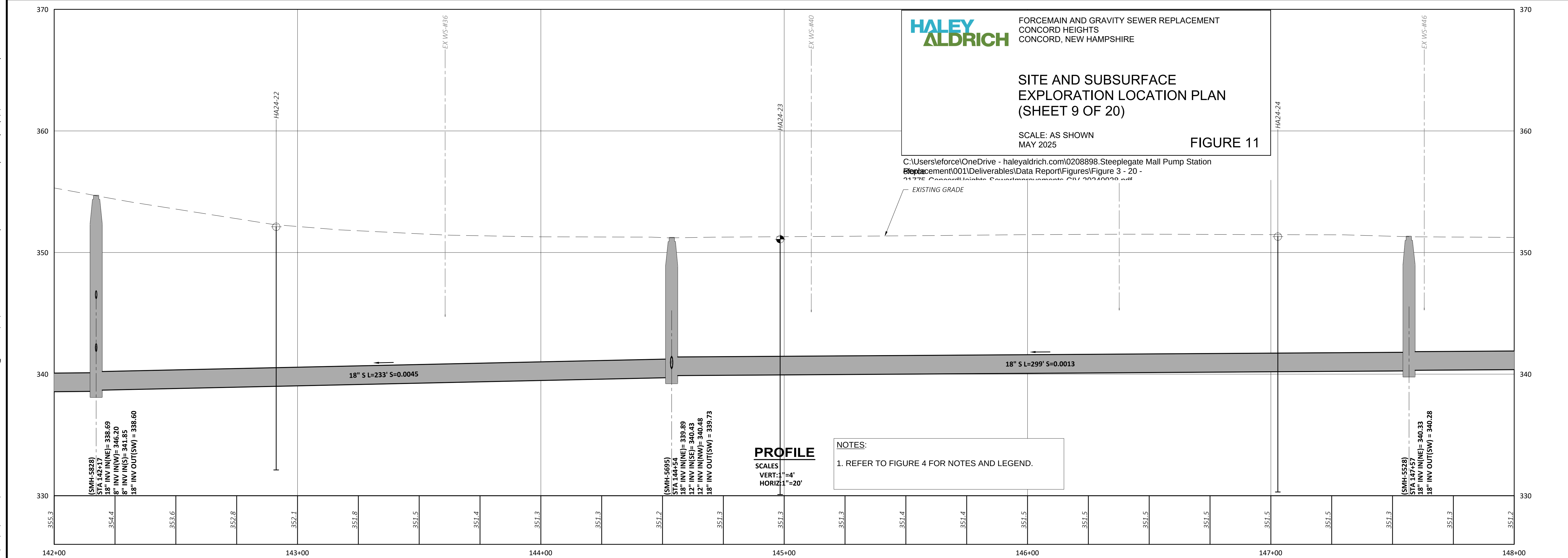
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DRAWING  
C-9

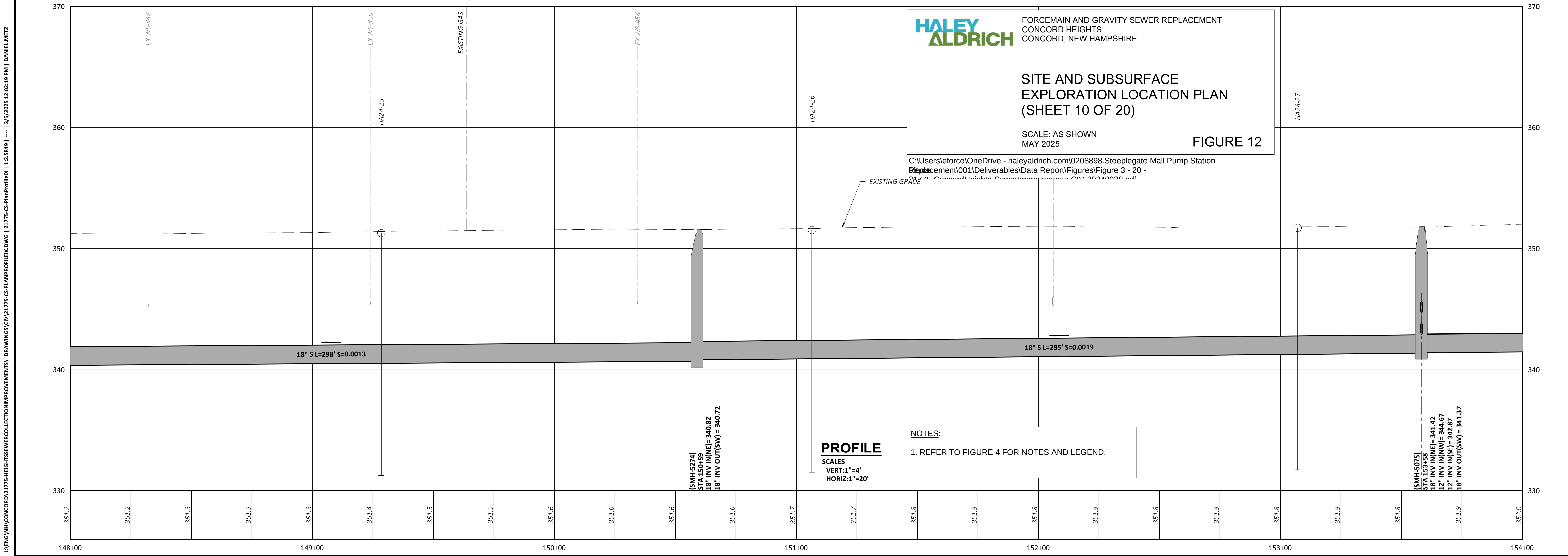
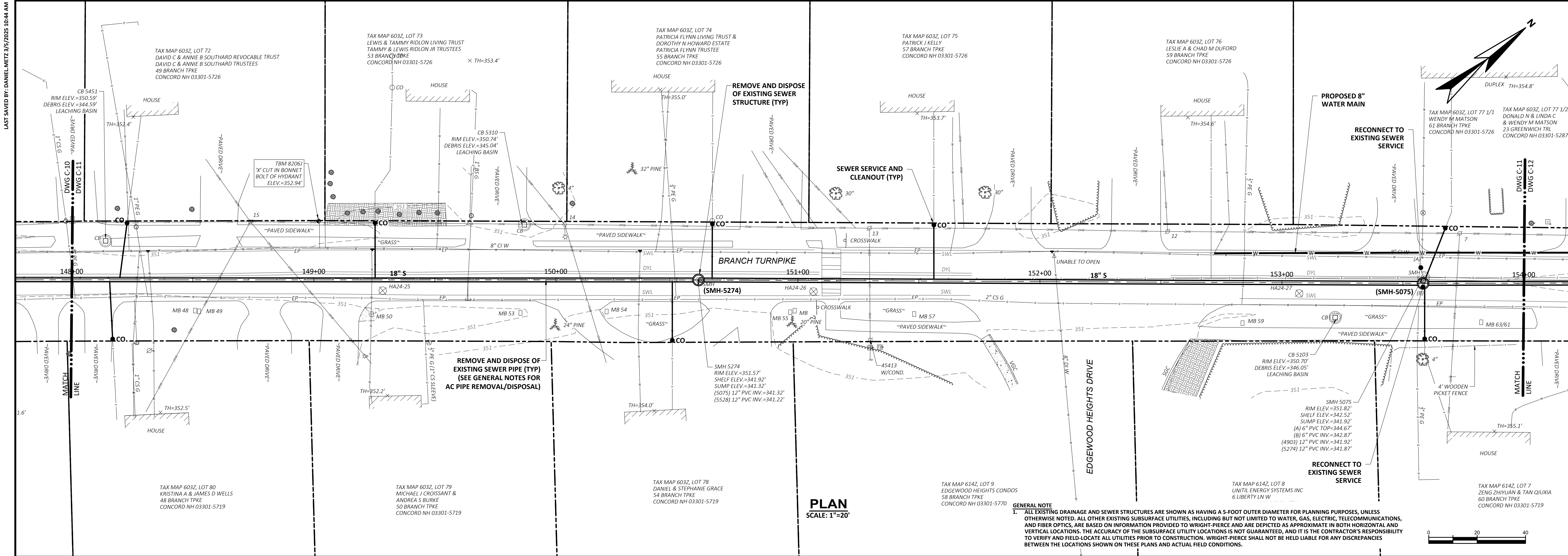




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| CITY OF CONCORD, NEW HAMPSHIRE<br>CONCORD HEIGHTS<br>SEWER COLLECTION IMPROVEMENTS |  <p><b>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></b></p> <p>230 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801</p> |  |  |  | PROJECT NO.: 21175       | NO | REV/SIONS | APPD DATE |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | DESIGNED: A.KINGS/C.DIAS |    |           |           |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | CAD COORD: C.DIAS        |    |           |           |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | CAD: C.DIAS/D.METZ       |    |           |           |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | CHECKED:                 |    |           |           |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | DATE:                    |    |           |           |
| BRANCH TURNPIKE - GRAVITY SEWER<br>PLAN AND PROFILE: STA 142+00 TO STA 148+00      |                                                                                                                                                                                                                                              |  |  |  | APPROVED:                |    |           |           |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | DATE:                    |    |           |           |
|                                                                                    |                                                                                                                                                                                                                                              |  |  |  | SUBMISSION: 30% DESIGN   |    |           |           |
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| REVISIONS |  | APPRO | DATE |
|-----------|--|-------|------|
| NO        |  |       |      |

| PROJECT NO:                     | 21775        |
|---------------------------------|--------------|
| DESIGNED: <td>A KING/CDIAS</td> | A KING/CDIAS |
| CAD COORD: <td>CDIAS</td>       | CDIAS        |
| CAD: <td>CDIAS/D.METZ</td>      | CDIAS/D.METZ |
| CHECKED: <td></td>              |              |
| DATE: <td></td>                 |              |
| APPROVED: <td></td>             |              |
| DATE: <td></td>                 |              |
| SUBMISSION: <td>30% DESIGN</td> | 30% DESIGN   |

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230 COMMERCIAL WAY, SUITE 302, PORTSMOUTH, NH 03801

**CITY OF CONCORD, NEW HAMPSHIRE**

**CONCORD HEIGHTS**

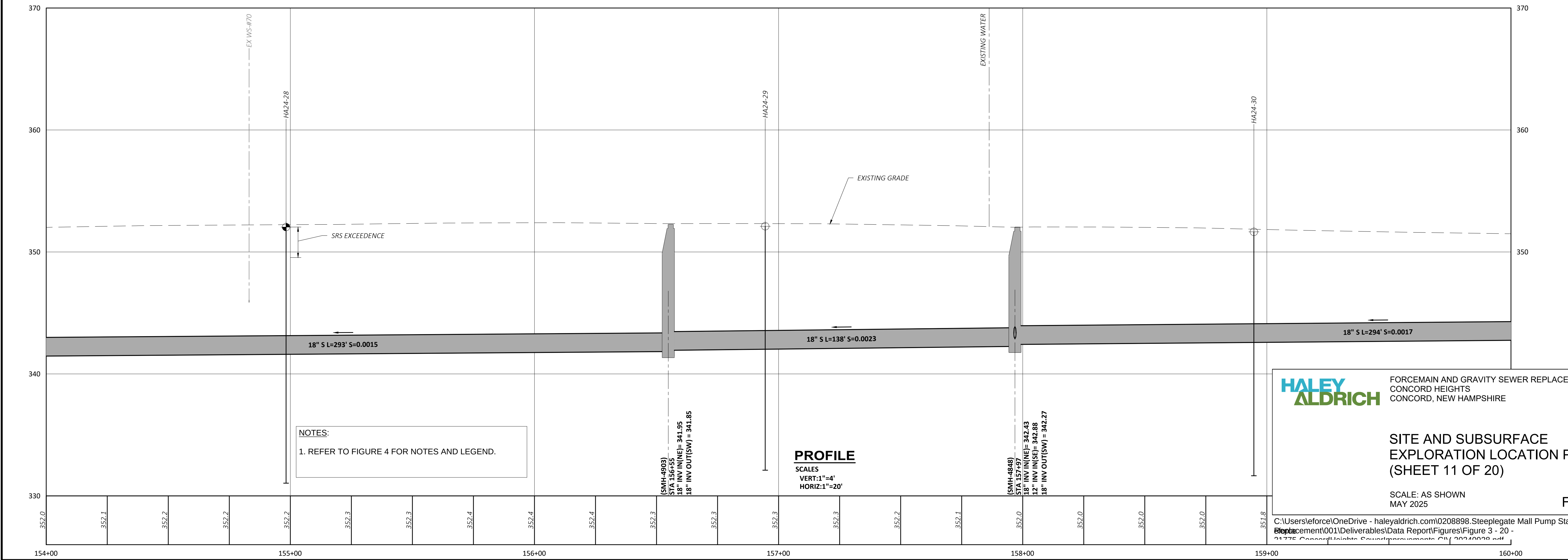
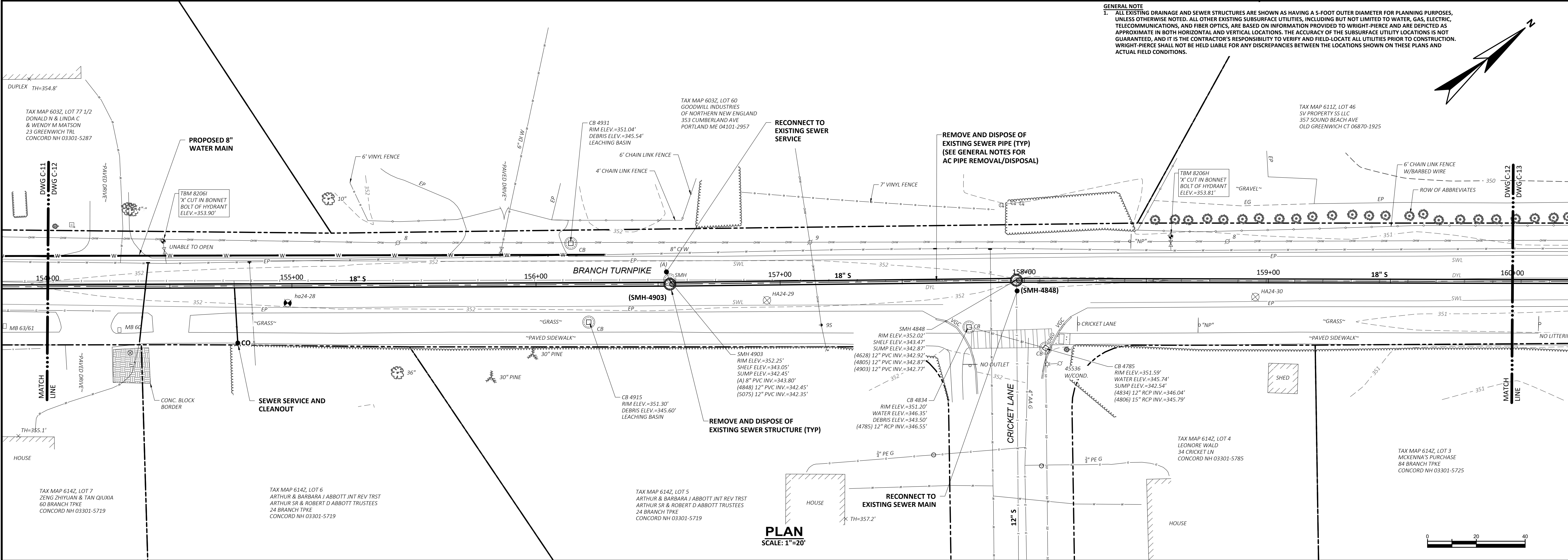
**SEWER COLLECTION IMPROVEMENTS**

**BRANCH TURNPIKE - GRAVITY SEWER**

**PLAN AND PROFILE: STA 148+00 TO STA 154+00**

DRAWING  
**C-11**





| REVISIONS |  | APPROVED | DATE |
|-----------|--|----------|------|
| NO        |  |          |      |

PROJECT NO: 21775  
DESIGNED: A KING/CDIAS  
CAD COORD: CDIAS  
CHECKED: CDIAS/D.METZ  
DATE: DATE  
APPROVED: DATE  
SUBMISSION: 30% DESIGN

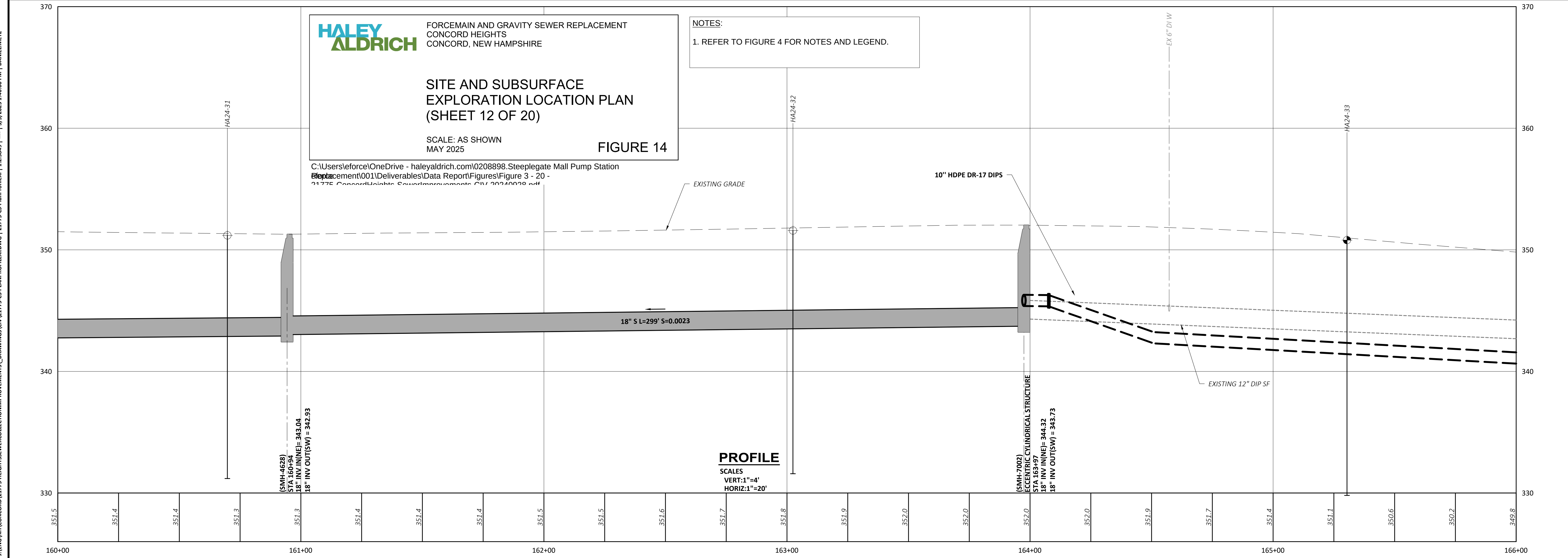
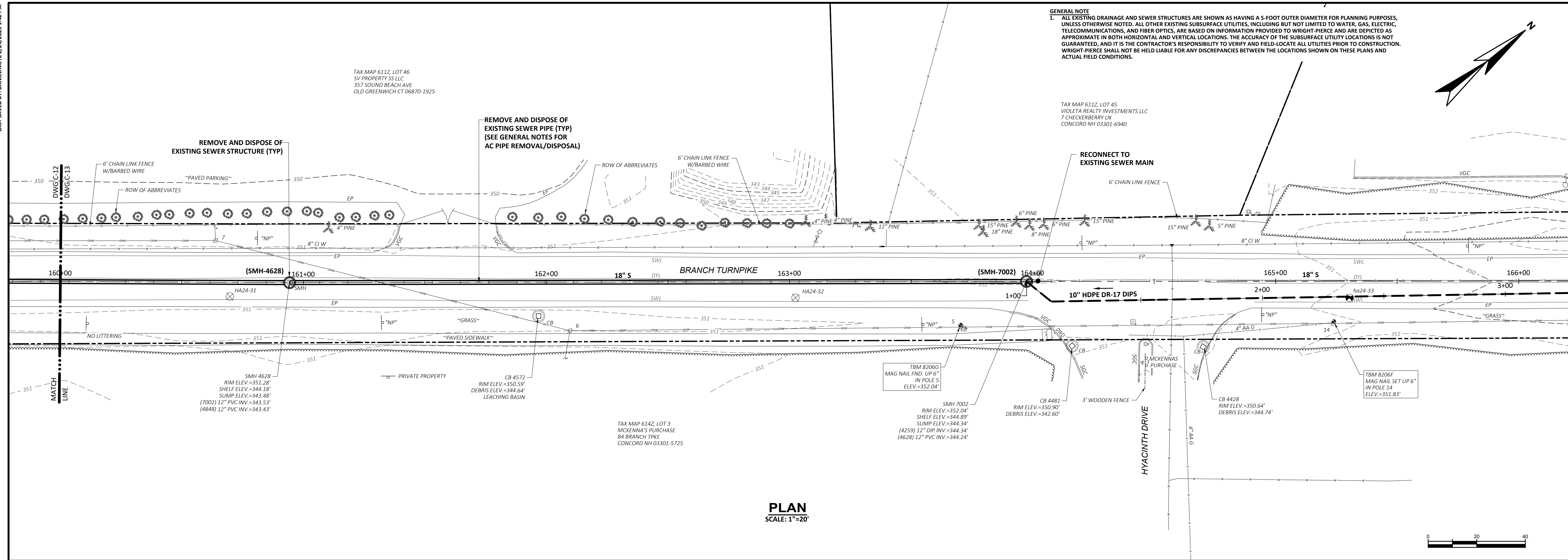
**WRIGHT-PIERCE**  
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NEW HAMPSHIRE  
HEIGHTS  
IMPROVEMENTS

BRANCH TURNPIKE - GRAVITY SEWER  
PLAN AND PROFILE: STA 154+00 TO STA 160+00

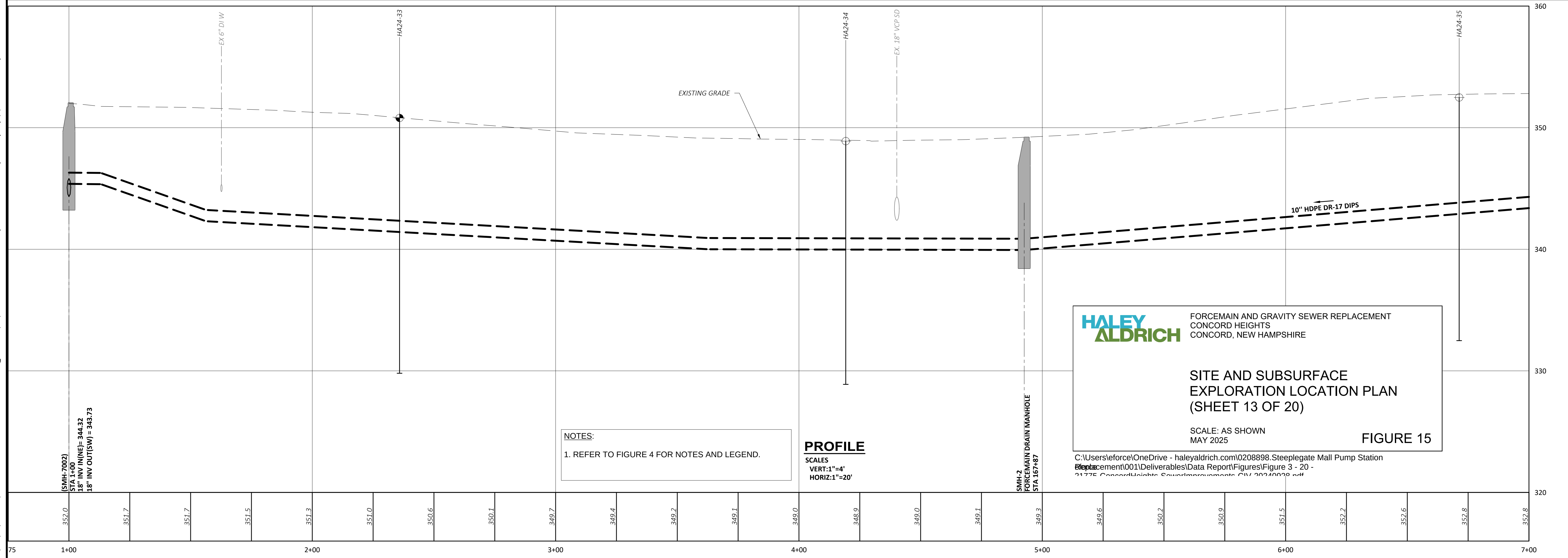
C-12





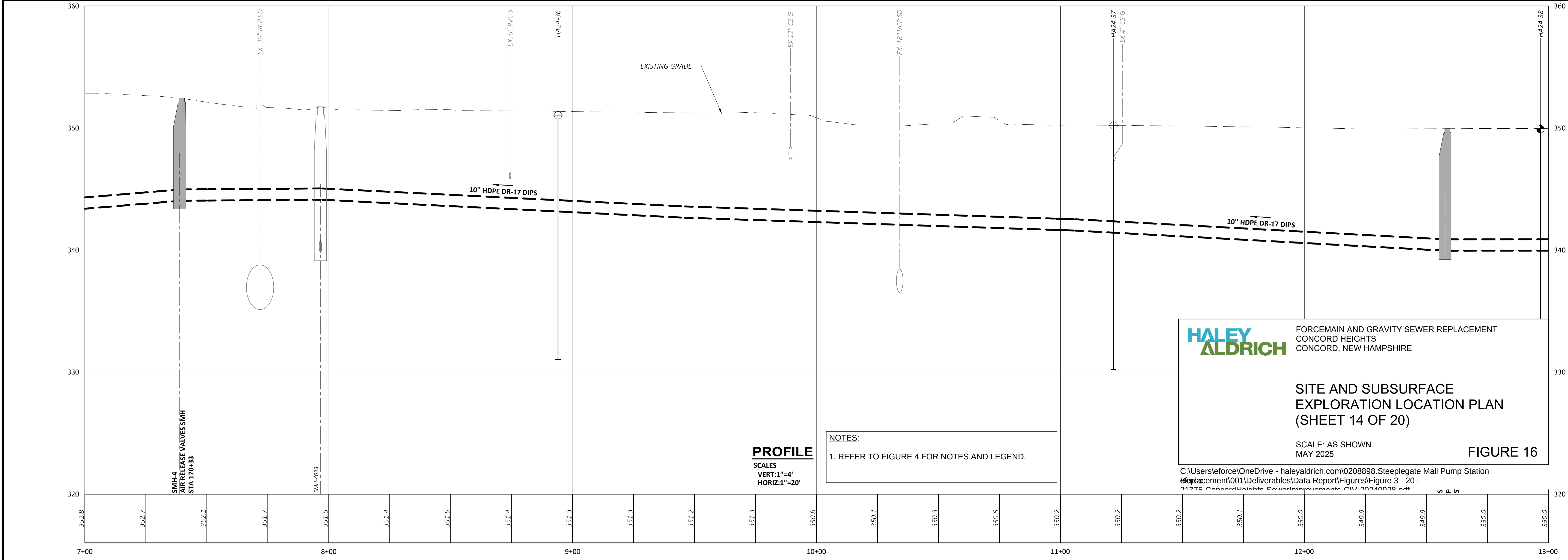
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| <div>CITY OF CONCORD, NEW HAMPSHIRE<br/>CONCORD HEIGHTS<br/>SEWER COLLECTION IMPROVEMENTS</div> <div>BRANCH TURNPIKE - GRAVITY SEWER<br/>PLAN AND PROFILE: STA 160+00 TO STA 166+00</div> |  | <div><div>WRIGHT-PIERCE</div><div>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></div><div>230 COMMERCE WAY, SUITE 302, PORTSMOUTH, NH 03801</div></div> |  |  |  |  |  |                        |  | PROJECT NO.: 21175      |  | NO | REVISIONS |  | APPD | DATE |
|                                                                                                                                                                                           |  |                                                                                                                                                                                           |  |  |  |  |  |                        |  | DESIGNED: A.KING/C.DIAS |  |    |           |  |      |      |
|                                                                                                                                                                                           |  |                                                                                                                                                                                           |  |  |  |  |  |                        |  | CAD COORD: C.DIAS       |  |    |           |  |      |      |
|                                                                                                                                                                                           |  |                                                                                                                                                                                           |  |  |  |  |  |                        |  | CAD: C.DIAS/D.METZ      |  |    |           |  |      |      |
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|                                                                                                                                                                                           |  |                                                                                                                                                                                           |  |  |  |  |  | DATE:                  |  | △                       |  |    |           |  |      |      |
|                                                                                                                                                                                           |  |                                                                                                                                                                                           |  |  |  |  |  | SUBMISSION: 30% DESIGN |  | △                       |  |    |           |  |      |      |
| DRAWING                                                                                                                                                                                   |  |                                                                                                                                                                                           |  |  |  |  |  |                        |  |                         |  |    |           |  |      |      |
| C-13                                                                                                                                                                                      |  |                                                                                                                                                                                           |  |  |  |  |  |                        |  |                         |  |    |           |  |      |      |





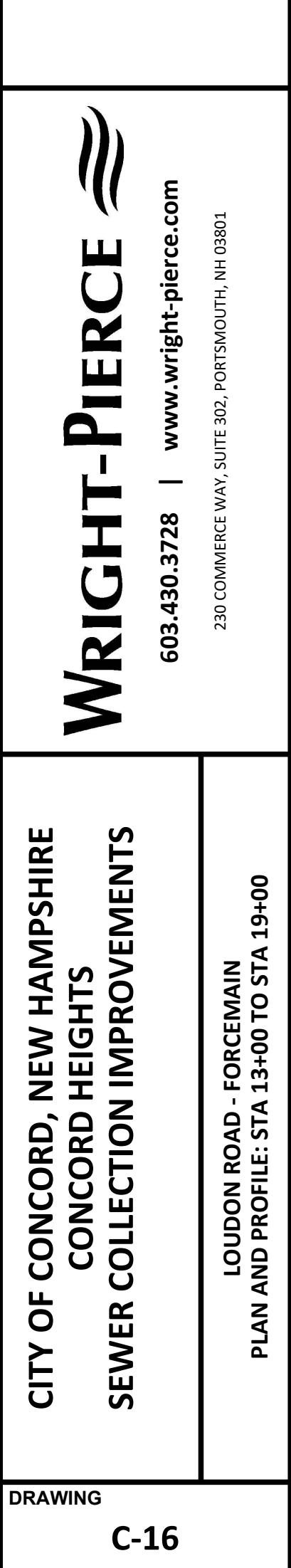
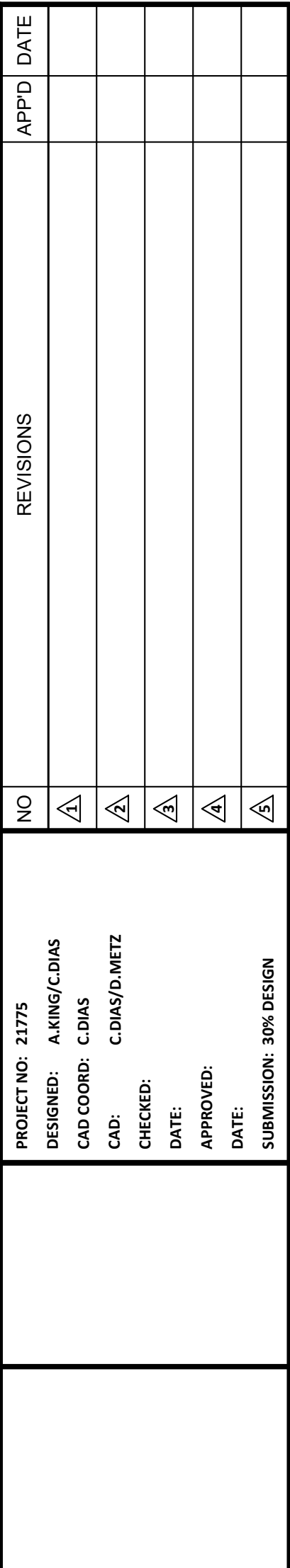
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| <p><b>CITY OF CONCORD, NEW HAMPSHIRE</b><br/> <b>CONCORD HEIGHTS</b><br/> <b>SEWER COLLECTION IMPROVEMENTS</b></p> | <p><b>WRIGHT-PIERCE</b></p>  <p>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></p> <p>230 COMMERCIAL WAY, SUITE 302, PORTSMOUTH, NH 03801</p> | <p>PROJECT NO: 21175<br/> DESIGNED: A.KINGS/CDIAS<br/> CAD COORD: C.DIAS<br/> CAD: C.DIAS/D.METZ<br/> CHECKED:<br/> DATE:<br/> APPROVED:<br/> DATE:<br/> SUBMISSION: 30% DESIGN</p> | NO | REVISIONS | APPD | DATE |
|                                                                                                                    |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                     | △  |           |      |      |
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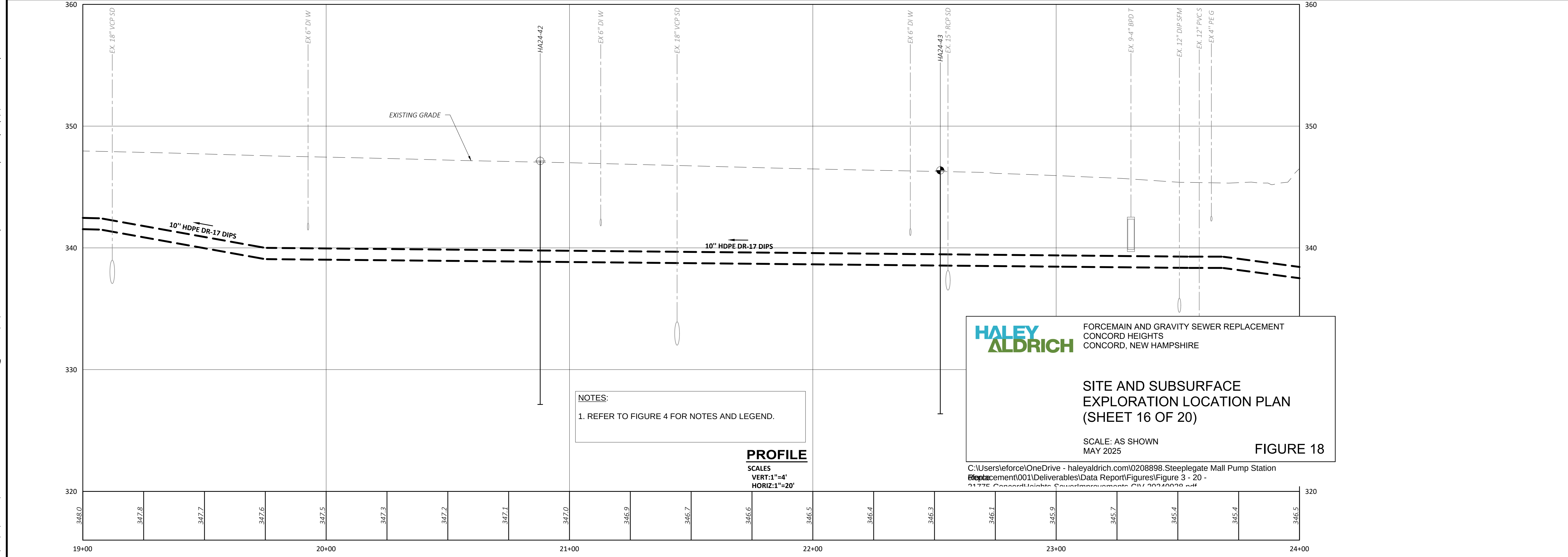
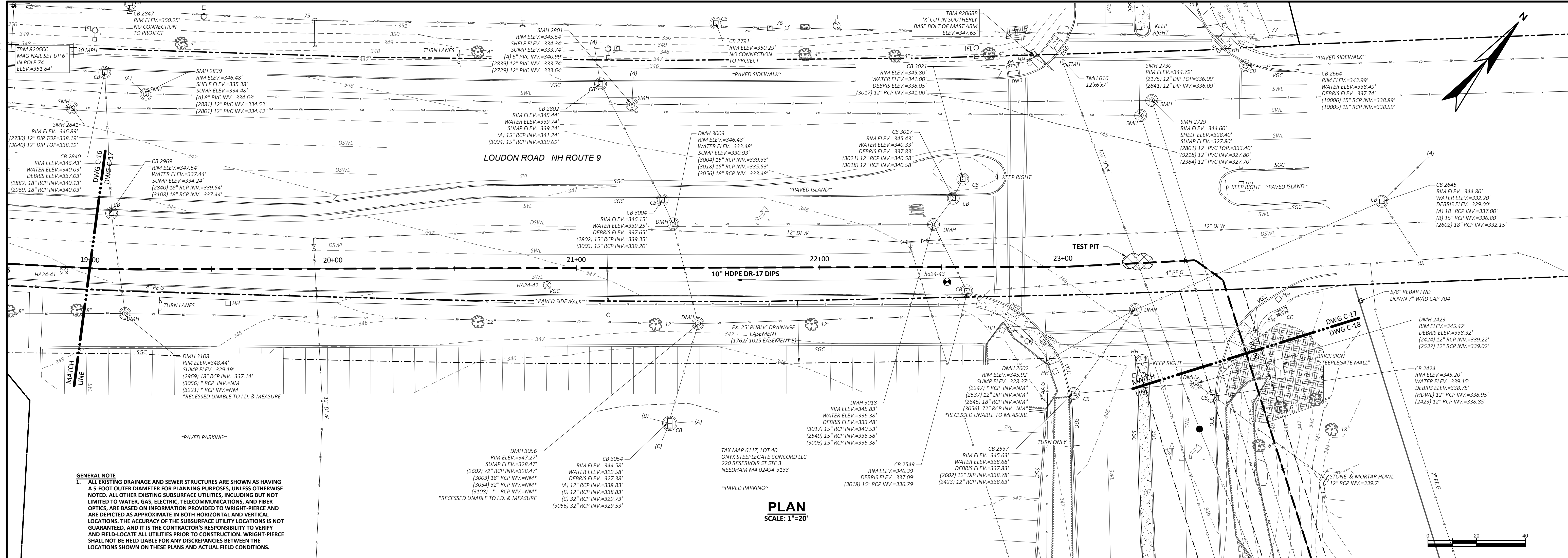


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| <p><b>CITY OF CONCORD, NEW HAMPSHIRE</b><br/> <b>CONCORD HEIGHTS</b><br/> <b>SEWER COLLECTION IMPROVEMENTS</b></p> | <p><b>WRIGHT-PIERCE</b></p>  <p>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></p> <p>230 COMMERCIAL WAY, SUITE 302, PORTSMOUTH, NH 03801</p> | <p>PROJECT NO: 21175<br/> DESIGNED: A.KINGS/C.DIAS<br/> CAD COORD: C.DIAS<br/> CAD: C.DIAS/D.METZ<br/> CHECKED:<br/> DATE:<br/> APPROVED:<br/> DATE:<br/> SUBMISSION: 30% DESIGN</p> | NO | REVISIONS | APPD | DATE |
|                                                                                                                    |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                      | △  |           |      |      |
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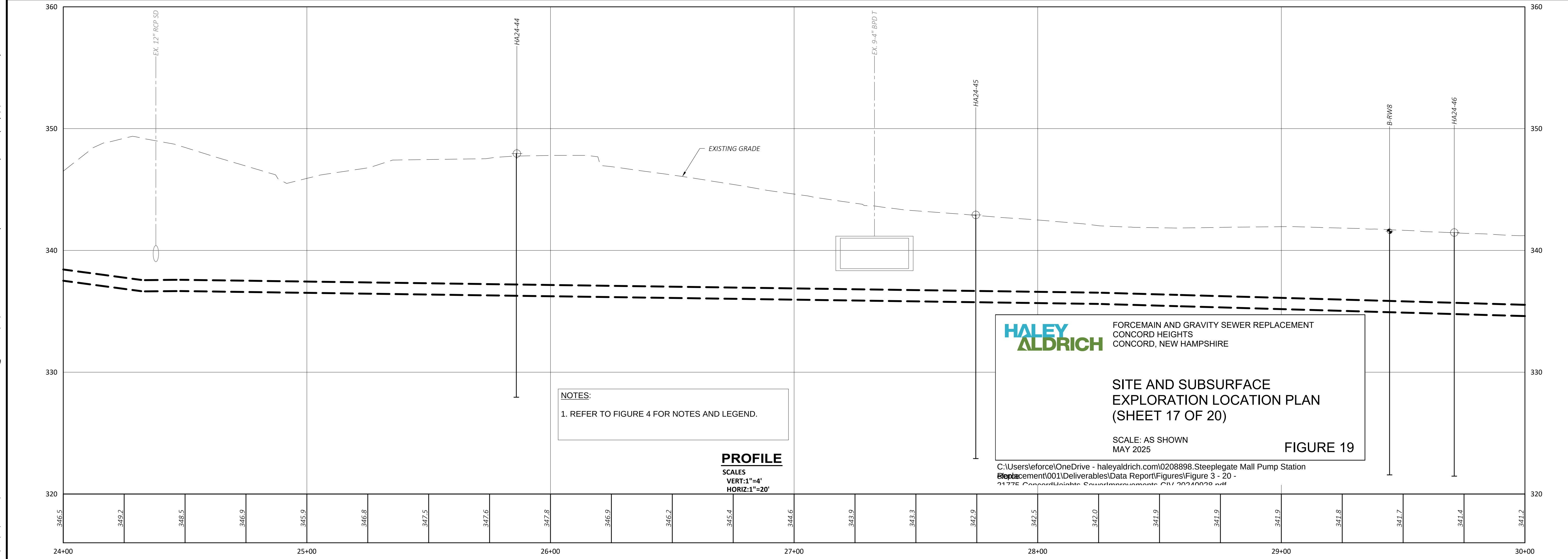






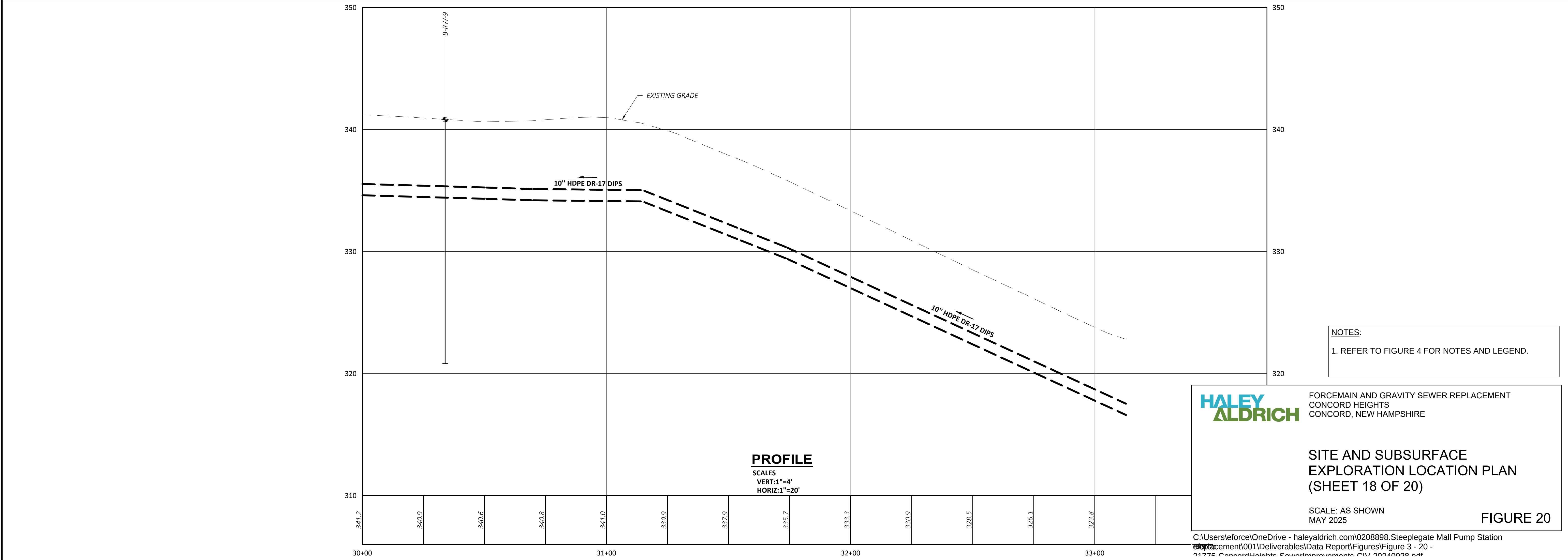
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| CITY OF CONCORD, NEW HAMPSHIRE<br>CONCORD HEIGHTS<br>SEWER COLLECTION IMPROVEMENTS | WRIGHT-PIERCE<br><br>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a><br><br>230 COMMERCIAL WAY, SUITE 302, PORTSMOUTH, NH 03801 |  | PROJECT NO: 21775<br>DESIGNED: A.J.KING/C.DIAS<br>CADD COORD: C.DIAS<br>CADD: C.DIAS/D.METZ<br>CHECKED:<br>DATE:<br>APPROVED:<br>DATE:<br>SUBMISSION: 30% DESIGN | NO | REVISIONS | APPD | DATE |
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| DRAWING                                                                            |                                                                                                                                                                                                                                                     |  | C-17                                                                                                                                                             |    |           |      |      |





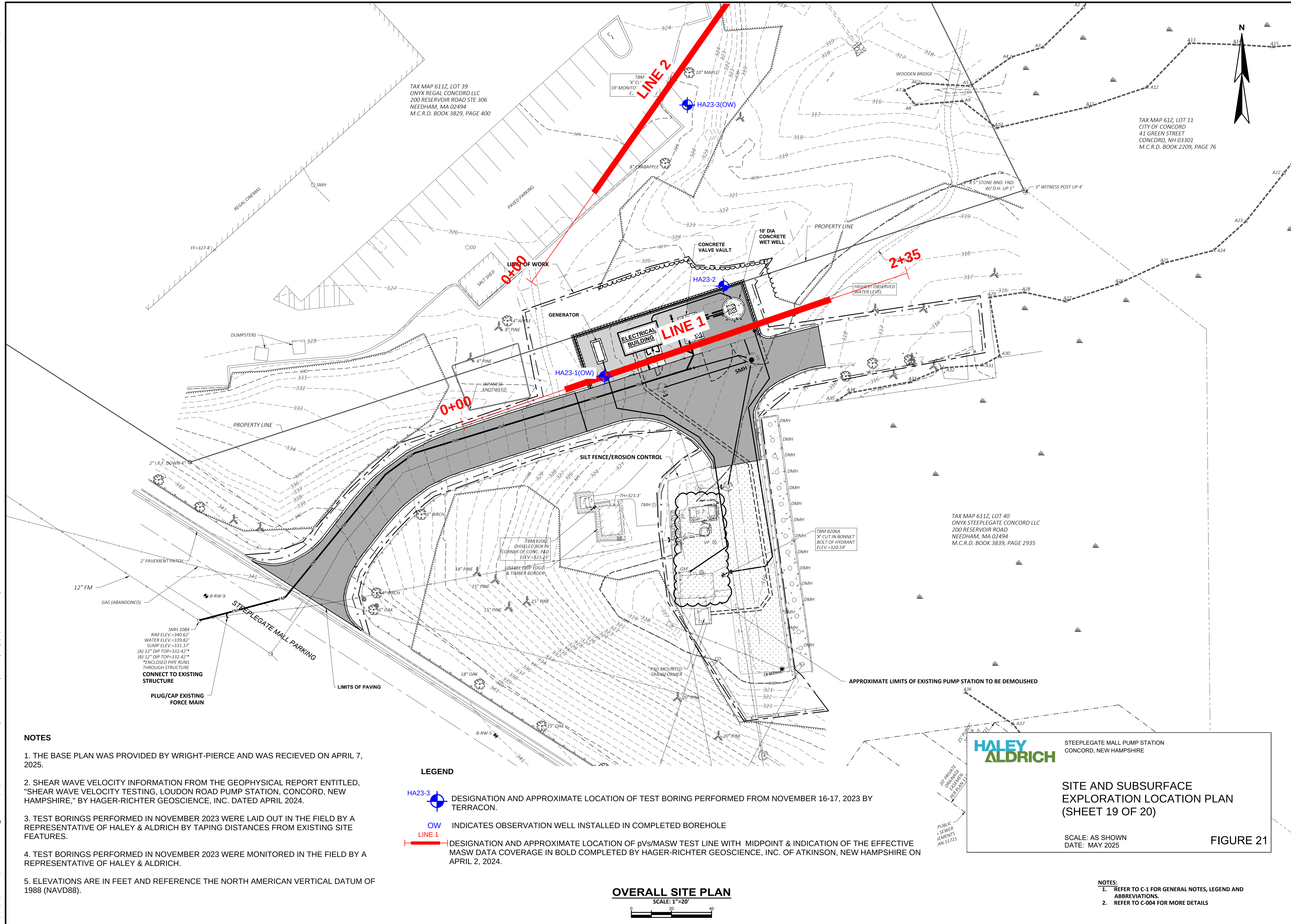
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| <div>CITY OF CONCORD, NEW HAMPSHIRE<br/>CONCORD HEIGHTS<br/>SEWER COLLECTION IMPROVEMENTS</div> <div>STEEPLEGATE MALL - FORCEMAIN<br/>PLAN AND PROFILE: STA 24+00 TO STA 30+00</div> | <div><div>WRIGHT-PIERCE</div><div>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></div><div>230 COMMERCIAL WAY, SUITE 302, PORTSMOUTH, NH 03801</div></div> |  |  |  | PROJECT NO.: 21775      | NO | REVISIONS | DATE |
|                                                                                                                                                                                      |                                                                                                                                                                                             |  |  |  | DESIGNED: A.KING/C.DIAS | △  |           |      |
|                                                                                                                                                                                      |                                                                                                                                                                                             |  |  |  | CAD COORD: C.DIAS       |    |           |      |
|                                                                                                                                                                                      |                                                                                                                                                                                             |  |  |  | CAD: C.DIAS/D.METZ      | △  |           |      |
|                                                                                                                                                                                      |                                                                                                                                                                                             |  |  |  | CHECKED:                | △  |           |      |
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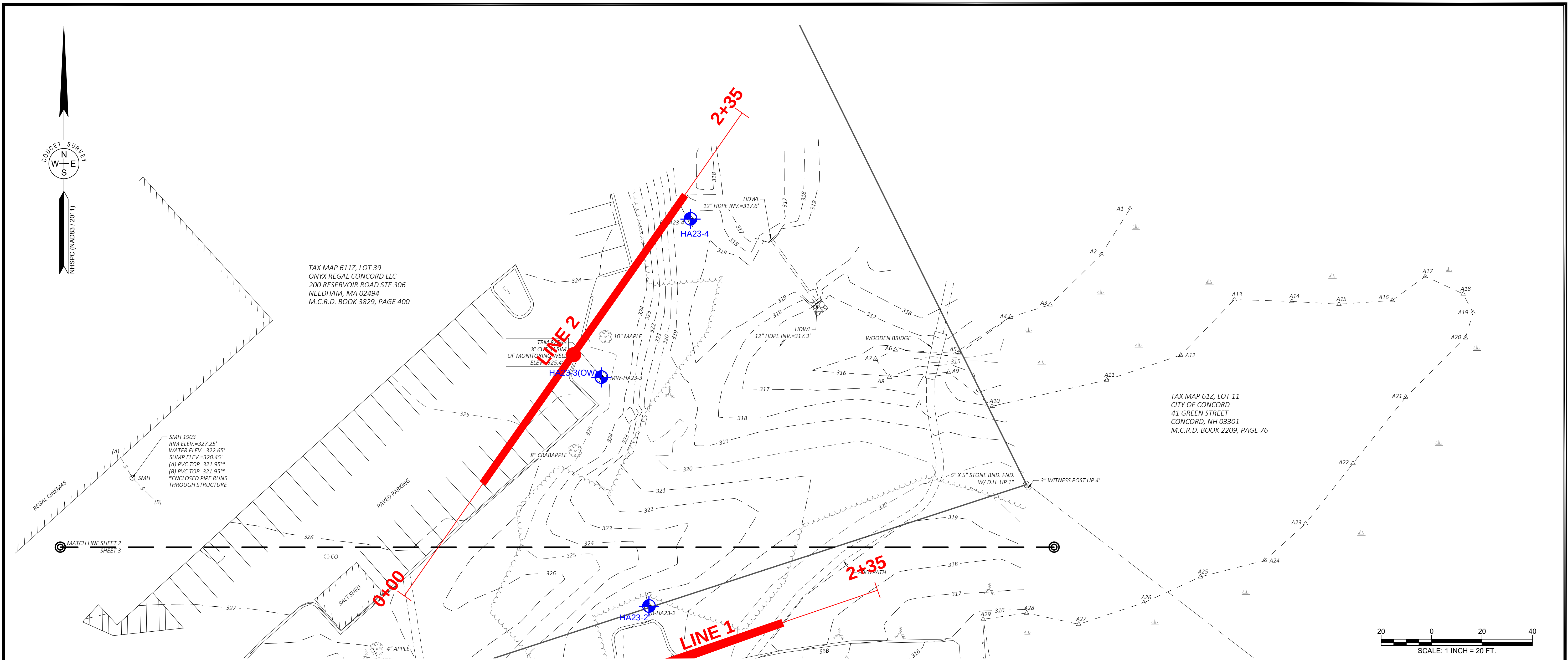
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| <div>CITY OF CONCORD, NEW HAMPSHIRE<br/>CONCORD HEIGHTS<br/>SEWER COLLECTION IMPROVEMENTS</div> <div>STEEPLEGATE MALL - FORCEMAIN<br/>PLAN AND PROFILE: STA 30+00 TO STA 33+84</div> |  | <div><div>WRIGHT-PIERCE</div><div>603.430.3728   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a></div><div>230 COMMERCIAL WAY, SUITE 302, PORTSMOUTH, NH 03801</div></div> |  |  |  |  |  |  | PROJECT NO.: 21175<br>DESIGNED: A.KING/C.DIAS<br>CAD COORD: C.DIAS<br>CAD: C.DIAS/D.METZ<br>CHECKED:<br>DATE:<br>APPROVED:<br>DATE:<br>SUBMISSION: 30% DESIGN |  | NO | REVISIONS | APPD | DATE |
|                                                                                                                                                                                      |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  | △  |           |      |      |
|                                                                                                                                                                                      |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  | △  |           |      |      |
|                                                                                                                                                                                      |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  | △  |           |      |      |
|                                                                                                                                                                                      |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  | △  |           |      |      |
|                                                                                                                                                                                      |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  | △  |           |      |      |
| DRAWING                                                                                                                                                                              |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  |    |           |      |      |
| C-19                                                                                                                                                                                 |  |                                                                                                                                                                                             |  |  |  |  |  |  |                                                                                                                                                               |  |    |           |      |      |





|                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |  |   |  |  |  |                                                                                                                                                                                                                             |  |    |           |      |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----|-----------|------|------|
| <div> <div> CITY OF CONCORD, NEW HAMPSHIRE<br/> STEEPLEGATE MALL PUMP STATION<br/> AND FORCE MAIN UPGRADES </div> <div> OVERALL SITE LOCATION PLAN </div> </div> | <div> <div>  <div> 603.606.4420   <a href="http://www.wright-pierce.com">www.wright-pierce.com</a> </div> </div> <div> 10 CORPORATE DRIVE, SUITE 206, BEDFORD, NH 03101 </div> </div> |  |   |  |  |  | <div> PROJECT NO: 21638<br/> DESIGNED: J.SHAHTMAN<br/> CAD COORD: K.TURNER/A.NEMEC<br/> CAD: D.SAVAGE/M.VACHON<br/> CHECKED: R.GREENE<br/> DATE: 2-2025<br/> APPROVED:<br/> DATE:<br/> SUBMISSION: 90% DESIGN REVIEW </div> |  | NO | REV/SIONS | APPD | DATE |
|                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |  | A |  |  |  |                                                                                                                                                                                                                             |  |    |           |      |      |
|                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |  | A |  |  |  |                                                                                                                                                                                                                             |  |    |           |      |      |
|                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |  | A |  |  |  |                                                                                                                                                                                                                             |  |    |           |      |      |
|                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |  | A |  |  |  |                                                                                                                                                                                                                             |  |    |           |      |      |
|                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |  | A |  |  |  |                                                                                                                                                                                                                             |  |    |           |      |      |





NOTES

1. THE BASE PLAN DATED DECEMBER 2023 WAS PROVIDED BY WRIGHT-PIERCE.
2. SHEAR WAVE VELOCITY INFORMATION FROM THE GEOPHYSICAL REPORT ENTITLED, "SHEAR WAVE VELOCITY TESTING, LOUDON ROAD PUMP STATION, CONCORD, NEW HAMPSHIRE," BY HAGER-RICHTER GEOSCIENCE, INC. DATED APRIL 2024.
3. TEST BORINGS PERFORMED IN NOVEMBER 2023 WERE LAID OUT IN THE FIELD BY A REPRESENTATIVE OF HALEY & ALDRICH BY TAPING DISTANCES FROM EXISTING SITE FEATURES.
4. TEST BORINGS PERFORMED IN NOVEMBER 2023 WERE MONITORED IN THE FIELD BY A REPRESENTATIVE OF HALEY & ALDRICH.
5. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND

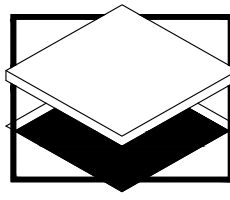
- HA23-3  
OW  
LINE 1
- DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING PERFORMED FROM NOVEMBER 16-17, 2023 BY TERRACON.
- INDICATES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE
- DESIGNATION AND APPROXIMATE LOCATION OF pVs/MASW TEST LINE WITH MIDPOINT & INDICATION OF THE EFFECTIVE MASW DATA COVERAGE IN BOLD COMPLETED BY HAGER-RICHTER GEOSCIENCE, INC. OF ATKINSON, NEW HAMPSHIRE ON APRIL 2, 2024.

| SURVEY CONTROL DATA |            |             |           |              |
|---------------------|------------|-------------|-----------|--------------|
| POINT               | NORTHING   | EASTING     | ELEVATION | DESCRIPTION  |
| 1                   | 263979.817 | 1032527.414 | 341.01    | MAG NAIL SET |
| 2                   | 264098.816 | 1032760.256 | 320.54    | MAG NAIL SET |
| 3                   | 264164.812 | 1032860.906 | 319.55    | SPIKE SET    |
| 4                   | 264217.146 | 1032671.076 | 324.82    | MAG NAIL SET |
| 5                   | 264141.687 | 1032516.202 | 326.90    | MAG NAIL SET |
| 50                  | 264191.811 | 1032157.068 | 346.47    | MAG NAIL SET |

TOPOGRAPHIC PLAN  
FOR  
WRIGHT-PIERCE  
OF  
STEEPLEGATE MALL PUMP STATION  
OFF LOUDON ROAD  
CONCORD, NEW HAMPSHIRE

| DRAFT<br>12/15/23 |      |             |    |
|-------------------|------|-------------|----|
| NO.               | DATE | DESCRIPTION | BY |

|             |        |             |                   |
|-------------|--------|-------------|-------------------|
| DRAWN BY:   | A.K.H. | DATE:       | DECEMBER 15, 2023 |
| CHECKED BY: | J.F.K. | DRAWING NO. | 8206A             |
| JOB NO.     | 8206   | SHEET       | 2 OF 3            |

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**HALEY  
ALDRICH**

STEEPLEGATE MALL PUMP STATION  
CONCORD, NEW HAMPSHIRE

SITE AND SUBSURFACE  
EXPLORATION LOCATION PLAN  
(SHEET 20 OF 20)

SCALE: AS SHOWN  
DATE: MAY 2025

FIGURE 22

mbrassard

## APPENDIX A

### Test Boring Logs

## **2023 Test Boring Logs**

## TEST BORING REPORT

Boring No. HA23-1

Project Steeplegate Mall Pump Station, 270 Loudon Road, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-000  
Sheet No. 1 of 3  
Start 16 November 2023  
Finish 16 November 2023  
Driller P. Michaud  
H&A Rep. H. Hollauer  
Elevation 326.0 (est.)  
Datum NAVD88  
Location See Plan

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures      |
|-----------------------|--------|---------|--------|----------------------------------------|
| Type                  | HW     | S       | NQ     | Rig Make & Model: Mobile Drill B-57    |
| Inside Diameter (in.) | 4.0    | 1.375   | 1.87   | Bit Type: Roller Bit                   |
| Hammer Weight (lb)    | 140    | 140     | -      | Drill Mud: Polymer                     |
| Hammer Fall (in.)     | 30     | 30      | -      | Casing: HSA to 12'/HW to 44.5'         |
|                       |        |         |        | Hoist/Hammer: Winch / Automatic Hammer |
|                       |        |         |        | PID Make & Model: MiniRAE 3000 10.6 eV |

| Depth (ft) | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft)                                                                 | PID Readings<br>(ppm) | Casing Blows<br>(per ft) | Well Diagram                                                                  | Stratum<br>Change<br>Elev/Depth (ft) | USCS Symbol                                                                                                | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME, max. particle size*,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          |        | Field Test |           |           |            |          |
|------------|----------------------------|----------------------------|--------------------------------------------------------------------------------------|-----------------------|--------------------------|-------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|--------|------------|-----------|-----------|------------|----------|
|            |                            |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   | % Coarse | % Fine | % Coarse | % Medium | % Fine | % Fines    | Dilatancy | Toughness | Plasticity | Strength |
| 0          | 4                          | S1<br>14                   | 0.0                                                                                  | 0.0                   |                          | 325.7                                                                         | SP                                   | -TOPSOIL/ROOTMAT-                                                                                          | -                                                                                                                                                                                                 | -        | -      | 5        | 90       | 5      |            |           |           |            |          |
|            | 0.3                        |                            | Medium dense medium orange-brown poorly-graded SAND (SP), no structure, no odor, dry |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 6                          | S2<br>20                   | 2.0                                                                                  |                       |                          | 324.5                                                                         | SP                                   | -FILL-                                                                                                     | -                                                                                                                                                                                                 | 5        | -      | 5        | 85       | 5      |            |           |           |            |          |
|            | 2.0                        |                            | 1.5                                                                                  |                       |                          | Dense medium orange-brown poorly-graded SAND (SP), no structure, no odor, dry |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 10                         |                            | 4.0                                                                                  |                       |                          |                                                                               |                                      | -GLACIODELTAIC DEPOSIT-                                                                                    |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 15                         |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 18                         |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 15                         |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
| 5          | 4                          | S3<br>22                   | 5.0                                                                                  | 0.0                   |                          | 321.0                                                                         | SM                                   | Loose orange-brown silty SAND (SM), stratified, multiple oxidation layers form 5.2 to 6.7 ft, no odor, dry | -                                                                                                                                                                                                 | -        | -      | 14       | 70       | 16     |            |           |           |            |          |
|            | 5.0                        |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 4                          |                            | 7.0                                                                                  |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 5                          |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 8                          |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
| 10         | 5                          | S4<br>18                   | 10.0                                                                                 | 0.0                   |                          | 316.0                                                                         | SP                                   | Medium dense orange-brown poorly-graded SAND (SP), no structure, no odor, dry                              | -                                                                                                                                                                                                 | -        | -      | -        | 95       | 5      |            |           |           |            |          |
|            | 10.0                       |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 6                          |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 7                          |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 9                          |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            |                            |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            |                            |                            |                                                                                      |                       | 48                       |                                                                               |                                      |                                                                                                            | Note: Water encountered during drilling at approximately 13.5 ft.                                                                                                                                 |          |        |          |          |        |            |           |           |            |          |
|            |                            |                            |                                                                                      |                       | 52                       |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            |                            |                            |                                                                                      |                       | 45                       |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
| 15         | 2                          | S5<br>18                   | 15.0                                                                                 | 0.0                   |                          | 46                                                                            | SP                                   | Loose orange-brown poorly-graded SAND (SP), no structure, no odor, wet                                     | -                                                                                                                                                                                                 | -        | -      | 53       | 46       | 1      |            |           |           |            |          |
|            | 3                          |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 4                          |                            | 17.0                                                                                 |                       |                          |                                                                               |                                      | 44                                                                                                         |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            | 5                          |                            |                                                                                      |                       |                          |                                                                               |                                      | 52                                                                                                         |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            |                            |                            |                                                                                      |                       |                          | 54                                                                            |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
|            |                            |                            |                                                                                      |                       |                          | 57                                                                            |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |
| 20         |                            |                            |                                                                                      |                       |                          |                                                                               |                                      |                                                                                                            |                                                                                                                                                                                                   |          |        |          |          |        |            |           |           |            |          |

| Water Level Data |      |                    |                  |                |       | Sample ID                                                                                  |  | Well Diagram |  | Summary           |         |
|------------------|------|--------------------|------------------|----------------|-------|--------------------------------------------------------------------------------------------|--|--------------|--|-------------------|---------|
| Date             | Time | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Split Spoon Sample |  |              |  | Overburden (ft)   | 44.5    |
|                  |      |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                            |  |              |  | Rock Cored (ft)   | 5.0     |
| 11/16/23         | 1430 | 0                  | -                | 23.0           | 14.2  |                                                                                            |  |              |  | Samples           | 11S, 1C |
|                  |      |                    |                  |                |       |                                                                                            |  |              |  | Boring No. HA23-1 |         |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

\*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

## TEST BORING REPORT

Boring No. HA23-1

File No. 0208898-000

Sheet No. 2 of 3

| Depth (ft) | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft) | PID Readings<br>(ppm) | Casing Blows<br>(per ft) | Well Diagram                                                                        | Stratum<br>Change<br>Elev/Depth (ft) | USCS Symbol | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME, max. particle size,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          |        |    | Field Test |           |           |            |
|------------|----------------------------|----------------------------|----------------------|-----------------------|--------------------------|-------------------------------------------------------------------------------------|--------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|--------|----|------------|-----------|-----------|------------|
|            |                            |                            |                      |                       |                          |                                                                                     |                                      |             |                                                                                                                                                                                                  | % Coarse | % Fine | % Coarse | % Medium | % Fine |    | % Fines    | Dilatancy | Toughness | Plasticity |
| 20         | 5<br>5<br>5<br>7           | S6<br>6                    | 20.0<br>22.0         |                       | 60                       |    |                                      | SP          | Loose orange-brown poorly-graded SAND (SP), no structure., no odor, wet                                                                                                                          | -        | 5      | 5        | 10       | 75     | 5  |            |           |           |            |
|            |                            |                            |                      |                       | 60                       |    |                                      |             | -GLACIODELTAIC DEPOSIT-                                                                                                                                                                          |          |        |          |          |        |    |            |           |           |            |
|            | 5<br>5<br>5<br>8           | S7<br>14                   | 22.0<br>24.0         |                       | 58                       |    |                                      | SP          | Similar to description for Sample S6                                                                                                                                                             | 5        | -      | 5        | 10       | 75     | 5  |            |           |           |            |
|            |                            |                            |                      |                       | 80                       |    |                                      |             | Note: Driller added polymer to water.                                                                                                                                                            |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 75                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
| 25         | 13<br>11<br>16<br>14       | S8<br>14                   | 25.0<br>27.0         |                       | 70                       |    |                                      | SP          | Medium dense dark brown poorly-graded SAND (SP), no structure, no odor, wet                                                                                                                      | -        | 5      | 5        | 10       | 75     | 5  |            |           |           |            |
|            |                            |                            |                      |                       | 73                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 75                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 77                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 80                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
| 30         | 17<br>15<br>12<br>12       | S9<br>16                   | 30.0<br>32.0         |                       | 85                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 88                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 84                       |    | 294.3<br>31.7                        | SM          | Medium dense light gray silty SAND (SM), slightly bonded, no odor, wet<br>-GLACIODELTAIC DEPOSIT-                                                                                                | -        | -      | -        | -        | 80     | 20 |            |           |           |            |
|            |                            |                            |                      |                       | 82                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 80                       |    |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
| 35         | 6<br>6<br>12<br>25         | S10<br>18                  | 35.0<br>37.0         |                       | 85                       |   | 291.0<br>35.0                        | SP          | Medium dense light gray poorly-graded SAND (SP), moderately bonded, no odor, wet                                                                                                                 | 5        | -      | -        | 5        | 85     | 5  |            |           |           |            |
|            |                            |                            |                      |                       | 89                       |  |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 90                       |  |                                      |             | Note: Cobble from 37.5 to 38 ft                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 88                       |  |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 90                       |  |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
| 40         | 50/2"<br>1                 | S11<br>1                   | 40.0<br>40.2         |                       | 95                       |  |                                      | SP          | Similar to sample S10 above, spoon refusal on cobble                                                                                                                                             | 5        | -      | -        | 5        | 85     | 5  |            |           |           |            |
|            |                            |                            |                      |                       | 94                       |  |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 90                       |  |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       | 92                       |  |                                      |             |                                                                                                                                                                                                  |          |        |          |          |        |    |            |           |           |            |
|            |                            |                            |                      |                       |                          |  | 281.5<br>44.5                        |             | TOP OF BEDROCK 44.5 FT                                                                                                                                                                           |          |        |          |          |        |    |            |           |           |            |
| 45         |                            |                            |                      |                       |                          |                                                                                     |                                      |             | Note: Rollerbit advanced to 45 ft. Coring began at 45 ft.<br>SEE CORE BORING REPORT FOR ROCK DETAILS                                                                                             |          |        |          |          |        |    |            |           |           |            |

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley &amp; Aldrich, Inc.

Boring No. HA23-1



| Depth<br>(ft) | Drilling<br>Rate<br>(min./ft) | Run<br>No. | Run<br>Depth<br>(ft) | Recovery/RQD |    | Weath-<br>ering | Well<br>Dia-<br>gram                                                              | Elev./<br>Depth<br>(ft) | Visual Description<br>and Remarks                                                                                                                                                                                                                                                     |
|---------------|-------------------------------|------------|----------------------|--------------|----|-----------------|-----------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                               |            |                      | in.          | %  |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 45            | 2:50                          | C1         | 45.0                 | 58           | 97 | Fresh           |  | 276.0<br>50.0           | SEE TEST BORING REPORT FOR OVERBURDEN DETAILS                                                                                                                                                                                                                                         |
|               | 2:45                          |            | 50.0                 | 56           | 93 |                 |                                                                                   |                         | Hard, fresh, white-black-gray, fine to coarse-grained, GRANITE. Primary joints dipping at high angles, spaced moderately close, stepped, fresh, rough, tight to open, no infilling. One secondary joint dipping low angle, only present at 48.3 ft depth, rough, tight, no infilling. |
|               | 2:50                          |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
|               | 3:15                          |            |                      |              |    |                 |                                                                                   |                         | -CONCORD GRANITE-                                                                                                                                                                                                                                                                     |
|               | 3:00                          |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 50            |                               |            |                      |              |    |                 |                                                                                   |                         | BOTTOM OF EXPLORATION 50.0 FT                                                                                                                                                                                                                                                         |
|               |                               |            |                      |              |    |                 |                                                                                   |                         | Note: Boring completed as an observation well screened from 13 to 23 ft bgs with bottom of well at 23.0 ft.                                                                                                                                                                           |
| 55            |                               |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 60            |                               |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 65            |                               |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 70            |                               |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 75            |                               |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |
| 80            |                               |            |                      |              |    |                 |                                                                                   |                         |                                                                                                                                                                                                                                                                                       |

HA-TEST BORING-09 REV ME W/PID-CASING PLOG-HA-LIB09-BOS STANDARD ONLY-RLG.GLB HA-TB-CORE+WELL-09 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CP\PROJECTS\0208898\GINT\0208898\_TB09\W\_HA23-4.GPJ Jan 19, 24

|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------|--------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|--|--|----------------------------------------|----------|--------|----------|------------------------------------------------------------------|------------|---------|-----------|-----------|------------|----------|
| <div>HALEYALDRICH</div> <div>TEST BORING REPORT</div>                                                      |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  | Boring No. HA23-2                      |          |        |          |                                                                  |            |         |           |           |            |          |
| Project Steeplegate Mall Pump Station, 270 Loudon Road, Concord, New Hampshire                             |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  | File No. 0208898-000                   |          |        |          |                                                                  |            |         |           |           |            |          |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  | Sheet No. 1 of 3                       |          |        |          |                                                                  |            |         |           |           |            |          |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  | Start 16 November 2023                 |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   | Casing             | Sampler               | Barrel                                                                                     | Drilling Equipment and Procedures      |                                                                                                                                                                                            |                      |         |  |  | Finish 16 November 2023                |          |        |          |                                                                  |            |         |           |           |            |          |
| Type                                                                                                       |                         |                         |                   | HW                 | S                     | NQ                                                                                         | Rig Make & Model: Diedrich D-50        |                                                                                                                                                                                            |                      |         |  |  | Driller C. Johnston                    |          |        |          |                                                                  |            |         |           |           |            |          |
| Inside Diameter (in.)                                                                                      |                         |                         |                   | 4.0                | 1.375                 | 1.87                                                                                       | Bit Type: Roller Bit                   |                                                                                                                                                                                            |                      |         |  |  | H&A Rep. H. Hollauer                   |          |        |          |                                                                  |            |         |           |           |            |          |
| Hammer Weight (lb)                                                                                         |                         |                         |                   | 140                | 140                   | -                                                                                          | Drill Mud: Polymer                     |                                                                                                                                                                                            |                      |         |  |  | Elevation 322.0 (est.)                 |          |        |          |                                                                  |            |         |           |           |            |          |
| Hammer Fall (in.)                                                                                          |                         |                         |                   | 30                 | 30                    | -                                                                                          | Casing: HSA to 12'/HW to 33.5'         |                                                                                                                                                                                            |                      |         |  |  | Datum NAVD88                           |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            | Hoist/Hammer: Winch / Automatic Hammer |                                                                                                                                                                                            |                      |         |  |  | Location See Plan                      |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            | PID Make & Model: MiniRAE 3000 10.6 eV |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | Casing Blows (per ft) | Stratum Change Elev/Depth (ft)                                                             | USCS Symbol                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) |                      |         |  |  |                                        | Gravel   |        | Sand     |                                                                  | Field Test |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        | % Coarse | % Fine | % Coarse | % Medium                                                         | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |
| 0                                                                                                          | 3<br>9<br>11<br>8       | S1<br>8                 | 0.0<br>2.0        | 0.0                |                       | 321.8<br>0.2                                                                               | SP                                     | -TOPSOIL/ROOTMAT-<br>Medium dense orange-brown and light brown poorly-graded SAND (SP), no structure, no odor, dry                                                                         |                      |         |  |  |                                        | -        | 5      | -        | 5                                                                | 85         | 5       |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            | 12<br>10<br>7<br>6      | S2<br>10                | 2.0<br>4.0        | 0.0                |                       | 320.0<br>2.0                                                                               | SM                                     | -FILL-<br>Medium dense orange-brown silty SAND (SM), mottled oxidation from 3.7 to 5.2 ft, no odor, dry                                                                                    |                      |         |  |  |                                        | -        | -      | 1        | 8                                                                | 56         | 35      |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            | 6<br>6<br>7<br>9        | S3<br>16                | 4.0<br>6.0        | 0.0                |                       | 318.0<br>4.0                                                                               | SP                                     | Medium dense brown/tan poorly-graded SAND (SP), no structure, no odor, dry<br><br>-GLACIODELTAIC DEPOSIT-<br>Medium dense orange-brown poorly-graded SAND (SP), no structure, no odor, dry |                      |         |  |  |                                        | -        | -      | -        | -                                                                | 95         | 5       |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            | 7<br>8<br>8<br>9        | S4<br>20                | 6.0<br>8.0        | 0.0                |                       |                                                                                            | SP                                     | Note: Driller added polymer to water.<br>Note: Water encountered during drilling at approximately 9.5 ft.<br>Medium dense orange brown poorly-graded SAND (SP), no structure, no odor, wet |                      |         |  |  |                                        | -        | -      | -        | 5                                                                | 90         | 5       |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 28                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 30                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 32                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 55                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 50                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 52                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 51                                                                                         | SP                                     | Loose orange-brown poorly-graded SAND (SP), no structure, no odor, wet                                                                                                                     |                      |         |  |  |                                        | -        | -      | -        | 24                                                               | 74         | 2       |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 64                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 67                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 69                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       | 72                                                                                         |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
| 20                                                                                                         |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
| Water Level Data                                                                                           |                         |                         |                   | Sample ID          |                       |                                                                                            | Well Diagram                           |                                                                                                                                                                                            |                      | Summary |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |                       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Split Spoon Sample |                                        | Riser Pipe<br>Screen<br>Filter Sand<br>Cuttings<br>Grout<br>Concrete<br>Bentonite Seal                                                                                                     | Overburden (ft) 33.5 |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water                 |                                                                                            |                                        |                                                                                                                                                                                            | Rock Cored (ft) 10.0 |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            | Samples 10S, 2C      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            | Boring No. HA23-2    |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
| Field Tests:                                                                                               |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  | Dilatancy: R - Rapid S - Slow N - None |          |        |          | Plasticity: N - Nonplastic L - Low M - Medium H - High           |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  | Toughness: L - Low M - Medium H - High |          |        |          | Dry Strength: N - None L - Low M - Medium H - High V - Very High |            |         |           |           |            |          |
| *Note: Maximum particle size is determined by direct observation within the limitations of sampler size.   |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |                       |                                                                                            |                                        |                                                                                                                                                                                            |                      |         |  |  |                                        |          |        |          |                                                                  |            |         |           |           |            |          |



HA23-TEST BORING-09 REV ME W/PID-CASING PLOG-HA-LIB09-BOS STANDARD ONLY-RLG.GLB HA-TB+CORE+WELL-09 W FENCE.GDT \\HALEYALDRICH.COM\SHARE\CP\PROJECTS\0208898\GINT\0208898\_TB09BOW\_HA23-1\_HA23-4.GPJ Jan 19, 24

| HALEY<br>ALDRICH |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                | TEST BORING REPORT                                                    |                                         |          |          |        |         |            |           |            | Boring No. HA23-2 |  |  |  |
|------------------|-------------------------|-------------------------|-----------------------------------------------------------|--------------------|-----------------------|--------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------|----------|----------|--------|---------|------------|-----------|------------|-------------------|--|--|--|
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                | File No. 0208898-000                                                  |                                         |          |          |        |         |            |           |            | Sheet No. 2 of 3  |  |  |  |
| Depth (ft)       | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft)                                         | PID Readings (ppm) | Casing Blows (per ft) | Stratum Change Elev/Depth (ft) | USCS Symbol             | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel                                                                |                                         | Sand     |          |        | % Fines | Field Test |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                | % Coarse                                                              | % Fine                                  | % Coarse | % Medium | % Fine |         | Dilatancy  | Toughness | Plasticity | Strength          |  |  |  |
| 20               | 7                       | S7<br>12                | 20.0                                                      |                    | 78                    |                                | SP                      | Loose orange-brown poorly-graded SAND (SP), no structure, no odor, wet                                                                                                                         | -                                                                     | 5                                       | 5        | 10       | 75     | 5       |            |           |            |                   |  |  |  |
|                  | 5<br>5<br>6             |                         | 22.0                                                      |                    | 82                    |                                | -GLACIODELTAIC DEPOSIT- |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  | 5                       | S8<br>12                | 22.0                                                      |                    | 84                    |                                | SP                      | Loose orange-brown poorly-graded SAND (SP), no structure, no odor, wet                                                                                                                         | -                                                                     | 5                                       | 5        | 10       | 75     | 5       |            |           |            |                   |  |  |  |
|                  | 4<br>6<br>8             |                         | 24.0                                                      |                    | 80                    |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         | 82                                                        |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
| 25               | 5                       | S9<br>8                 | 25.0                                                      |                    | 295.2<br>26.8         |                                | SP                      | Medium dense light gray poorly-graded SAND (SP), no structure, no odor, wet                                                                                                                    | -                                                                     | 5                                       | 5        | 10       | 75     | 5       |            |           |            |                   |  |  |  |
|                  |                         |                         | 27.0                                                      |                    |                       |                                |                         | -GLACIODELTAIC DEPOSIT-                                                                                                                                                                        |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
| 30               | 8                       | S10<br>12               | 30.0                                                      |                    |                       | 288.5<br>33.5                  |                         | SP                                                                                                                                                                                             | Medium dense gray poorly-graded SAND (SP), no structure, no odor, wet | 5                                       | -        | -        | -      | 90      | 5          |           |            |                   |  |  |  |
|                  | 9<br>10<br>11           |                         | 32.0                                                      |                    |                       |                                |                         |                                                                                                                                                                                                | TOP OF BEDROCK 33.5 FT                                                |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         | Note: Rollerbit advanced to 35 ft. Coring began at 35 ft. |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
| 35               |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       | SEE CORE BORING REPORT FOR ROCK DETAILS |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
| 40               |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |
|                  |                         |                         |                                                           |                    |                       |                                |                         |                                                                                                                                                                                                |                                                                       |                                         |          |          |        |         |            |           |            |                   |  |  |  |

| Depth<br>(ft) | Drilling<br>Rate<br>(min./ft) | Run<br>No. | Run<br>Depth<br>(ft) | Recovery/RQD |     | Weath-<br>ering       | Elev./<br>Depth<br>(ft)        | Visual Description<br>and Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|-------------------------------|------------|----------------------|--------------|-----|-----------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                               |            |                      | in.          | %   |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 35            | 3:10                          | C1         | 35.0                 | 53           | 102 | Slight to<br>Moderate | 287.0<br>35.0                  | SEE TEST BORING REPORT FOR OVERBURDEN DETAILS                                                                                                                                                                                                                                                                                                                                                                                                                             |
|               | 3:00                          |            | 39.3                 | 53           | 102 |                       |                                | Hard to moderately hard, slightly to moderately weathered, black-white-gray with orange iron-stained zones, fine to very coarse-grained GRANITE. Joints dipping at horizontal angles, spaced moderately close, stepped, rough, fresh to decomposed, open, iron staining throughout.                                                                                                                                                                                       |
|               | 3:05                          |            |                      |              |     |                       |                                | -CONCORD GRANITE-                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|               | 3:00                          |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|               | 3:10                          |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 40            | 3:20                          | C2         | 39.3                 | 57           | 95  | Slight to<br>Moderate | 281.2<br>40.8<br>281.0<br>41.0 | Similar to C1 above to 40.8 ft. Solid core stem of pegmatitic granite.                                                                                                                                                                                                                                                                                                                                                                                                    |
|               | 3:40                          |            | 44.3                 | 53           | 88  |                       |                                | Contact at 40.8 ft (MIGMATITE). Altered SCHIST from 40.8 to 41 ft with healed high-angle fracture.                                                                                                                                                                                                                                                                                                                                                                        |
|               | 3:20                          |            |                      |              |     |                       |                                | Hard to moderately hard, slightly to moderately weathered, gray, SCHIST. Primary joints dipping at horizontal to low angles, spaced close to moderately close, stepped to planar, rough to smooth, fresh to decomposed, tight to open. Quartz intrusion at 43.1 to 43.3 ft. Secondary joints dipping at high angles, spaced very close, planar, smooth, fresh to discolored, tight to open. Moderately weathered zone extending 2 to 3 in. into joint surface at 42.9 ft. |
|               | 2:50                          |            |                      |              |     |                       |                                | -CONCORD GRANITE-                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|               | 2:50                          |            |                      |              |     |                       |                                | BOTTOM OF EXPLORATION 44.3 FT                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 45            |                               |            |                      |              |     |                       | 277.7<br>44.3                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 50            |                               |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 55            |                               |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 60            |                               |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 65            |                               |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 70            |                               |            |                      |              |     |                       |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|            |                                                                        |
|------------|------------------------------------------------------------------------|
| Project    | Steeplegate Mall Pump Station, 270 Loudon Road, Concord, New Hampshire |
| Client     | Wright-Pierce                                                          |
| Contractor | Terracon                                                               |

|           |                  |
|-----------|------------------|
| File No.  | 0208898-000      |
| Sheet No. | 1 of 3           |
| Start     | 16 November 2023 |
| Finish    | 16 November 2023 |
| Driller   | P. Michaud       |
| H&A Rep.  | H. Hollauer      |
| Elevation | 325.5 (est.)     |
| Datum     | NAVD88           |
| Location  | See Plan         |

|                       |        |         |        |                                        |                |                                |
|-----------------------|--------|---------|--------|----------------------------------------|----------------|--------------------------------|
|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures      | Finish Driller | 16 November 2023<br>P. Michaud |
| Type                  | HW     | S       | NQ     | Rig Make & Model: Mobile Drill B-57    | H&A Rep.       | H. Hollauer                    |
| Inside Diameter (in.) | 4.0    | 1.375   | 1.87   | Bit Type: Roller Bit                   | Elevation      | 325.5 (est.)                   |
| Hammer Weight (lb)    | 140    | 140     | -      | Drill Mud: None                        | Datum          | NAVD88                         |
| Hammer Fall (in.)     | 30     | 30      | -      | Casing: HSA to 22"/HW to 38.5'         | Location       | See Plan                       |
|                       |        |         |        | Hoist/Hammer: Winch / Automatic Hammer |                |                                |
|                       |        |         |        | PID Make & Model: MiniRAE 3000 10.6 eV |                |                                |

[illegible]

| Water Level Data |      |                    |                  |                |       | Sample ID                                                                                  |                                                                                                                                                                                                                                   | Well Diagram |  | Summary           |               |
|------------------|------|--------------------|------------------|----------------|-------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--|-------------------|---------------|
| Date             | Time | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Split Spoon Sample | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>Riser Pipe<br/>Screen<br/>Filter Sand<br/>Cuttings<br/>Grout<br/>Concrete<br/>Bentonite Seal</div> |              |  |                   |               |
|                  |      |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                            |                                                                                                                                                                                                                                   |              |  | Overburden (ft)   |               |
| 11/16/23         | 0900 | 0                  | -                | 25.0           | 12.90 |                                                                                            |                                                                                                                                                                                                                                   |              |  | Overburden (ft)   | 38.5          |
| 11/17/23         | 0700 | 22                 | -                | 25.0           | 12.85 |                                                                                            |                                                                                                                                                                                                                                   |              |  | Rock Cored (ft)   | 5.0           |
|                  |      |                    |                  |                |       |                                                                                            |                                                                                                                                                                                                                                   |              |  | Samples           | 11S, 1C       |
|                  |      |                    |                  |                |       |                                                                                            |                                                                                                                                                                                                                                   |              |  | <b>Boring No.</b> | <b>HA23-3</b> |

|                     |                                               |                                                                         |
|---------------------|-----------------------------------------------|-------------------------------------------------------------------------|
| <b>Field Tests:</b> | <b>Dilatancy:</b> R - Rapid S - Slow N - None | <b>Plasticity:</b> N - Nonplastic L - Low M - Medium H - High           |
|                     | <b>Toughness:</b> L - Low M - Medium H - High | <b>Dry Strength:</b> N - None L - Low M - Medium H - High V - Very High |

<sup>†</sup> Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

|            |        |
|------------|--------|
| Boring No. | HA23-3 |
|------------|--------|

| Depth<br>(ft) | Drilling<br>Rate<br>(min./ft) | Run<br>No. | Run<br>Depth<br>(ft) | Recovery/RQD |    | Weath-<br>ering     | Well<br>Dia-<br>gram                                                              | Elev./<br>Depth<br>(ft) | Visual Description<br>and Remarks                                                                                                                                                                                                                                                                                                                    |
|---------------|-------------------------------|------------|----------------------|--------------|----|---------------------|-----------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                               |            |                      | in.          | %  |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |
| 40            | 2:50                          | C1         | 40.0                 | 54           | 90 | Fresh               |  |                         | SEE TEST BORING REPORT FOR OVERBURDEN DETAILS                                                                                                                                                                                                                                                                                                        |
|               | 3:00                          |            | 45.0                 | 46           | 77 |                     |                                                                                   |                         | Very hard to hard, fresh, white, black and gray, fine to coarse-grained, GRANITE. Solid core stem. RQD influenced by solid pegmatite. Change at 43.0 ft.                                                                                                                                                                                             |
|               | 3:30                          |            |                      |              |    |                     |                                                                                   |                         | -CONCORD GRANITE-                                                                                                                                                                                                                                                                                                                                    |
|               | 3:00                          |            |                      |              |    | Slight to<br>Highly |                                                                                   | 282.5<br>43.0           | Hard to soft, slightly to highly weathered, gray, aphanitic to coarse-grained, SCHIST. Joints dipping at horizontal to low angles, spaced very close to moderately close, stepped, rough, discolored to decomposed, tight to open, minor soil infilling. Iron staining from 43 to 43.7 ft at weathered zone. Pegmatite intrusion from 44 to 44.4 ft. |
|               | 3:00                          |            |                      |              |    |                     |                                                                                   | 280.5<br>45.0           | -RANGELEY FORMATION (Upper Part)-                                                                                                                                                                                                                                                                                                                    |
| 45            |                               |            |                      |              |    |                     |                                                                                   |                         | BOTTOM OF EXPLORATION 45.0 FT                                                                                                                                                                                                                                                                                                                        |
|               |                               |            |                      |              |    |                     |                                                                                   |                         | Note: Boring completed as an observation well screened from 15 to 25 ft bgs with bottom of well at 25.0 ft.                                                                                                                                                                                                                                          |
| 50            |                               |            |                      |              |    |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |
| 55            |                               |            |                      |              |    |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |
| 60            |                               |            |                      |              |    |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |
| 65            |                               |            |                      |              |    |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |
| 70            |                               |            |                      |              |    |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |
| 75            |                               |            |                      |              |    |                     |                                                                                   |                         |                                                                                                                                                                                                                                                                                                                                                      |

## TEST BORING REPORT

Boring No. HA23-4

Project Steeplegate Mall Pump Station, 270 Loudon Road, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-000  
Sheet No. 1 of 3  
Start 17 November 2023  
Finish 17 November 2023  
Driller P. Michaud  
H&A Rep. H. Hollauer

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures      |
|-----------------------|--------|---------|--------|----------------------------------------|
| Type                  | HW     | S       | NQ     | Rig Make & Model: Mobile Drill B-57    |
| Inside Diameter (in.) | 4.0    | 1.375   | 1.87   | Bit Type: Roller Bit                   |
| Hammer Weight (lb)    | 140    | 140     | -      | Drill Mud: Polymer                     |
| Hammer Fall (in.)     | 30     | 30      | -      | Casing: HSA to 5'/HW to 38.5'          |
|                       |        |         |        | Hoist/Hammer: Winch / Automatic Hammer |
|                       |        |         |        | PID Make & Model: MiniRAE 3000 10.6 eV |

Elevation 318.0 (est.)  
Datum NAVD88  
Location See Plan

| Depth (ft) | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft) | PID Readings<br>(ppm) | Casing Blows<br>(per ft) | Stratum<br>Change<br>Elev/Depth (ft) | USCS Symbol | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME, max. particle size*,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel                                                                                                                                                                                 |        | Sand     |          |        | Field Test |           |           |            |          |  |
|------------|----------------------------|----------------------------|----------------------|-----------------------|--------------------------|--------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|----------|--------|------------|-----------|-----------|------------|----------|--|
|            |                            |                            |                      |                       |                          |                                      |             |                                                                                                                                                                                                   | % Coarse                                                                                                                                                                               | % Fine | % Coarse | % Medium | % Fine | % Fines    | Dilatancy | Toughness | Plasticity | Strength |  |
| 0          | 1                          | S1                         | 0.0                  | 0.0                   |                          | 317.8                                | SP          | TOPSOIL/ROOTMAT                                                                                                                                                                                   | -                                                                                                                                                                                      | 5      | -        | -        | 90     | 5          |           |           |            |          |  |
|            | 3<br>5<br>6                | 18                         | 2.0                  | 0.0                   |                          | 0.2                                  |             |                                                                                                                                                                                                   | Loose orange-brown poorly-graded SAND (SP), no structure,<br>no odor, dry                                                                                                              | -      | 5        | -        | 5      | 85         | 5         |           |            |          |  |
|            | 6<br>5<br>5<br>5           | S2<br>18                   | 2.0<br>4.0           | 0.0                   |                          |                                      |             | Loose orange-brown poorly-graded SAND (SP), no structure,<br>no odor, dry                                                                                                                         | -                                                                                                                                                                                      | 5      | -        | 5        | 85     | 5          |           |           |            |          |  |
|            |                            |                            |                      |                       |                          |                                      |             | -GLACIODELTAIC DEPOSIT-                                                                                                                                                                           |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
| 5          | 3<br>3<br>3                | S3<br>12                   | 5.0<br>7.0           | 0.0                   |                          | 15                                   |             | SP                                                                                                                                                                                                | Note: Water encountered during drilling at approximately 4.5<br>ft.<br>Loose orange-brown with red oxidized banding poorly-graded<br>SAND with gravel (SP), no structure, no odor, wet | -      | 16       | 6        | 40     | 36         | 2         |           |            |          |  |
|            |                            |                            |                      |                       |                          | 22                                   |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
|            |                            |                            |                      |                       |                          | 30                                   |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
|            |                            |                            |                      |                       |                          | 40                                   |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
| 10         | 4<br>4<br>3<br>3           | S4<br>6                    | 10.0<br>12.0         | 0.0                   |                          | 33                                   |             | SP                                                                                                                                                                                                | Loose orange-brown poorly-graded SAND (SP), no structure,<br>no odor, wet                                                                                                              | -      | 10       | 7        | 47     | 34         | 2         |           |            |          |  |
|            |                            |                            |                      |                       |                          | 30                                   |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
|            |                            |                            |                      |                       | 60                       |                                      |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
| 15         | 7<br>8<br>14<br>18         | S5<br>14                   | 15.0<br>17.0         |                       | 78                       |                                      | SP          | Medium dense alternating orange-brown with dark red-brown<br>from oxidation poorly-graded SAND (SP), no structure, no<br>odor, wet<br>Note: Polymer added to water.                               | 5                                                                                                                                                                                      | 5      | 5        | 10       | 70     | 5          |           |           |            |          |  |
|            |                            |                            |                      |                       | 75                       |                                      |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |
|            |                            |                            |                      |                       | 80                       |                                      |             |                                                                                                                                                                                                   |                                                                                                                                                                                        |        |          |          |        |            |           |           |            |          |  |

| Water Level Data |      |                    |                  |                |       | Sample ID        |                    | Well Diagram           |                        | Summary           |                 |
|------------------|------|--------------------|------------------|----------------|-------|------------------|--------------------|------------------------|------------------------|-------------------|-----------------|
| Date             | Time | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod | T - Thin Wall Tube | U - Undisturbed Sample | S - Split Spoon Sample | Overburden (ft)   | Rock Cored (ft) |
|                  |      |                    | Bottom of Casing | Bottom of Hole | Water |                  |                    |                        |                        |                   |                 |
| 11/17/23         | 1045 | 0                  | -                | ~15.0          | 5.2   |                  |                    |                        |                        | 38.5              | 5.0             |
|                  |      | Collapsed          |                  |                |       |                  |                    |                        |                        | Samples           | 10S, 1C         |
|                  |      |                    |                  |                |       |                  |                    |                        |                        | Boring No. HA23-4 |                 |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

\*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

## TEST BORING REPORT

Boring No. HA23-4

File No. 0208898-000

Sheet No. 2 of 3

| Depth (ft) | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | Casing Blows (per ft) | Stratum Change Elev/Depth (ft) | USCS Symbol | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          | Fines  |         | Field Test |           |            |          |
|------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------|--------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|--------|---------|------------|-----------|------------|----------|
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            | % Coarse | % Fine | % Coarse | % Medium | % Fine | % Fines | Dilatancy  | Toughness | Plasticity | Strength |
| 20         | 17                      | S6                      | 20.0              |                    | 60                    | 298.0                          | SP-SM       | Dense red-brown poorly-graded SAND with silt (SP-SM), no structure, no odor, wet                                                                                                           | -        | 5      | 5        | 5        | 75     | 10      |            |           |            |          |
|            | 17                      | 14                      | 22.0              |                    | 60                    | 20.0                           |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 17                      |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 15                      |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 13                      | S7                      | 22.0              |                    | 63                    |                                | SP-SM       | Medium dense red-brown poorly-graded SAND with silt (SP-SM), no structure, no odor, wet                                                                                                    | -        | 5      | 5        | 5        | 75     | 10      |            |           |            |          |
|            | 10                      | 20                      | 24.0              |                    | 80                    |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 13                      |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 11                      |                         |                   |                    | 100                   |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
| 25         | 50                      | S8                      | 25.0              |                    |                       | 293.0                          | SM          | Very dense gray silty SAND (SM), moderately bonded, no odor, wet, refusal on possible cobble                                                                                               | 5        | 5      | 5        | 5        | 65     | 15      |            |           |            |          |
|            | 50/4"                   | 6                       | 25.8              |                    |                       | 25.0                           |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
| 30         | 21                      | S9                      | 30.0              |                    |                       | 288.0                          | SP          | Dense gray poorly-graded SAND (SP), moderately bonded, no odor, wet                                                                                                                        | -        | -      | -        | 5        | 90     | 5       |            |           |            |          |
|            | 16                      | 18                      | 32.0              |                    |                       | 30.0                           |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 18                      |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 20                      |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
| 35         | 10                      | S10                     | 35.0              |                    |                       | 282.0                          | SP-SM       | Very dense gray poorly-graded SAND with silt (SP-SM), moderately bonded, no odor, moist                                                                                                    | -        | -      | -        | 5        | 85     | 10      |            |           |            |          |
|            | 29                      | 18                      | 36.8              |                    |                       | 36.0                           |             | Note: Advanced roller bit through weathered bedrock to 38.5 ft.                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            | 45                      |                         |                   |                    |                       |                                |             | TOP OF BEDROCK 38.5 FT                                                                                                                                                                     |          |        |          |          |        |         |            |           |            |          |
|            | 50/4"                   |                         |                   |                    |                       | 279.5                          |             | Note: Rollerbit advanced to 40 ft. Coring began at 40 ft.                                                                                                                                  |          |        |          |          |        |         |            |           |            |          |
| 40         |                         |                         |                   |                    |                       | 38.5                           |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             | SEE CORE BORING REPORT FOR ROCK DETAILS                                                                                                                                                    |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
| 45         |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |
|            |                         |                         |                   |                    |                       |                                |             |                                                                                                                                                                                            |          |        |          |          |        |         |            |           |            |          |

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley &amp; Aldrich, Inc.

Boring No. HA23-4

| Depth<br>(ft) | Drilling<br>Rate<br>(min./ft) | Run<br>No. | Run<br>Depth<br>(ft) | Recovery/RQD |     | Weath-<br>ering       | Elev./<br>Depth<br>(ft) | Visual Description<br>and Remarks                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|-------------------------------|------------|----------------------|--------------|-----|-----------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                               |            |                      | in.          | %   |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 40            | 2:00                          | C1         | 40.0                 | 60           | 100 | Slight to<br>Moderate | 278.0<br>40.0           | SEE TEST BORING REPORT FOR OVERBURDEN DETAILS                                                                                                                                                                                                                                                                                                                                                                                                                |
|               | 2:00                          |            | 45.0                 | 40           | 67  |                       |                         | Hard to soft, slightly to moderately weathered, dark gray with white, aphanitic to fine-grained, SCHIST. Primary joints dipping at low angle, spaced very close to close, planar, rough, fresh to decomposed, tight to open. One high angle joint at 43 ft, stepped, rough, fresh to discolored, open. Weathered zone from ~44 to 44.9 ft as indicated by iron discoloration. Pegmatitic Granite intrusion 43.4 to 43.6 ft. Occasional quartzite intrusions. |
|               | 2:00                          |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|               | 2:00                          |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|               | 2:00                          |            |                      |              |     |                       |                         | -RANGELEY FORMATION (Upper Part)-                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 45            |                               |            |                      |              |     |                       | 273.0<br>45.0           | BOTTOM OF EXPLORATION 45.0 FT                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 50            |                               |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 55            |                               |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 60            |                               |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 65            |                               |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 70            |                               |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 75            |                               |            |                      |              |     |                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



## **2024 Test Boring and Probe Logs**

H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONE\DRIVE - HALEY\ALDRICH.COM\INT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------|------------------------|------------|---------|-----------|-----------|------------|----------|--|--|
| <div><div><div>HALEYALDRICH</div><div>TEST BORING REPORT</div></div></div>                                 |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Boring No. HA24-1      |            |         |           |           |            |          |  |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | File No. 0208898-001   |            |         |           |           |            |          |  |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Sheet No. 1 of 1       |            |         |           |           |            |          |  |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Start 6 Jun 2024       |            |         |           |           |            |          |  |  |
|                                                                                                            |                         | Casing                  | Sampler           | Barrel             | Drilling Equipment and Procedures |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Finish 6 Jun 2024      |            |         |           |           |            |          |  |  |
| Type                                                                                                       |                         | SSA                     | GB                | -                  | Rig Make & Model: CME 45          |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | H&A Rep. S. Shay       |            |         |           |           |            |          |  |  |
| Inside Diameter (in.)                                                                                      |                         | -                       | -                 | -                  | Bit Type: Cutting Head            |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Elevation 342.5 (est.) |            |         |           |           |            |          |  |  |
| Hammer Weight (lb)                                                                                         |                         | -                       | -                 | -                  | Drill Mud: None                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Datum NAVD88           |            |         |           |           |            |          |  |  |
| Hammer Fall (in.)                                                                                          |                         | -                       | -                 | -                  | Casing: None                      |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          | Location See Plan      |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | Hoist/Hammer: Winch / None        |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | PID Make & Model: Tiger 10.6 eV   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol                       | Stratum Change Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION)                                 | Gravel                                                                                                                                                                                                                                      |                      | Sand     |                        | Field Test |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                | % Coarse                                                                                                                                                                                                                                    | % Fine               | % Coarse | % Medium               | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0                                                                                                          |                         |                         |                   |                    |                                   | 341.9<br>0.6<br>341.6<br>0.9   | - ASPHALT ROADWAY -<br>Binder base<br>Brown poorly graded SAND (SP), no structure, no odor                                                                                                                     |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   | 0.5                | SP                                |                                | - GLACIODELTAIC DEPOSITS                                                                                                                                                                                       |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| 5                                                                                                          |                         | GB1                     | 5.0               |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| 10                                                                                                         |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| 15                                                                                                         |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| 20                                                                                                         |                         |                         |                   |                    |                                   | 322.5<br>20.0                  | BOTTOM OF EXPLORATION AT 20.0 FEET<br><br>Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                      |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |                                   |                                | Sample ID                                                                                                                                                                                                      | Well Diagram                                                                                                                                                                                                                                | Summary              |          |                        |            |         |           |           |            |          |  |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |                                   |                                | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe                                                                                                      | <div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>Riser Pipe<br/>Screen<br/>Filter Sand<br/>Cuttings<br/>Grout<br/>Concrete<br/>Bentonite Seal</div></div> | Overburden (ft) 20.0 |          |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water                             |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             | Rock Cored (ft) 0.0  |          |                        |            |         |           |           |            |          |  |  |
| 06/06/24                                                                                                   | 07:36                   | not encountered         |                   |                    |                                   |                                |                                                                                                                                                                                                                | Samples S1                                                                                                                                                                                                                                  |                      |          |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                | Boring No. HA24-1                                                                                                                                                                                              |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |                                   |                                | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High<br>Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |                      |          |                        |            |         |           |           |            |          |  |  |

H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONE\DRIVE - HALEY\ALDRICH.COM\GINT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------|------------------------|------------|---------|-----------|-----------|------------|----------|--|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Boring No. HA24-2      |            |         |           |           |            |          |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | File No. 0208898-001   |            |         |           |           |            |          |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Sheet No. 1 of 1       |            |         |           |           |            |          |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Start 6 Jun 2024       |            |         |           |           |            |          |  |
|                                                                                                            |                         | Casing                  | Sampler           | Barrel             | Drilling Equipment and Procedures |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Finish 6 Jun 2024      |            |         |           |           |            |          |  |
| Type                                                                                                       |                         | SSA                     | GB                | -                  | Rig Make & Model: CME 45          |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | H&A Rep. S. Shay       |            |         |           |           |            |          |  |
| Inside Diameter (in.)                                                                                      |                         | -                       | -                 | -                  | Bit Type: Cutting Head            |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Elevation 342.5 (est.) |            |         |           |           |            |          |  |
| Hammer Weight (lb)                                                                                         |                         | -                       | -                 | -                  | Drill Mud: None                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Datum NAVD88           |            |         |           |           |            |          |  |
| Hammer Fall (in.)                                                                                          |                         | -                       | -                 | -                  | Casing: None                      |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          | Location See Plan      |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    | Hoist/Hammer: Winch / None        |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    | PID Make & Model: Tiger 10.6 eV   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol                       | Stratum Change Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION)                                 | Gravel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      | Sand     |                        | Field Test |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                | % Coarse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | % Fine               | % Coarse | % Medium               | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |  |
| 0                                                                                                          |                         |                         |                   |                    | SP                                | 342.0                          | -ASPHALT ROADWAY-                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    |                                   | 0.5                            | Binder base                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    |                                   | 341.8                          | Brown poorly graded SAND (SP), no odor, moist                                                                                                                                                                  | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5                    | 50       | 35                     | 5          |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    |                                   | 0.8                            | -GLACIODELTAIC DEPOSITS                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| 5                                                                                                          |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| 10                                                                                                         |                         | GB1                     | 10.0              |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| 15                                                                                                         |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| 20                                                                                                         |                         |                         |                   |                    |                                   | 322.5                          | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    |                                   | 20.0                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |                                   |                                | Sample ID                                                                                                                                                                                                      | Well Diagram                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Summary              |          |                        |            |         |           |           |            |          |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |                                   |                                | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe                                                                                                      | <br><br><br><br><br><br> | Overburden (ft) 20.0 |          |                        |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water                             |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Rock Cored (ft) 0.0  |          |                        |            |         |           |           |            |          |  |
| 06/06/24                                                                                                   | 07:56                   | not encountered         |                   |                    |                                   |                                |                                                                                                                                                                                                                | Samples S1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |          |                        |            |         |           |           |            |          |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                | Boring No. HA24-2                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |                                   |                                | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High<br>Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |          |                        |            |         |           |           |            |          |  |

H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE GDT C:\USERS\ALONGO\ONEDRIVE - HALEY\ALDRICH.COM\INT\0208898-TB.GPJ 25 Oct 24

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|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|------------------------|------------|---------|-----------|-----------|------------|----------|--|--|
| <div><div><div>HALEYALDRICH</div><div>TEST BORING REPORT</div></div></div>                                 |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              | Boring No. HA24-3      |            |         |           |           |            |          |  |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              | File No. 0208898-001   |            |         |           |           |            |          |  |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              | Sheet No. 1 of 1       |            |         |           |           |            |          |  |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              | Start 6 Jun 2024       |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | Casing      | Sampler                                                                                                   | Barrel                                                                                                                                                                         | Drilling Equipment and Procedures                                                                                                                                                                              |                 |              | Finish 6 Jun 2024      |            |         |           |           |            |          |  |  |
| Type                                                                                                       |                         |                         |                   |                    | HSA         | S                                                                                                         | -                                                                                                                                                                              | Rig Make & Model: CME 45                                                                                                                                                                                       |                 |              | H&A Rep. S. Shay       |            |         |           |           |            |          |  |  |
| Inside Diameter (in.)                                                                                      |                         |                         |                   |                    | 2.25        | 1 3/8                                                                                                     | -                                                                                                                                                                              | Bit Type: Cutting Head                                                                                                                                                                                         |                 |              | Elevation 342.5 (est.) |            |         |           |           |            |          |  |  |
| Hammer Weight (lb)                                                                                         |                         |                         |                   |                    | -           | 140                                                                                                       | -                                                                                                                                                                              | Drill Mud: None                                                                                                                                                                                                |                 |              | Datum NAVD88           |            |         |           |           |            |          |  |  |
| Hammer Fall (in.)                                                                                          |                         |                         |                   |                    | -           | 30                                                                                                        | -                                                                                                                                                                              | Casing: HSA                                                                                                                                                                                                    |                 |              | Location See Plan      |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                | Hoist/Hammer: Winch / Automatic Hammer                                                                                                                                                                         |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                | PID Make & Model: Tiger 10.6 eV                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel                                                                                                                                                                                                         | Sand            |              |                        | Field Test |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                | % Coarse                                                                                                                                                                                                       | % Fine          | % Coarse     | % Medium               | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0                                                                                                          |                         |                         |                   |                    |             | 342.0                                                                                                     | -ASPHALT ROADWAY-                                                                                                                                                              |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 9                       | S1                      | 1.0               | 0.3                | SP          | 0.5                                                                                                       | Binder base                                                                                                                                                                    |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 11                      | 18                      | 3.0               |                    |             | 341.7                                                                                                     | Medium dense brown to light brown poorly graded SAND (SP), no odor, moist                                                                                                      |                                                                                                                                                                                                                |                 | 10           | 50                     | 35         | 5       |           |           |            |          |  |  |
|                                                                                                            | 8                       |                         |                   |                    |             | 0.8                                                                                                       | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 4                       | S2                      | 3.0               | 0.3                |             |                                                                                                           | Loose brown poorly-graded SAND (SP), no odor, moist                                                                                                                            |                                                                                                                                                                                                                |                 | 1            | 5                      | 49         | 42      | 3         |           |            |          |  |  |
|                                                                                                            | 3                       | 20                      | 5.0               |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 4                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 3                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
| 5                                                                                                          | 2                       | S3                      | 5.0               | 0.3                |             |                                                                                                           | Very loose brown poorly-graded SAND (SP), no odor, moist                                                                                                                       |                                                                                                                                                                                                                |                 | 10           | 50                     | 35         | 5       |           |           |            |          |  |  |
|                                                                                                            | 2                       | 21                      | 7.0               |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 2                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 1                       | S4                      | 7.0               | 0.1                |             |                                                                                                           | Very loose brown poorly-graded SAND (SP), no odor, moist                                                                                                                       |                                                                                                                                                                                                                |                 | 2            | 2                      | 74         | 21      | 1         |           |            |          |  |  |
|                                                                                                            | 1                       | 24                      | 9.0               |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 1                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
| 10                                                                                                         | 3                       | S5                      | 10.0              | 0.0                |             |                                                                                                           | Very loose brown poorly-graded SAND (SP), no odor, moist                                                                                                                       |                                                                                                                                                                                                                |                 | 10           | 50                     | 35         | 5       |           |           |            |          |  |  |
|                                                                                                            | 2                       | 15                      | 12.0              |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 2                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 3                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
| 15                                                                                                         | 3                       | S6                      | 15.0              | 0.0                |             |                                                                                                           | Loose brown poorly-graded SAND (SP), no odor, moist                                                                                                                            |                                                                                                                                                                                                                |                 | 10           | 50                     | 35         | 5       |           |           |            |          |  |  |
|                                                                                                            | 2                       | 18                      | 17.0              |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 3                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 4                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
| 20                                                                                                         | 5                       | S7                      | 19.0              | 0.0                |             |                                                                                                           | Medium dense brown poorly-graded SAND (SP), no odor, moist                                                                                                                     |                                                                                                                                                                                                                |                 | 10           | 50                     | 35         | 5       |           |           |            |          |  |  |
|                                                                                                            | 4                       | 24                      | 21.0              |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 7                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            | 8                       |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             | 321.5                                                                                                     | BOTTOM OF EXPLORATION AT 21.0 FEET                                                                                                                                             |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             | 21.0                                                                                                      |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                | Sample ID                                                                                                                                                                                                      |                 | Well Diagram |                        | Summary    |         |           |           |            |          |  |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |             | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |                                                                                            | Riser Pipe<br>Screen<br>Filter Sand<br>Cuttings<br>Grout<br>Concrete<br>Bentonite Seal                                                                                                                         | Overburden (ft) |              | 21.0                   |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water       |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                | Rock Cored (ft) |              | 0.0                    |            |         |           |           |            |          |  |  |
| 06/06/24                                                                                                   | 09:08                   | not encountered         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                | Samples         |              | S7                     |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                | Boring No.                                                                                                                                                                                                     |                 | HA24-3       |                        |            |         |           |           |            |          |  |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High<br>Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High |                 |              |                        |            |         |           |           |            |          |  |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                |                                                                                                                                                                                                                |                 |              |                        |            |         |           |           |            |          |  |  |



# TEST BORING REPORT

**Boring No. HA24-4**

|            |                                                         |
|------------|---------------------------------------------------------|
| Project    | Forcemain and Sewer Replacement, Concord, New Hampshire |
| Client     | Wright-Pierce                                           |
| Contractor | Terracon                                                |

File No. 0208898-001  
Sheet No. 1 of 1  
Start 6 Jun 2024  
Finish 6 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

|           |              |
|-----------|--------------|
| Elevation | 342.0 (est.) |
| Datum     | NAVD88       |
| Location  | See Plan     |

[illegible]

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 | Well Diagram                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | Summary           |               |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------|---------------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                | Water |                                                                                                           |  Riser Pipe<br> Screen<br> Filter Sand<br> Cuttings<br> Grout<br> Concrete<br> Bentonite Seal |  |                   |               |
|                  |       |                    | Bottom of Casing | Bottom of Hole |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                   |               |
|                  |       |                    |                  |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Overburden (ft)   | 20.0          |
|                  |       |                    |                  |                |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Rock Cored (ft)   | 0.0           |
|                  |       |                    |                  |                |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Samples           | S1            |
| 06/06/24         | 09:36 | not encountered    |                  |                |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>Boring No.</b> | <b>HA24-4</b> |

|                     |                                                                                                |                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Field Tests:</b> | <b>Dilatancy:</b> R - Rapid S - Slow N - None<br><b>Toughness:</b> L - Low M - Medium H - High | <b>Plasticity:</b> N - Nonplastic L - Low M - Medium H - High<br><b>Dry Strength:</b> N - None L - Low M - Medium H - High V - Very High |
|---------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|

**Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.**







# TEST BORING REPORT

**Boring No. HA24-7**

|            |                                                         |
|------------|---------------------------------------------------------|
| Project    | Forcemain and Sewer Replacement, Concord, New Hampshire |
| Client     | Wright-Pierce                                           |
| Contractor | Terracon                                                |

File No. 0208898-001  
Sheet No. 1 of 1  
Start 6 Jun 2024  
Finish 6 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

|           |              |
|-----------|--------------|
| Elevation | 342.0 (est.) |
| Datum     | NAVD88       |
| Location  | See Plan     |

[illegible]

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 | Well Diagram                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Summary           |               |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                | Water | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  Riser Pipe<br> Screen<br> Filter Sand<br> Cuttings<br> Grout<br> Concrete<br> Bentonite Seal | Overburden (ft)   | 20.0          |
|                  |       |                    | Bottom of Casing | Bottom of Hole |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |               |
| 06/06/24         | 10:57 | not encountered    |                  |                |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Rock Cored (ft)   | 0.0           |
|                  |       |                    |                  |                |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Samples           | S1            |
|                  |       |                    |                  |                |       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Boring No.</b> | <b>HA24-7</b> |

|                     |                                               |                                                                         |
|---------------------|-----------------------------------------------|-------------------------------------------------------------------------|
| <b>Field Tests:</b> | <b>Dilatancy:</b> R - Rapid S - Slow N - None | <b>Plasticity:</b> N - Nonplastic L - Low M - Medium H - High           |
|                     | <b>Toughness:</b> L - Low M - Medium H - High | <b>Dry Strength:</b> N - None L - Low M - Medium H - High V - Very High |

**Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.**









# TEST BORING REPORT

**Boring No. HA24-10**

|            |                                                         |
|------------|---------------------------------------------------------|
| Project    | Forcemain and Sewer Replacement, Concord, New Hampshire |
| Client     | Wright-Pierce                                           |
| Contractor | Terracon                                                |

File No. 0208898-001  
Sheet No. 1 of 1  
Start 10 Jun 2024  
Finish 10 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

|           |              |
|-----------|--------------|
| Elevation | 343.5 (est.) |
| Datum     | NAVD88       |
| Location  | See Plan     |

[illegible]

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 | Well Diagram                                                                          | Summary        |                                                           |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                | Water | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  | Riser Pipe     | Overburden (ft) 20.0<br>Rock Cored (ft) 0.0<br>Samples S1 |
|                  |       |                    | Bottom of Casing | Bottom of Hole |       |                                                                                                           |  | Screen         |                                                           |
| 06/10/24         | 07:56 | not encountered    |                  |                |       |                                                                                                           |  | Filter Sand    |                                                           |
|                  |       |                    |                  |                |       |                                                                                                           |  | Cuttings       |                                                           |
|                  |       |                    |                  |                |       |                                                                                                           |  | Grout          |                                                           |
|                  |       |                    |                  |                |       |                                                                                                           |  | Concrete       | Boring No. HA24-10                                        |
|                  |       |                    |                  |                |       |                                                                                                           |  | Bentonite Seal |                                                           |

|                     |                                               |                                                                         |
|---------------------|-----------------------------------------------|-------------------------------------------------------------------------|
| <b>Field Tests:</b> | <b>Dilatancy:</b> R - Rapid S - Slow N - None | <b>Plasticity:</b> N - Nonplastic L - Low M - Medium H - High           |
|                     | <b>Toughness:</b> L - Low M - Medium H - High | <b>Dry Strength:</b> N - None L - Low M - Medium H - High V - Very High |

**Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.**

Project Forcemain and Sewer Replacement, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-001  
Sheet No. 1 of 1  
Start 10 Jun 2024  
Finish 10 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

Elevation 344.0 (est.)  
Datum NAVD88  
Location See Plan

| Depth (ft) | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft) | PID Readings<br>(ppm) | USCS Symbol | Stratum<br>Change<br>Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME & SYMBOL,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          | Field Test |         |           |           |            |          |  |  |
|------------|----------------------------|----------------------------|----------------------|-----------------------|-------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|------------|---------|-----------|-----------|------------|----------|--|--|
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0          |                            |                            |                      |                       |             | 343.8                                | <div>-ASPHALT ROADWAY-</div> <div>Binder base</div> <div>-FILL-</div>                                                                                                                 |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 343.5                                |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 0.5                                  |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            | GB1                        | 5.0                  |                       | SP          | 341.5                                | Brown poorly graded SAND (SP), no odor, moist<br><br>-GLACIODELTAIC DEPOSITS-                                                                                                         |          |        | 10       | 60       | 30         |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
| 5          |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |  |  |

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 |  | Well Diagram |  | Summary            |      |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|--|--------------|--|--------------------|------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  |              |  | Overburden (ft)    | 20.0 |
|                  |       |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                                           |  |              |  |                    |      |
| 06/10/24         | 08:12 | not encountered    |                  |                |       |                                                                                                           |  |              |  | Rock Cored (ft)    | 0.0  |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Samples            | S1   |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Boring No. HA24-11 |      |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

















Project Forcemain and Sewer Replacement, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-001  
Sheet No. 1 of 1  
Start 11 Jun 2024  
Finish 11 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

Elevation 349.5 (est.)  
Datum NAVD88  
Location See Plan

| Depth (ft) | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          | Field Test |         |           |           |
|------------|-------------------------|-------------------------|-------------------|--------------------|-------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|------------|---------|-----------|-----------|
|            |                         |                         |                   |                    |             |                                |                                                                                                                                                                                | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness |
| 0          |                         |                         |                   |                    |             | 349.2                          | -ASPHALT ROADWAY-                                                                                                                                                              |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 0.3                            | Binder base                                                                                                                                                                    |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 349.0                          | -FILL-                                                                                                                                                                         |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 0.5                            |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 348.0                          | Brown poorly graded SAND (SP), no odor, moist                                                                                                                                  |          |        | 15       | 40       | 40         | 5       |           |           |
|            |                         |                         |                   |                    |             | 1.5                            |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             |                                | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |          |        |          |          |            |         |           |           |
| 5          |                         | GB1                     | 5.0               |                    |             |                                |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
| 10         |                         |                         |                   |                    |             |                                |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
| 15         |                         |                         |                   |                    |             |                                |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
| 20         |                         |                         |                   |                    |             | 329.5                          | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                             |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 20.0                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                |          |        |          |          |            |         |           |           |

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 |  | Well Diagram |  | Summary            |      |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|--|--------------|--|--------------------|------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  |              |  | Overburden (ft)    | 20.0 |
|                  |       |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                                           |  |              |  |                    |      |
| 06/11/24         | 08:37 | not encountered    |                  |                |       |                                                                                                           |  |              |  | Rock Cored (ft)    | 0.0  |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Samples            | S1   |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Boring No. HA24-19 |      |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.







H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE-WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONEDRIVE - HALEY\ALDRICH.COM\INT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------|--------------------|----------------------------------------|------------|------------------------------------------------------------------|-----------|-----------|------------|----------|--|--|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Boring No. HA24-23                     |            |                                                                  |           |           |            |          |  |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | File No. 0208898-001                   |            |                                                                  |           |           |            |          |  |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Sheet No. 1 of 1                       |            |                                                                  |           |           |            |          |  |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Start 11 Jun 2024                      |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         | Casing                  | Sampler           | Barrel             | Drilling Equipment and Procedures |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Finish 11 Jun 2024                     |            |                                                                  |           |           |            |          |  |  |
| Type                                                                                                       | HSA                     |                         | S                 | -                  | Rig Make & Model: CME 45          |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | H&A Rep. S. Shay                       |            |                                                                  |           |           |            |          |  |  |
| Inside Diameter (in.)                                                                                      | 2.25                    |                         | 1 3/8             | -                  | Bit Type: Cutting Head            |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Elevation 351.0 (est.)                 |            |                                                                  |           |           |            |          |  |  |
| Hammer Weight (lb)                                                                                         | -                       |                         | 140               | -                  | Drill Mud: None                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Datum NAVD88                           |            |                                                                  |           |           |            |          |  |  |
| Hammer Fall (in.)                                                                                          | -                       |                         | 30                | -                  | Casing: HSA                       |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Location See Plan                      |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Hoist/Hammer: Winch / Automatic Hammer |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | PID Make & Model: Tiger 10.6 eV        |            |                                                                  |           |           |            |          |  |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol                       | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel                                                    | Sand   |                    |                                        | Field Test |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                | % Coarse                                                  | % Fine | % Coarse           | % Medium                               | % Fine     | % Fines                                                          | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0                                                                                                          |                         |                         |                   |                    |                                   | 350.8<br>0.3                                                                                              | -ASPHALT ROADWAY-                                                                                                                                                              |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            | 6<br>6<br>6<br>6        | S1<br>19                | 0.5<br>2.5        | 0.7                | SP                                | 350.5<br>0.5                                                                                              | Binder Base                                                                                                                                                                    |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   | 349.0<br>2.0                                                                                              | -FILL-                                                                                                                                                                         |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            | 5<br>5<br>5<br>7        | S2<br>18                | 2.5<br>4.5        | 0.3                |                                   |                                                                                                           | Loose brown poorly graded SAND (SP), no odor, dry                                                                                                                              |                                                           |        | 5                  | 60                                     | 30         | 5                                                                |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| 5                                                                                                          | 4<br>6<br>8<br>8        | S3<br>20                | 5.0<br>7.0        | 0.2                | SP                                |                                                                                                           | Loose brown poorly graded SAND (SP), no odor, dry                                                                                                                              |                                                           | 1      | 1                  | 42                                     | 52         | 4                                                                |           |           |            |          |  |  |
|                                                                                                            | 6<br>7<br>8<br>8        | S4<br>18                | 7.0<br>9.0        | 0.0                | SM                                | 344.0<br>7.0                                                                                              | Medium dense olive brown silty SAND (SM), seam, no odor, moist                                                                                                                 |                                                           |        |                    | 15                                     | 65         | 20                                                               |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | SW                                | 343.0<br>8.0                                                                                              | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | Medium dense brown well graded SAND (SW), no odor, dry                                                                                                                         |                                                           | 5      | 30                 | 30                                     | 30         | 5                                                                |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| 10                                                                                                         | 4<br>3<br>3<br>3        | S5<br>19                | 10.0<br>12.0      | 0.0                | SP                                | 341.0<br>10.0                                                                                             | Loose brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                              |                                                           | 5      | 6                  | 52                                     | 34         | 3                                                                |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| 15                                                                                                         | 5<br>5<br>8<br>7        | S6<br>24                | 15.0<br>17.0      | 0.0                | SM                                | 336.0<br>15.0                                                                                             | Medium dense olive brown silty SAND (SM), interbedded, no odor, moist                                                                                                          |                                                           |        |                    |                                        | 75         | 25                                                               |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | SP                                | 334.0<br>17.0                                                                                             | Light brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                              |                                                           |        |                    | 30                                     | 65         | 5                                                                |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| 20                                                                                                         |                         |                         |                   |                    |                                   | 330.0<br>21.0                                                                                             | BOTTOM OF EXPLORATION AT 21.0 FEET                                                                                                                                             |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Sample ID                              |            | Well Diagram                                                     |           | Summary   |            |          |  |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |                                   | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |                                                                                                                                                                                | Overburden (ft) 21.0<br>Rock Cored (ft) 0.0<br>Samples S6 |        | Boring No. HA24-23 |                                        |            |                                                                  |           |           |            |          |  |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water                             |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| 06/11/24                                                                                                   | 10:17                   | not encountered         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Dilatancy: R - Rapid S - Slow N - None |            | Plasticity: N - Nonplastic L - Low M - Medium H - High           |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    | Toughness: L - Low M - Medium H - High |            | Dry Strength: N - None L - Low M - Medium H - High V - Very High |           |           |            |          |  |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                |                                                           |        |                    |                                        |            |                                                                  |           |           |            |          |  |  |



H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONE\DRIVE - HALEY\ALDRICH.COM\INT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|----------|------------------------|------------|--------------------|-----------|-----------|------------|----------|--|--|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          | Boring No. HA24-24     |            |                    |           |           |            |          |  |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          | File No. 0208898-001   |            |                    |           |           |            |          |  |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          | Sheet No. 1 of 1       |            |                    |           |           |            |          |  |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          | Start 11 Jun 2024      |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         | Casing                  | Sampler           | Barrel             | Drilling Equipment and Procedures |                                |                                                                                                                                                                                |              |                 |          | Finish 11 Jun 2024     |            |                    |           |           |            |          |  |  |
| Type                                                                                                       |                         | SSA                     | GB                | -                  | Rig Make & Model: CME 45          |                                |                                                                                                                                                                                |              |                 |          | H&A Rep. S. Shay       |            |                    |           |           |            |          |  |  |
| Inside Diameter (in.)                                                                                      |                         | -                       | -                 | -                  | Bit Type: Cutting Head            |                                |                                                                                                                                                                                |              |                 |          | Elevation 351.5 (est.) |            |                    |           |           |            |          |  |  |
| Hammer Weight (lb)                                                                                         |                         | -                       | -                 | -                  | Drill Mud: None                   |                                |                                                                                                                                                                                |              |                 |          | Datum NAVD88           |            |                    |           |           |            |          |  |  |
| Hammer Fall (in.)                                                                                          |                         | -                       | -                 | -                  | Casing: None                      |                                |                                                                                                                                                                                |              |                 |          | Location See Plan      |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | Hoist/Hammer: Winch / None        |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | PID Make & Model: Tiger 10.6 eV   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol                       | Stratum Change Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel       |                 | Sand     |                        | Field Test |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                | % Coarse     | % Fine          | % Coarse | % Medium               | % Fine     | % Fines            | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0                                                                                                          |                         |                         |                   |                    |                                   | 351.3<br>0.3                   | -ASPHALT ROADWAY-                                                                                                                                                              |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | SP                                | 351.0<br>0.5                   | Binder base                                                                                                                                                                    |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   | 0.3                | SP                                | 349.5<br>2.0                   | -FILL-                                                                                                                                                                         |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                | Brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                    |              | 5               | 60       | 30                     | 5          |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| 5                                                                                                          |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| 10                                                                                                         |                         | GB1                     | 10.0              |                    |                                   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| 15                                                                                                         |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| 20                                                                                                         |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   | 330.5<br>21.0                  | BOTTOM OF EXPLORATION AT 21.0 FEET                                                                                                                                             |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |                                   |                                | Sample ID                                                                                                                                                                      | Well Diagram | Summary         |          |                        |            |                    |           |           |            |          |  |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |                                   |                                | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe                                                                      |              | Overburden (ft) |          | 21.0                   |            | Boring No. HA24-24 |           |           |            |          |  |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water                             | Rock Cored (ft)                |                                                                                                                                                                                |              | 0.0             |          |                        |            |                    |           |           |            |          |  |  |
| 06/11/24                                                                                                   | 10:37                   | not encountered         |                   |                    |                                   |                                |                                                                                                                                                                                |              | Samples         |          | S1                     |            |                    |           |           |            |          |  |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |                                   |                                | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High                                                                                               |              |                 |          |                        |            |                    |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                | Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High                                                     |              |                 |          |                        |            |                    |           |           |            |          |  |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |                                   |                                |                                                                                                                                                                                |              |                 |          |                        |            |                    |           |           |            |          |  |  |

## TEST BORING REPORT

Boring No. HA24-25

Project Forcemain and Sewer Replacement, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-001  
Sheet No. 1 of 1  
Start 11 Jun 2024  
Finish 11 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

Elevation 351.5 (est.)  
Datum NAVD88  
Location See Plan

| Depth (ft) | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          | Field Test |         |           |           |
|------------|-------------------------|-------------------------|-------------------|--------------------|-------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|------------|---------|-----------|-----------|
|            |                         |                         |                   |                    |             |                                |                                                                                                                                                                                | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness |
| 0          |                         |                         |                   |                    |             | 351.3                          | -ASPHALT ROADWAY-                                                                                                                                                              |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 0.3                            | Binder base                                                                                                                                                                    |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 351.0                          | -FILL-                                                                                                                                                                         |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 0.6                            |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 349.5                          | Brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                    |          |        | 5        | 60       | 30         | 5       |           |           |
|            |                         |                         |                   |                    |             | 2.0                            | -GLACIODELTAIC DEPOSITS-                                                                                                                                                       |          |        |          |          |            |         |           |           |
| 5          |                         | GB1                     | 5.0               |                    |             |                                |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
| 10         |                         |                         |                   |                    |             |                                |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
| 15         |                         |                         |                   |                    |             |                                |                                                                                                                                                                                |          |        |          |          |            |         |           |           |
| 20         |                         |                         |                   |                    |             | 331.5                          | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                             |          |        |          |          |            |         |           |           |
|            |                         |                         |                   |                    |             | 20.0                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                |          |        |          |          |            |         |           |           |

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 |  | Well Diagram |  | Summary            |      |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|--|--------------|--|--------------------|------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  |              |  | Overburden (ft)    | 20.0 |
|                  |       |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                                           |  |              |  |                    |      |
| 06/11/24         | 10:53 | not encountered    |                  |                |       |                                                                                                           |  |              |  | Rock Cored (ft)    | 0.0  |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Samples            | S1   |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Boring No. HA24-25 |      |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.









## TEST BORING REPORT

Boring No. HA24-30

Project Forcemain and Sewer Replacement, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-001  
Sheet No. 1 of 1  
Start 12 Jun 2024  
Finish 12 Jun 2024  
Driller P. Michaud

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

H&A Rep. S. Shay  
Elevation 351.5 (est.)  
Datum NAVD88  
Location See Plan

| Depth (ft) | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft) | PID Readings<br>(ppm) | USCS Symbol | Stratum<br>Change<br>Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME & SYMBOL,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          |        | Field Test |           |           |            |          |  |  |
|------------|----------------------------|----------------------------|----------------------|-----------------------|-------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|--------|------------|-----------|-----------|------------|----------|--|--|
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       | % Coarse | % Fine | % Coarse | % Medium | % Fine | % Fines    | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0          |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |
| 5          |                            | GB1                        | 5.0                  |                       | SP          | 351.0                                | -ASPHALT ROADWAY-                                                                                                                                                                     |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 0.5                                  | Binder base                                                                                                                                                                           |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 350.8                                | -FILL-                                                                                                                                                                                |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 0.7                                  |                                                                                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 349.5                                | Brown poorly graded SAND (SP), no odor, moist                                                                                                                                         | 10       | 45     | 40       | 5        |        |            |           |           |            |          |  |  |
| 10         |                            |                            |                      |                       | SP-SM       | 342.5                                | -GLACIODELTAIC DEPOSITS-                                                                                                                                                              |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 9.0                                  | Light brown poorly graded SAND with silt (SP-SM), stratified, no odor, moist, observation of auger spoils                                                                             |          |        | 15       | 75       | 10     |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      | -GLACIODELTAIC DEPOSITS-                                                                                                                                                              |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |
| 15         |                            |                            |                      |                       | SP          | 339.5                                | -GLACIODELTAIC DEPOSITS-                                                                                                                                                              |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 12.0                                 | Brown poorly graded SAND (SP), no odor, moist                                                                                                                                         | 10       | 50     | 35       | 5        |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      | -GLACIODELTAIC DEPOSITS-                                                                                                                                                              |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |
| 20         |                            |                            |                      |                       |             | 331.5                                | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                                    |          |        |          |          |        |            |           |           |            |          |  |  |
|            |                            |                            |                      |                       |             | 20.0                                 | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                       |          |        |          |          |        |            |           |           |            |          |  |  |

| Water Level Data   |       |                    |                  |                |       | Sample ID                                                                                                 |  | Well Diagram |  | Summary         |      |
|--------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|--|--------------|--|-----------------|------|
| Date               | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  |              |  | Overburden (ft) | 20.0 |
|                    |       |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                                           |  |              |  | Rock Cored (ft) | 0.0  |
| 06/12/24           | 07:50 | not encountered    |                  |                |       |                                                                                                           |  |              |  | Samples         | S1   |
| Boring No. HA24-30 |       |                    |                  |                |       |                                                                                                           |  |              |  |                 |      |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.





H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONE\DRIVE - HALEY\ALDRICH.COM\GINT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------|------------------------------------------------------------------|------------------------|------------|---------|-----------|-----------|------------|----------|--|--|
| <div><div><div>HALEYALDRICH</div><div>TEST BORING REPORT</div></div></div>                                 |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Boring No. HA24-32     |            |         |           |           |            |          |  |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | File No. 0208898-001   |            |         |           |           |            |          |  |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Sheet No. 1 of 1       |            |         |           |           |            |          |  |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Start 12 Jun 2024      |            |         |           |           |            |          |  |  |
|                                                                                                            |                         | Casing                  | Sampler           | Barrel             | Drilling Equipment and Procedures |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Finish 12 Jun 2024     |            |         |           |           |            |          |  |  |
| Type                                                                                                       |                         | SSA                     | GB                | -                  | Rig Make & Model: CME 45          |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | H&A Rep. S. Shay       |            |         |           |           |            |          |  |  |
| Inside Diameter (in.)                                                                                      |                         | -                       | -                 | -                  | Bit Type: Cutting Head            |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Elevation 351.5 (est.) |            |         |           |           |            |          |  |  |
| Hammer Weight (lb)                                                                                         |                         | -                       | -                 | -                  | Drill Mud: None                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Datum NAVD88           |            |         |           |           |            |          |  |  |
| Hammer Fall (in.)                                                                                          |                         | -                       | -                 | -                  | Casing: None                      |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  | Location See Plan      |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | Hoist/Hammer: Winch / None        |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | PID Make & Model: Tiger 10.6 eV   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol                       | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gravel                                                 |        | Sand                                                             |                        | Field Test |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | % Coarse                                               | % Fine | % Coarse                                                         | % Medium               | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0                                                                                                          |                         |                         |                   |                    |                                   | 351.2<br>0.3                                                                                              | -ASPHALT ROADWAY-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | SP                                | 350.9<br>0.6                                                                                              | Binder base                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | Brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    | SP                                | 349.0<br>2.5                                                                                              | -FILL-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | Brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        | 5      | 5                                                                | 50                     | 35         | 5       |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | -GLACIODELTIC DEPOSITS-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| 5                                                                                                          |                         | GB1                     | 5.0               |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| 10                                                                                                         |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| 15                                                                                                         |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| 20                                                                                                         |                         |                         |                   |                    |                                   | 331.5<br>20.0                                                                                             | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |                                   | Sample ID                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Well Diagram                                           |        | Summary                                                          |                        |            |         |           |           |            |          |  |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |                                   | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe | <br>Riser Pipe<br><br>Screen<br><br>Filter Sand<br><br>Cuttings<br><br>Grout<br><br>Concrete<br><br>Bentonite Seal | Overburden (ft) 20.0                                   |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water                             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Rock Cored (ft) 0.0                                    |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| 06/12/24                                                                                                   | 08:24                   | not encountered         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Samples S1                                             |        |                                                                  |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        | Boring No. HA24-32                                               |                        |            |         |           |           |            |          |  |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |                                   | Dilatancy: R - Rapid S - Slow N - None                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Plasticity: N - Nonplastic L - Low M - Medium H - High |        | Dry Strength: N - None L - Low M - Medium H - High V - Very High |                        |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |                                   |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |        |                                                                  |                        |            |         |           |           |            |          |  |  |

H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE-WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONEDRIVE - HALEY\ALDRICH.COM\GINT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------|----------|------------------------|----------|----------|------------|---------|-----------|-----------|------------|-----------|--|--------------|--|---------|--|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          | Boring No. HA24-33     |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          | File No. 0208898-001   |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          | Sheet No. 1 of 1       |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          | Start 12 Jun 2024      |          |          |            |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            |                         |                         |                   |                    | Casing      | Sampler                                                                                                   | Barrel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Drilling Equipment and Procedures                         |                    |          | Finish 12 Jun 2024     |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Type                                                                                                       |                         |                         |                   |                    | HSA         | S                                                                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Rig Make & Model: CME 45                                  |                    |          | H&A Rep. S. Shay       |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Inside Diameter (in.)                                                                                      |                         |                         |                   |                    | 2.25        | 1 3/8                                                                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Bit Type: Cutting Head                                    |                    |          | Elevation 351.0 (est.) |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Hammer Weight (lb)                                                                                         |                         |                         |                   |                    | -           | 140                                                                                                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Drill Mud: None                                           |                    |          | Datum NAVD88           |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Hammer Fall (in.)                                                                                          |                         |                         |                   |                    | -           | 30                                                                                                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Casing: HSA                                               |                    |          | Location See Plan      |          |          |            |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Hoist/Hammer: Winch / Automatic Hammer                    |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PID Make & Model: Tiger 10.6 eV                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                    | Gravel   |                        | Sand     |          | Field Test |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    | % Coarse | % Fine                 | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength  |  |              |  |         |  |
| 0                                                                                                          |                         |                         |                   |                    |             | 350.7<br>0.3<br>350.5<br>0.5                                                                              | -ASPHALT ROADWAY-<br>Binder base                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            | 7<br>7<br>7<br>7        | S1<br>16                | 0.5<br>2.5        |                    | SP          |                                                                                                           | Medium dense poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                           |                    |          |                        | 10       | 35       | 50         | 5       |           |           |            |           |  |              |  |         |  |
|                                                                                                            | 9<br>7<br>7<br>10       | S2<br>13                | 2.5<br>4.5        |                    | SP          | 348.0<br>3.0                                                                                              | -FILL-<br>Medium dense brown poorly graded SAND (SP), no odor, moist<br>- GLACIODELTAIC DEPOSITS -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                           |                    | 5        | 5                      | 40       | 50       |            |         |           |           |            |           |  |              |  |         |  |
| 5                                                                                                          | 11<br>14<br>15<br>13    | S3<br>12                | 5.0<br>7.0        | 0.0                | SP-SM       | 346.0<br>5.0                                                                                              | Medium dense brown poorly graded SAND with silt (SP-SM), stratified, no odor, moist<br>-GLACIODELTAIC DEPOSITS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                    | 14       | 16                     | 44       | 18       | 8          |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            | 12<br>13<br>11<br>8     | S4<br>12                | 7.0<br>9.0        | 0.2                | SP          | 344.0<br>7.0                                                                                              | Medium dense brown poorly graded SAND (SP), stratified, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           |                    | 6        | 4                      | 54       | 32       | 4          |         |           |           |            |           |  |              |  |         |  |
| 10                                                                                                         | 7<br>6<br>8<br>8        | S5<br>20                | 10.0<br>12.0      | 0.2                | SP          |                                                                                                           | Medium dense brown to light brown poorly graded SAND (SP), stratified, no odor, moist<br><br>-GLACIODELTAIC DEPOSITS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                           |                    | 5        | 5                      | 40       | 50       |            |         |           |           |            |           |  |              |  |         |  |
| 15                                                                                                         | 5<br>6<br>7<br>7        | S6<br>18                | 15.0<br>17.0      | 0.0                | SP          | 334.0<br>17.0                                                                                             | Medium dense tan poorly graded SAND (SP), stratified, no odor, moist<br><br>-GLACIODELTAIC DEPOSITS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                           |                    |          |                        | 5        | 90       | 5          |         |           |           |            |           |  |              |  |         |  |
| 20                                                                                                         | 8<br>8<br>8             | S7<br>20                | 19.0<br>21.0      | 0.0                | SP-SM       | 330.0<br>21.0                                                                                             | Medium dense olive brown to brown poorly graded SAND with silt (SP-SM), interbedded, no odor, moist, occasional silty fine sand seams, prominent mottling<br><br>BOTTOM OF EXPLORATION AT 21.0 FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                           |                    |          |                        | 40       | 50       | 10         |         |           |           |            |           |  |              |  |         |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          |                        |          |          |            |         |           |           |            | Sample ID |  | Well Diagram |  | Summary |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |             | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe | <br>Riser Pipe<br><br>Screen<br><br>Filter Sand<br><br>Cuttings<br><br>Grout<br><br>Concrete<br><br>Bentonite Seal | Overburden (ft) 21.0<br>Rock Cored (ft) 0.0<br>Samples S7 |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
| 06/12/24                                                                                                   | 09:11                   | not encountered         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           | Boring No. HA24-33 |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High    |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                    |          |                        |          |          |            |         |           |           |            |           |  |              |  |         |  |

H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE GDT C:\USERS\ALONGO\ONE\DRIVE - HALEY\ALDRICH.COM\INT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------|------------|------|----------------------------------------------------------------------------------------------------------------------------|--------|----------|----------|------------|---------|-----------|-----------|------------|
| <div><div><div>HALEY</div><div>ALDRICH</div></div><div>TEST BORING REPORT</div></div>                      |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | Boring No. HA24-34                                                                                                         |        |          |          |            |         |           |           |            |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | File No. 0208898-001                                                                                                       |        |          |          |            |         |           |           |            |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | Sheet No. 1 of 1                                                                                                           |        |          |          |            |         |           |           |            |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | Start 12 Jun 2024                                                                                                          |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   | Casing             | Sampler     | Barrel                                                                                                    | Drilling Equipment and Procedures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                        |                 |            |      | Finish 12 Jun 2024                                                                                                         |        |          |          |            |         |           |           |            |
| Type                                                                                                       |                         |                         |                   | SSA                | GB          | -                                                                                                         | Rig Make & Model: CME 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                        |                 |            |      | H&A Rep. S. Shay                                                                                                           |        |          |          |            |         |           |           |            |
| Inside Diameter (in.)                                                                                      |                         |                         |                   | -                  | -           | -                                                                                                         | Bit Type: Cutting Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                        |                 |            |      | Elevation 349.0 (est.)                                                                                                     |        |          |          |            |         |           |           |            |
| Hammer Weight (lb)                                                                                         |                         |                         |                   | -                  | -           | -                                                                                                         | Drill Mud: None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | Datum NAVD88                                                                                                               |        |          |          |            |         |           |           |            |
| Hammer Fall (in.)                                                                                          |                         |                         |                   | -                  | -           | -                                                                                                         | Casing: None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                        |                 |            |      | Location See Plan                                                                                                          |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | Hoist/Hammer: Winch / None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | PID Make & Model: Tiger 10.6 eV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br>(Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                        |                 |            |      | Gravel                                                                                                                     |        | Sand     |          | Field Test |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | % Coarse                                                                                                                   | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness | Plasticity |
| 0                                                                                                          |                         |                         |                   |                    | SM          | 348.5<br>0.5<br>348.3<br>0.8                                                                              | -ASPHALT ROADWAY-<br>Binder base                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Dark brown silty SAND (SM), no structure, no odor, moist                               |                 |            |      |                                                                                                                            |        |          |          | 30         | 55      | 15        |           |            |
|                                                                                                            |                         | GB1                     | 5.0               |                    |             |                                                                                                           | -FILL-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
| 5                                                                                                          |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    | SP          | 339.0<br>10.0                                                                                             | Brown poorly graded SAND (SP), no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                        |                 |            |      |                                                                                                                            |        |          |          | 30         | 65      | 5         |           |            |
| 10                                                                                                         |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -GLACIODELTAIC DEPOSITS-                                                               |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
| 15                                                                                                         |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             | 329.0<br>20.0                                                                                             | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
| 20                                                                                                         |                         |                         |                   |                    |             |                                                                                                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |
| Water Level Data                                                                                           |                         |                         |                   |                    |             | Sample ID                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Well Diagram                                                                           |                 | Summary    |      |                                                                                                                            |        |          |          |            |         |           |           |            |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |             | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe | <br><br><br><br><br><br> | Riser Pipe<br>Screen<br>Filter Sand<br>Cuttings<br>Grout<br>Concrete<br>Bentonite Seal | Overburden (ft) |            | 20.0 |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        | Rock Cored (ft) |            | 0.0  |                                                                                                                            |        |          |          |            |         |           |           |            |
| 06/12/24                                                                                                   | 09:28                   | not encountered         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        | Samples         |            | S1   |                                                                                                                            |        |          |          |            |         |           |           |            |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 | Boring No. |      | HA24-34                                                                                                                    |        |          |          |            |         |           |           |            |
| Field Tests:                                                                                               |                         |                         |                   |                    |             | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      | Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High |        |          |          |            |         |           |           |            |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                        |                 |            |      |                                                                                                                            |        |          |          |            |         |           |           |            |



H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONE\DRIVE - HALEY\ALDRICH.COM\GINT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------|--------------|------------------------|------------|---------|--------|--|-------------|--|----------|--------|----------|----------|------------|---------|----------------|-----------------|------------|----------|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              | Boring No. HA24-36     |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              | File No. 0208898-001   |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              | Sheet No. 1 of 1       |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              | Start 12 Jun 2024      |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    | Casing      | Sampler                        | Barrel                                                                                                                      | Drilling Equipment and Procedures |                       |              | Finish 12 Jun 2024     |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Type                                                                                                       |                         |                         |                   |                    | SSA         | GB                             | -                                                                                                                           | Rig Make & Model: CME 45          |                       |              | Driller P. Michaud     |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Inside Diameter (in.)                                                                                      |                         |                         |                   |                    | -           | -                              | -                                                                                                                           | Bit Type: Cutting Head            |                       |              | H&A Rep. S. Shay       |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Hammer Weight (lb)                                                                                         |                         |                         |                   |                    | -           | -                              | -                                                                                                                           | Drill Mud: None                   |                       |              | Elevation 351.0 (est.) |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Hammer Fall (in.)                                                                                          |                         |                         |                   |                    | -           | -                              | -                                                                                                                           | Casing: None                      |                       |              | Datum NAVD88           |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                |                                                                                                                             | Hoist/Hammer: Winch / None        |                       |              | Location See Plan      |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                |                                                                                                                             | PID Make & Model: Tiger 10.6 eV   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION                                                                                |                                   |                       |              |                        |            |         |        |  |             |  | Gravel   |        | Sand     |          | Field Test |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                | (Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION) |                                   |                       |              |                        |            |         |        |  |             |  | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy      | Toughness       | Plasticity | Strength |
| 0                                                                                                          |                         |                         |                   |                    |             | 350.7                          | -ASPHALT ROADWAY-                                                                                                           |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    | SP          | 0.3                            | Binder base                                                                                                                 |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    | SP          | 350.4                          | Poorly graded SAND (SP), no structure, no odor, moist                                                                       |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             | 0.6                            |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             | 349.5                          | -FILL-                                                                                                                      |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             | 1.5                            | Brown to light brown poorly graded SAND (SP), stratified, no odor, moist                                                    |                                   |                       |              |                        |            |         |        |  |             |  | 5        | 10     | 40       | 40       | 5          |         |                |                 |            |          |
| 5                                                                                                          |                         | GB1                     | 5.0               |                    |             |                                | -GLACIODELTAIC DEPOSITS-                                                                                                    |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| 10                                                                                                         |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| 15                                                                                                         |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| 20                                                                                                         |                         |                         |                   |                    |             | 331.0                          | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                          |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
|                                                                                                            |                         |                         |                   |                    |             | 20.0                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Water Level Data                                                                                           |                         |                         |                   |                    |             |                                | Sample ID                                                                                                                   |                                   |                       | Well Diagram |                        |            | Summary |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |             | O - Open End Rod               | T - Thin Wall Tube                                                                                                          | U - Undisturbed Sample            | S - Splitspoon Sample | G - Geoprobe |                        | Riser Pipe |         | Screen |  | Filter Sand |  | Cuttings |        | Grout    |          | Concrete   |         | Bentonite Seal | Overburden (ft) |            | 20.0     |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water       |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                | Rock Cored (ft) |            | 0.0      |
| 06/12/24                                                                                                   | 09:59                   | not encountered         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         | Samples        |                 | S1         |          |
| Boring No. HA24-36                                                                                         |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High    |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |             |                                |                                                                                                                             |                                   |                       |              |                        |            |         |        |  |             |  |          |        |          |          |            |         |                |                 |            |          |



H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE-WELL-09 W FENCE GDT C:\USERS\ALONGO\ONEDRIVE - HALEY\ALDRICH.COM\GINT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--|--|------------------------------------------------------------------|--|--------------|--|---------|--|--|----------|--------|----------|----------|------------|---------|-----------|-----------|------------|----------|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Boring No. HA24-38                                               |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | File No. 0208898-001                                             |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Sheet No. 1 of 1                                                 |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Start 12 Jun 2024                                                |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    | Casing      | Sampler                                                                                                   | Barrel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Drilling Equipment and Procedures      |  |  | Finish 12 Jun 2024                                               |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Type                                                                                                       |                         |                         |                   |                    | HSA         | S                                                                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Rig Make & Model: CME 45               |  |  | H&A Rep. S. Shay                                                 |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Inside Diameter (in.)                                                                                      |                         |                         |                   |                    | 2.25        | 1 3/8                                                                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Bit Type: Cutting Head                 |  |  | Elevation 350.0 (est.)                                           |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Hammer Weight (lb)                                                                                         |                         |                         |                   |                    | -           | 140                                                                                                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Drill Mud: None                        |  |  | Datum NAVD88                                                     |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Hammer Fall (in.)                                                                                          |                         |                         |                   |                    | -           | 30                                                                                                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Casing: HSA                            |  |  | Location See Plan                                                |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hoist/Hammer: Winch / Automatic hammer |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PID Make & Model: Tiger 10.6 eV        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |  |  |                                                                  |  |              |  |         |  |  | Gravel   |        | Sand     |          | Field Test |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | (Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |  |  |                                                                  |  |              |  |         |  |  | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |
| 0                                                                                                          |                         |                         |                   |                    |             | 349.8 0.3                                                                                                 | -ASPHALT ROADWAY-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            | 9 15 22 20              | S1 18                   | 0.5 2.5           | 1.0                | SP          | 349.5 0.5                                                                                                 | Binder base<br>Dense poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            | 16 14 14 11             | S2 15                   | 2.5 4.5           | 0.8                | SP-SM       | 347.5 2.5                                                                                                 | -FILL-<br>Medium dense brown to dark brown poorly graded SAND with silt (SP-SM), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |  |  |                                                                  |  |              |  |         |  |  | 10       | 10     | 43       | 24       | 13         |         |           |           |            |          |
| 5                                                                                                          | 3 3 2 3                 | S3 13                   | 5.0 7.0           | 0.9                | SP-SM       |                                                                                                           | -FILL-<br>Loose brown to dark brown poorly graded SAND with silt (SP-SM), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |  |  |                                                                  |  |              |  |         |  |  | 5        | 10     | 35       | 40       | 10         |         |           |           |            |          |
|                                                                                                            | 3 2 2 3                 | S4 12                   | 7.0 9.0           | 0.5                | SP          | 343.0 7.0                                                                                                 | Very loose brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |  |  |                                                                  |  |              |  |         |  |  | 10       | 10     | 12       | 46       | 18         | 4       |           |           |            |          |
| 10                                                                                                         | 2 1 1 2                 | S5 20                   | 10.0 12.0         | 0.3                | SP          |                                                                                                           | -FILL-<br>Very loose brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |  |  |                                                                  |  |              |  |         |  |  | 5        | 10     | 50       | 35       |            |         |           |           |            |          |
| 15                                                                                                         | 5 4 5 3                 | S6 12                   | 15.0 17.0         | 0.5                | SP-SM       | 335.0 15.0                                                                                                | Loose brown poorly graded SAND with silt (SP-SM), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |  |  |                                                                  |  |              |  |         |  |  |          | 5      | 35       | 50       | 10         |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | -FILL-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| 20                                                                                                         | 7 6 7 8                 | S7 20                   | 19.0 21.0         | 1.0                | SM          | 331.0 19.0                                                                                                | Medium dense dark brown silty SAND (SM), no structure, slight organic odor, moist, trace wood, appears to be disturbed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |  |  |                                                                  |  |              |  |         |  |  |          | 5      | 10       | 50       | 35         |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    | SP          | 330.0 20.0                                                                                                | -FILL-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |  |  |                                                                  |  |              |  |         |  |  | 5        | 10     | 35       | 45       | 5          |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |             | 329.0 21.0                                                                                                | Medium dense brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | -GLACIODELTAIC DEPOSITS-<br>BOTTOM OF EXPLORATION AT 21.0 FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Water Level Data                                                                                           |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Sample ID                                                        |  | Well Diagram |  | Summary |  |  |          |        |          |          |            |         |           |           |            |          |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |             | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe | <br>Riser Pipe<br><br>Screen<br><br>Filter Sand<br><br>Cuttings<br><br>Grout<br><br>Concrete<br><br>Bentonite Seal | Overburden (ft) 21.0                   |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Rock Cored (ft) 0.0                    |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| 06/12/24                                                                                                   | 11:51                   | not encountered         |                   |                    |             |                                                                                                           | Samples S7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Field Tests:                                                                                               |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Boring No. HA24-38                                               |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Dilatancy: R - Rapid S - Slow N - None                                                                     |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Plasticity: N - Nonplastic L - Low M - Medium H - High           |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Toughness: L - Low M - Medium H - High                                                                     |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  | Dry Strength: N - None L - Low M - Medium H - High V - Very High |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |  |  |                                                                  |  |              |  |         |  |  |          |        |          |          |            |         |           |           |            |          |







Project Forcemain and Sewer Replacement, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon

File No. 0208898-001  
Sheet No. 1 of 1  
Start 13 Jun 2024  
Finish 13 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|                       | Casing | Sampler | Barrel | Drilling Equipment and Procedures |
|-----------------------|--------|---------|--------|-----------------------------------|
| Type                  | SSA    | GB      | -      | Rig Make & Model: CME 45          |
| Inside Diameter (in.) | -      | -       | -      | Bit Type: Cutting Head            |
| Hammer Weight (lb)    | -      | -       | -      | Drill Mud: None                   |
| Hammer Fall (in.)     | -      | -       | -      | Casing: None                      |
|                       |        |         |        | Hoist/Hammer: Winch / None        |
|                       |        |         |        | PID Make & Model: Tiger 10.6 eV   |

Elevation 348.0 (est.)  
Datum NAVD88  
Location See Plan

| Depth (ft) | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft) | PID Readings<br>(ppm) | USCS Symbol | Stratum<br>Change<br>Elev/Depth (ft) | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME & SYMBOL,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION) | Gravel   |        | Sand     |          | Field Test |         |           |           |            |          |
|------------|----------------------------|----------------------------|----------------------|-----------------------|-------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|------------|---------|-----------|-----------|------------|----------|
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |
| 0          |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       | SP          | 347.8<br>0.3                         | -ASHPHALT ROADWAY-                                                                                                                                                                    |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             | 347.5<br>0.5                         | Binder base                                                                                                                                                                           |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      | Brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                           |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       | SP          | 345.5<br>2.5                         | -FILL-                                                                                                                                                                                |          | 5      | 10       | 35       | 45         | 5       |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      | Brown poorly graded SAND (SP), no odor, moist                                                                                                                                         |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      | -GLACIODELTAIC DEPOSITS-                                                                                                                                                              |          |        |          |          |            |         |           |           |            |          |
| 5          |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
| 10         |                            | GB1                        | 10.0                 |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
| 15         |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      |                                                                                                                                                                                       |          |        |          |          |            |         |           |           |            |          |
| 20         |                            |                            |                      |                       |             | 328.0<br>20.0                        | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                                    |          |        |          |          |            |         |           |           |            |          |
|            |                            |                            |                      |                       |             |                                      | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                       |          |        |          |          |            |         |           |           |            |          |

| Water Level Data |       |                    |                  |                |       | Sample ID                                                                                                 |  | Well Diagram |  | Summary            |      |
|------------------|-------|--------------------|------------------|----------------|-------|-----------------------------------------------------------------------------------------------------------|--|--------------|--|--------------------|------|
| Date             | Time  | Elapsed Time (hr.) | Depth (ft) to:   |                |       | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe |  |              |  | Overburden (ft)    | 20.0 |
|                  |       |                    | Bottom of Casing | Bottom of Hole | Water |                                                                                                           |  |              |  |                    |      |
| 06/13/24         | 07:35 | not encountered    |                  |                |       |                                                                                                           |  |              |  | Rock Cored (ft)    | 0.0  |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Samples            | S1   |
|                  |       |                    |                  |                |       |                                                                                                           |  |              |  | Boring No. HA24-41 |      |

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High  
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.



# TEST BORING REPORT

**Boring No. HA24-42**

|            |                                                         |
|------------|---------------------------------------------------------|
| Project    | Forcemain and Sewer Replacement, Concord, New Hampshire |
| Client     | Wright-Pierce                                           |
| Contractor | Terracon                                                |

File No. 0208898-001  
Sheet No. 1 of 1  
Start 13 Jun 2024  
Finish 13 Jun 2024  
Driller P. Michaud  
H&A Rep. S. Shay

|           |              |
|-----------|--------------|
| Elevation | 347.0 (est.) |
| Datum     | NAVD88       |
| Location  | See Plan     |

|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------|----------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------|--|--------------------------------------------------|--------|----------|----------|--------|------------|-----------|-----------|------------|
|                                                                                                            |                            |                            |                      | Casing                                                                           | Sampler     | Barrel                                                                                                    | Drilling Equipment and Procedures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                            |                 |  | Finish<br>Driller P. Michaud<br>H&A Rep. S. Shay |        |          |          |        |            |           |           |            |
| Type                                                                                                       |                            |                            |                      | SSA                                                                              | GB          | -                                                                                                         | Rig Make & Model: CME 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                            |                 |  | Elevation 347.0 (est.)                           |        |          |          |        |            |           |           |            |
| Inside Diameter (in.)                                                                                      |                            |                            |                      | -                                                                                | -           | -                                                                                                         | Bit Type: Cutting Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                            |                 |  | Datum NAVD88                                     |        |          |          |        |            |           |           |            |
| Hammer Weight (lb)                                                                                         |                            |                            |                      | -                                                                                | -           | -                                                                                                         | Drill Mud: None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  | Location See Plan                                |        |          |          |        |            |           |           |            |
| Hammer Fall (in.)                                                                                          |                            |                            |                      | -                                                                                | -           | -                                                                                                         | Casing: None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | Hoist/Hammer: Winch / None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | PID Make & Model: Tiger 10.6 eV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
| Depth (ft)                                                                                                 | Sampler Blows<br>per 6 in. | Sample No.<br>& Rec. (in.) | Sample<br>Depth (ft) | PID Readings<br>(ppm)                                                            | USCS Symbol | Stratum<br>Change<br>Elev/Depth (ft)                                                                      | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION<br><br>(Density/consistency, color, GROUP NAME & SYMBOL,<br>structure, odor, moisture, optional descriptions<br>GEOLOGIC INTERPRETATION)                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                            |                 |  | Gravel                                           |        | Sand     |          |        | Field Test |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  | % Coarse                                         | % Fine | % Coarse | % Medium | % Fine | % Fines    | Dilatancy | Toughness | Plasticity |
| 0                                                                                                          |                            |                            |                      |                                                                                  | SP          | 346.8<br>0.3                                                                                              | -ASPHALT ROADWAY-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  | SP          | 346.5<br>0.3                                                                                              | Binder base                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             | 345.5<br>1.5                                                                                              | Poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                            |                 |  |                                                  | 5      | 10       | 35       | 45     | 5          |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | -FILL-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | Brown poorly graded SAND (SP), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
| 5                                                                                                          |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            | GB1                        | 10.0                 |                                                                                  | SP-SM       | 337.0<br>10.0                                                                                             | Light brown poorly graded SAND with silt (SP-SM), no structure, no odor, moist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                            |                 |  |                                                  | 5      | 10       | 30       | 45     | 10         |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | -GLACIODELTAIC DEPOSITS-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
| 10                                                                                                         |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
| 15                                                                                                         |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
| 20                                                                                                         |                            |                            |                      |                                                                                  |             | 327.0<br>20.0                                                                                             | BOTTOM OF EXPLORATION AT 20.0 FEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           | Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |
| Water Level Data                                                                                           |                            |                            |                      |                                                                                  |             |                                                                                                           | Sample ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                            | Well Diagram    |  | Summary                                          |        |          |          |        |            |           |           |            |
| Date                                                                                                       | Time                       | Elapsed<br>Time (hr.)      | Depth (ft) to:       |                                                                                  |             | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe | <br><br><br><br><br><br> | Riser Pipe<br>Screen<br>Filter Sand<br>Cuttings<br>Grout<br>Concrete<br>Bentonite Seal                                     | Overburden (ft) |  | 20.0                                             |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            | Bottom<br>of Casing  | Bottom<br>of Hole                                                                | Water       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            | Rock Cored (ft) |  | 0.0                                              |        |          |          |        |            |           |           |            |
| 06/13/24                                                                                                   | 07:46                      | not encountered            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            | Samples         |  | S1                                               |        |          |          |        |            |           |           |            |
|                                                                                                            |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            | Boring No.      |  | HA24-42                                          |        |          |          |        |            |           |           |            |
| Field Tests:                                                                                               |                            |                            |                      | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High |                 |  |                                                  |        |          |          |        |            |           |           |            |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                            |                            |                      |                                                                                  |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |                 |  |                                                  |        |          |          |        |            |           |           |            |



H&A-TEST BORING WITH PERM PID COLUMN PLOG-HA-LIB09-BOS STANDARD ONLY - COPY.GLB HA-TB-CORE+WELL-09 W FENCE.GDT C:\USERS\ALONGO\ONEDRIVE - HALEY\ALDRICH.COM\GINT\0208898-TB.GPJ 25 Oct 24

|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------|--------------------|-------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|--|--|--------------------|------------------------|--|--|----------------------------------------------------------------------------------------------------------------------------|----------|--------|----------|----------|------------|---------|-----------|-----------|------------|----------|--|--|
| <div><div><div>HALEYALDRICH</div></div><div>TEST BORING REPORT</div></div>                                 |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    | Boring No. HA24-44     |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Project Forcemain and Sewer Replacement, Concord, New Hampshire                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    | File No. 0208898-001   |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Client Wright-Pierce                                                                                       |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    | Sheet No. 1 of 1       |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Contractor Terracon                                                                                        |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    | Start 13 Jun 2024      |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   | Casing             | Sampler     | Barrel                                                                                                    | Drilling Equipment and Procedures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |  |  |  |                    | Finish 13 Jun 2024     |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Type                                                                                                       |                         |                         |                   | SSA                | GB          | -                                                                                                         | Rig Make & Model: CME 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |  |  |  |                    | H&A Rep. S. Shay       |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Inside Diameter (in.)                                                                                      |                         |                         |                   | -                  | -           | -                                                                                                         | Bit Type: Cutting Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |  |  |  |                    | Elevation 348.0 (est.) |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Hammer Weight (lb)                                                                                         |                         |                         |                   | -                  | -           | -                                                                                                         | Drill Mud: None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    | Datum NAVD88           |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Hammer Fall (in.)                                                                                          |                         |                         |                   | -                  | -           | -                                                                                                         | Casing: None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |  |  |  |                    | Location See Plan      |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | Hoist/Hammer: Winch / None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | PID Make & Model: Tiger 10.6 eV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Depth (ft)                                                                                                 | Sampler Blows per 6 in. | Sample No. & Rec. (in.) | Sample Depth (ft) | PID Readings (ppm) | USCS Symbol | Stratum Change Elev/Depth (ft)                                                                            | VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |  |  |  |                    |                        |  |  |                                                                                                                            | Gravel   |        | Sand     |          | Field Test |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           | (Density/consistency, color, GROUP NAME & SYMBOL, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |  |  |  |                    |                        |  |  |                                                                                                                            | % Coarse | % Fine | % Coarse | % Medium | % Fine     | % Fines | Dilatancy | Toughness | Plasticity | Strength |  |  |
| 0                                                                                                          |                         |                         |                   |                    | SP-SM       | 347.8<br>0.2<br>347.6<br>0.4                                                                              | -ASPHALT ROADWAY-<br>Binder base<br>Dark brown poorly graded SAND with silt (SP-SM), no structure, no odor, moist<br><br>-FILL-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| 10                                                                                                         |                         | GB1                     | 10.0              |                    | SP          | 338.0<br>10.0                                                                                             | Brown poorly graded SAND (SP), no odor, moist<br><br>-GLACIODELTAIC DEPOSITS-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |  |  |  |                    |                        |  |  |                                                                                                                            | 5        | 10     | 35       | 45       | 5          |         |           |           |            |          |  |  |
| 20                                                                                                         |                         |                         |                   |                    |             | 328.0<br>20.0                                                                                             | BOTTOM OF EXPLORATION AT 20.0 FEET<br><br>Note: "GB" indicates grab sample collected from auger cuttings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Water Level Data                                                                                           |                         |                         |                   |                    |             | Sample ID                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Well Diagram         |  |  |  | Summary            |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Date                                                                                                       | Time                    | Elapsed Time (hr.)      | Depth (ft) to:    |                    |             | O - Open End Rod<br>T - Thin Wall Tube<br>U - Undisturbed Sample<br>S - Splitspoon Sample<br>G - Geoprobe | <br>Riser Pipe<br><br>Screen<br><br>Filter Sand<br><br>Cuttings<br><br>Grout<br><br>Concrete<br><br>Bentonite Seal | Overburden (ft) 20.0 |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         | Bottom of Casing  | Bottom of Hole     | Water       |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Rock Cored (ft) 0.0  |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| 06/13/24                                                                                                   | 09:00                   | not encountered         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  | Samples S1         |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
|                                                                                                            |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  | Boring No. HA24-44 |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |
| Field Tests:                                                                                               |                         |                         |                   |                    |             | Dilatancy: R - Rapid S - Slow N - None<br>Toughness: L - Low M - Medium H - High                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    |                        |  |  | Plasticity: N - Nonplastic L - Low M - Medium H - High<br>Dry Strength: N - None L - Low M - Medium H - High V - Very High |          |        |          |          |            |         |           |           |            |          |  |  |
| Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc. |                         |                         |                   |                    |             |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |  |  |                    |                        |  |  |                                                                                                                            |          |        |          |          |            |         |           |           |            |          |  |  |





APPENDIX B  
Groundwater Observation Well Installation and  
Groundwater Monitoring Reports

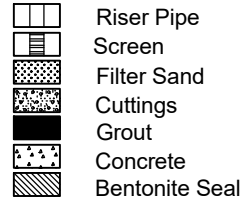


GROUNDWATER OBSERVATION WELL  
INSTALLATION REPORT

Well No. HA23-1

Project Steeplegate Mall Pump Station  
Location 270 Loudon Road, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon  
Driller P. Michaud

## Well Diagram



File No. 0208898-000  
Date Installed 16 Nov 2023  
H&A Rep. H. Hollauer  
Location See Plan

Ground El. 326.0 (est.)  
Datum NAVD88

Initial Water Level (depth bgs) 14.2 ft

## SOIL/ROCK

CONDITIONS

DEPTH  
(ft.)

GRAPHIC

WELL  
DETAILSDEPTH  
(ft.)ELEVATION  
(ft.)

## WELL CONSTRUCTION DETAILS

Type of protective cover 9/16 Bolts

Depth of Roadway Box below ground surface 0.0 ft

Depth of top of riser below ground surface 0.2 ft

Type of protective casing Roadway Box

Length 0.8 ft

Inside diameter 6.0 in.

Depth of bottom of Roadway Box 0.8 ft

Type of riser pipe Schedule 40 PVC

Inside diameter of riser pipe 2.0 in.

Depth of bottom of riser pipe 13.0 ft

| Type of Seals  | Top of Seal (ft) | Thickness (ft) |
|----------------|------------------|----------------|
| Concrete       | 0.0              | 1.0            |
| Bentonite Seal | 9.0              | 2.0            |
|                | -                | -              |
|                | -                | -              |

Diameter of borehole 4.0 in.

Depth to top of well screen 13.0 ft

Type of screen Machine slotted Sch 40 PVC

Screen gauge or size of openings 0.010 in.

Diameter of screen 2.0 in.

Type of Backfill around Screen #00 Filter Sand

Depth to bottom of well screen 23.0 ft

Bottom of silt trap 23.0 ft

Depth of bottom of well 23.0 ft

Depth of bottom of borehole 50.0 ft

Jan 5, 24  
PLOG-HA-LIB09-BOS STANDARD ONLY-RLG GLB GW INSTALLATION REPORT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0208898\GINT\0208898\_TBCBOW\_HA23-1\_HA23-4.GPJ

COMMENTS:

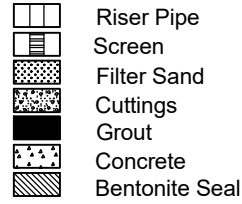


GROUNDWATER OBSERVATION WELL  
INSTALLATION REPORT

Well No. HA23-3

Project Steeplegate Mall Pump Station  
Location 270 Loudon Road, Concord, New Hampshire  
Client Wright-Pierce  
Contractor Terracon  
Driller P. Michaud

## Well Diagram



File No. 0208898-000  
Date Installed 16 Nov 2023  
H&A Rep. H. Hollauer  
Location See Plan

Ground El. 325.5 (est.)  
Datum NAVD88

Initial Water Level (depth bgs) 12.9 ft

## SOIL/ROCK

CONDITIONS

DEPTH  
(ft.)

GRAPHIC

WELL  
DETAILSDEPTH  
(ft.)ELEVATION  
(ft.)

## WELL CONSTRUCTION DETAILS

Type of protective cover 9/16 Bolts

Depth of Roadway Box below ground surface 0.0 ft

Depth of top of riser below ground surface 0.2 ft

Type of protective casing Roadway Box

Length 0.8 ft

Inside diameter 6.0 in.

Depth of bottom of Roadway Box 0.8 ft

Type of riser pipe Schedule 40 PVC

Inside diameter of riser pipe 2.0 in.

Depth of bottom of riser pipe 15.0 ft

| Type of Seals | Top of Seal (ft) | Thickness (ft) |
|---------------|------------------|----------------|
|---------------|------------------|----------------|

|          |     |     |
|----------|-----|-----|
| Concrete | 0.0 | 1.0 |
|----------|-----|-----|

|                |      |     |
|----------------|------|-----|
| Bentonite Seal | 10.0 | 3.0 |
|----------------|------|-----|

|  |   |   |
|--|---|---|
|  | - | - |
|--|---|---|

|  |   |   |
|--|---|---|
|  | - | - |
|--|---|---|

Diameter of borehole 4.0 in.

Depth to top of well screen 15.0 ft

Type of screen Machine slotted Sch 40 PVC

Screen gauge or size of openings 0.010 in.

Diameter of screen 2.0 in.

Type of Backfill around Screen #00 Filter Sand

Depth to bottom of well screen 25.0 ft

Bottom of silt trap 25.0 ft

Depth of bottom of well 25.0 ft

Depth of bottom of borehole 45.0 ft

Jan 5, 24  
PLOG-HA-LIB09-BOS STANDARD ONLY-RLG GLB GW INSTALLATION REPORT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0208898\GINT\0208898 TBCBOW HA23-1 HA23-4.GPJ

COMMENTS:

|                   |                               |
|-------------------|-------------------------------|
| <b>PROJECT</b>    | STEEPLEGATE MALL PUMP STATION |
| <b>LOCATION</b>   | CONCORD, NEW HAMPSHIRE        |
| <b>CLIENT</b>     | WRIGHT-PIERCE                 |
| <b>CONTRACTOR</b> | TERRACON                      |

|                         |             |
|-------------------------|-------------|
| <b>H&amp;A FILE NO.</b> | 0208898-000 |
| <b>PROJECT MGR.</b>     | E. FORCE    |
| <b>FIELD REP.</b>       | H. HOLLAUER |
| <b>DATE</b>             | 16-Nov-23   |

|                                     |              |                                                                            |                              |                                |
|-------------------------------------|--------------|----------------------------------------------------------------------------|------------------------------|--------------------------------|
| <b>ELEVATION OF REFERENCE POINT</b> | <u>325.5</u> | <b>REFERENCE POINT:</b> Ground Surface <input checked="" type="checkbox"/> | PVC <input type="checkbox"/> | Other <input type="checkbox"/> |
|-------------------------------------|--------------|----------------------------------------------------------------------------|------------------------------|--------------------------------|

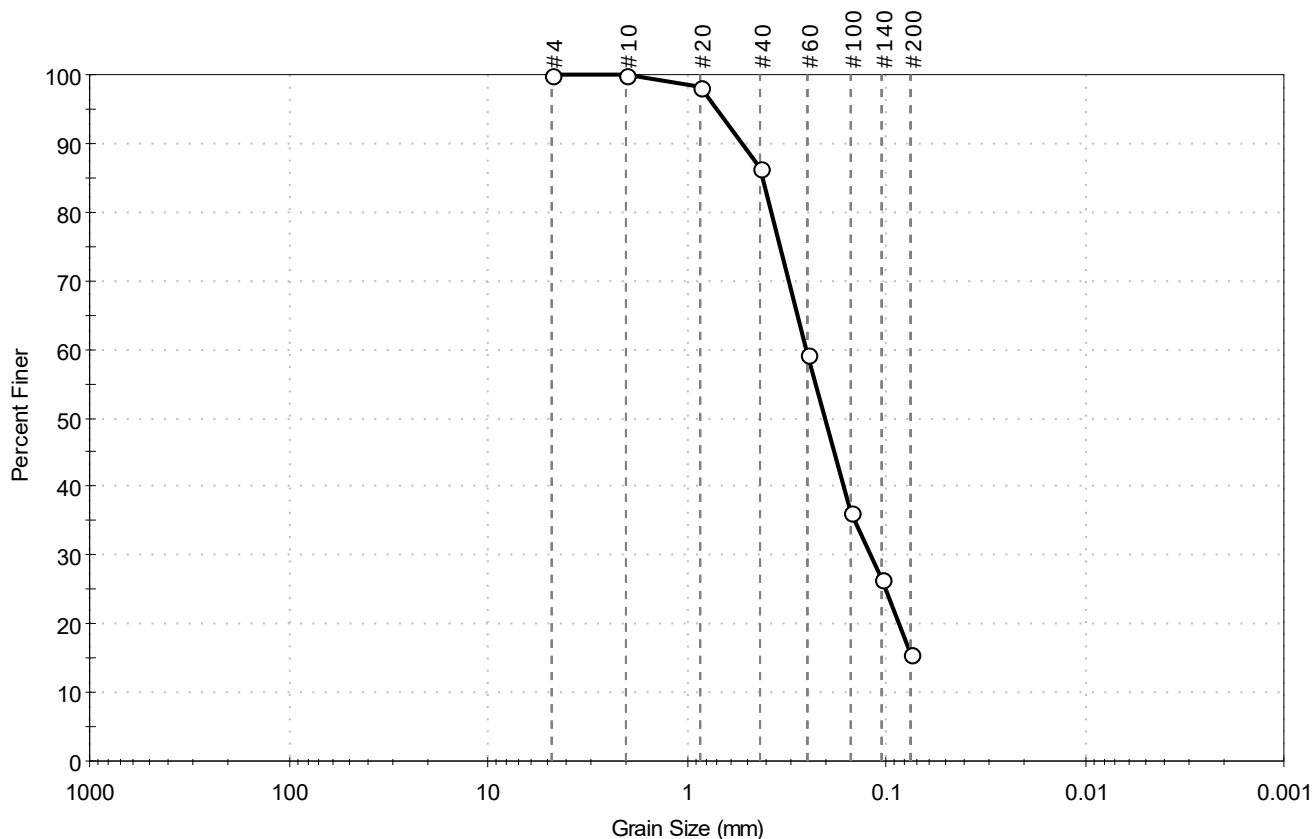
[illegible]

## APPENDIX C

### Geotechnical Laboratory Test Results

|                     |                                 |              |            |
|---------------------|---------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.           | Project No:  | GTX-318317 |
| Project:            | Steeplegate Mall Pump Station   |              |            |
| Location:           | Concord, NH                     |              |            |
| Boring ID:          | HA23-1                          | Sample Type: | bag        |
| Sample ID:          | S3                              | Test Date:   | 12/26/23   |
| Depth :             | 5.0-7.0                         | Test Id:     | 751097     |
| Test Comment:       | ---                             |              |            |
| Visual Description: | Moist, yellowish red silty sand |              |            |
| Sample Comment:     | ---                             |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.0      | 84.4   | 15.6               |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 100           |               |          |
| #20        | 0.85           | 98            |               |          |
| #40        | 0.42           | 86            |               |          |
| #60        | 0.25           | 59            |               |          |
| #100       | 0.15           | 36            |               |          |
| #140       | 0.11           | 27            |               |          |
| #200       | 0.075          | 16            |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 0.4131 mm | D <sub>30</sub> = 0.1199 mm |
| D <sub>60</sub> = 0.2541 mm | D <sub>15</sub> = N/A       |
| D <sub>50</sub> = 0.2037 mm | D <sub>10</sub> = N/A       |
| C <sub>u</sub> = N/A        | C <sub>c</sub> = N/A        |

### Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

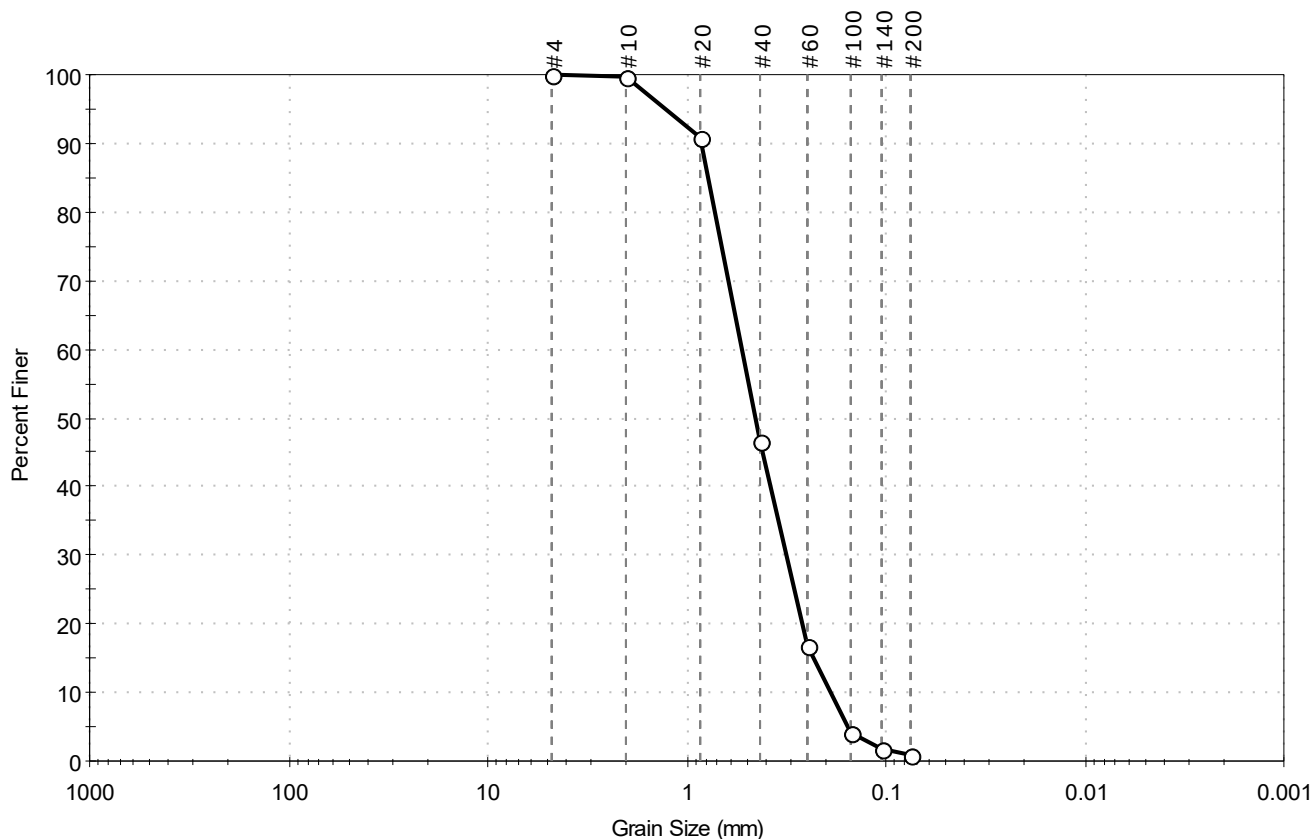
### Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                     |                               |              |            |
|---------------------|-------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.         |              |            |
| Project:            | Steeplegate Mall Pump Station |              |            |
| Location:           | Concord, NH                   | Project No:  | GTX-318317 |
| Boring ID:          | HA23-1                        | Sample Type: | bag        |
| Sample ID:          | S5                            | Test Date:   | 12/26/23   |
| Depth :             | 15.0-17.0                     | Test Id:     | 751098     |
| Test Comment:       | ---                           |              |            |
| Visual Description: | Moist, brownish yellow sand   |              |            |
| Sample Comment:     | ---                           |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.0      | 99.1   | 0.9                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 100           |               |          |
| #20        | 0.85           | 91            |               |          |
| #40        | 0.42           | 47            |               |          |
| #60        | 0.25           | 17            |               |          |
| #100       | 0.15           | 4             |               |          |
| #140       | 0.11           | 2             |               |          |
| #200       | 0.075          | 0.9           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 0.7742 mm | D <sub>30</sub> = 0.3161 mm |
| D <sub>60</sub> = 0.5236 mm | D <sub>15</sub> = 0.2327 mm |
| D <sub>50</sub> = 0.4478 mm | D <sub>10</sub> = 0.1906 mm |
| C <sub>u</sub> = 2.747      | C <sub>c</sub> = 1.001      |

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

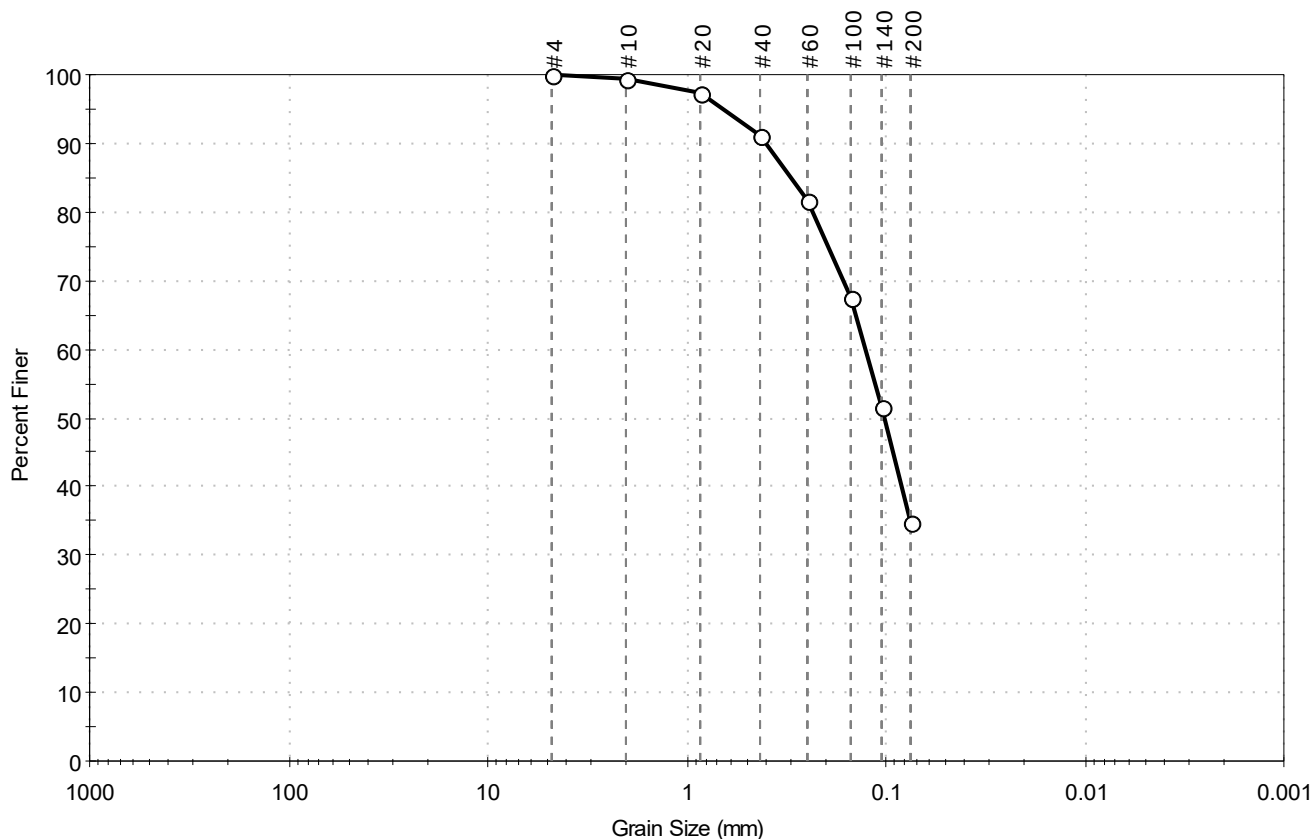
### Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                     |                                   |              |            |
|---------------------|-----------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.             |              |            |
| Project:            | Steeplegate Mall Pump Station     |              |            |
| Location:           | Concord, NH                       | Project No:  | GTX-318317 |
| Boring ID:          | HA23-2                            | Sample Type: | bag        |
| Sample ID:          | S2                                | Test Date:   | 12/26/23   |
| Depth :             | 2.0-4.0                           | Test Id:     | 751099     |
| Test Comment:       | ---                               |              |            |
| Visual Description: | Moist, yellowish brown silty sand |              |            |
| Sample Comment:     | ---                               |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.0      | 65.1   | 34.9               |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 99            |               |          |
| #20        | 0.85           | 97            |               |          |
| #40        | 0.42           | 91            |               |          |
| #60        | 0.25           | 82            |               |          |
| #100       | 0.15           | 68            |               |          |
| #140       | 0.11           | 52            |               |          |
| #200       | 0.075          | 35            |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.3005 \text{ mm}$        $D_{30} = \text{N/A}$   
 $D_{60} = 0.1271 \text{ mm}$        $D_{15} = \text{N/A}$   
 $D_{50} = 0.1026 \text{ mm}$        $D_{10} = \text{N/A}$   
 $C_u = \text{N/A}$        $C_c = \text{N/A}$

### Classification

ASTM      N/A

AASHTO      Silty Gravel and Sand (A-2-4 (0))

### Sample / Test Description

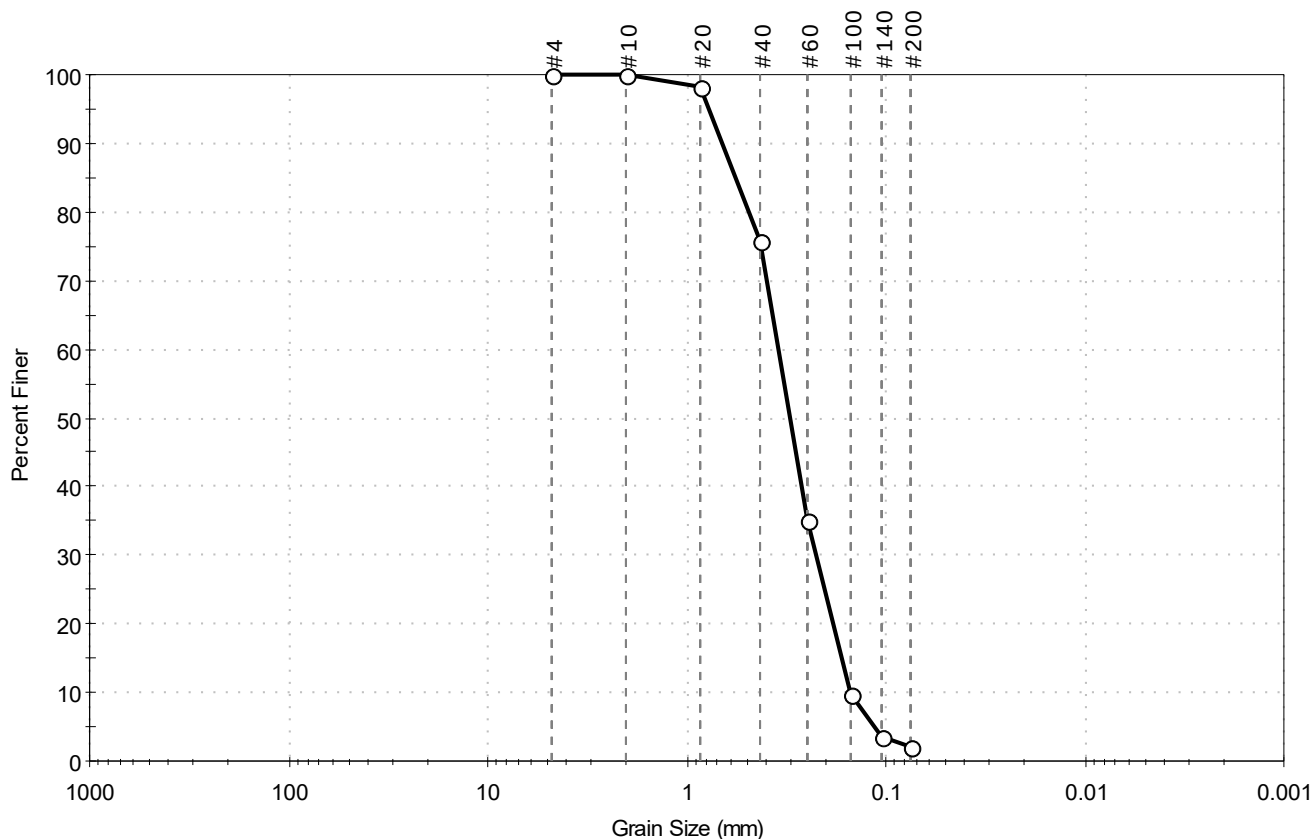
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---



|                     |                               |              |            |
|---------------------|-------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.         |              |            |
| Project:            | Steeplegate Mall Pump Station |              |            |
| Location:           | Concord, NH                   | Project No:  | GTX-318317 |
| Boring ID:          | HA23-2                        | Sample Type: | bag        |
| Sample ID:          | S6                            | Test Date:   | 12/26/23   |
| Depth :             | 15.0-17.0                     | Test Id:     | 751100     |
| Test Comment:       | ---                           |              |            |
| Visual Description: | Moist, brownish yellow sand   |              |            |
| Sample Comment:     | ---                           |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.0      | 98.0   | 2.0                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 100           |               |          |
| #20        | 0.85           | 98            |               |          |
| #40        | 0.42           | 76            |               |          |
| #60        | 0.25           | 35            |               |          |
| #100       | 0.15           | 10            |               |          |
| #140       | 0.11           | 4             |               |          |
| #200       | 0.075          | 2.0           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 0.5648 mm | D <sub>30</sub> = 0.2255 mm |
| D <sub>60</sub> = 0.3459 mm | D <sub>15</sub> = 0.1668 mm |
| D <sub>50</sub> = 0.3036 mm | D <sub>10</sub> = 0.1508 mm |
| C <sub>u</sub> = 2.294      | C <sub>c</sub> = 0.975      |

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Fine Sand (A-3 (1))

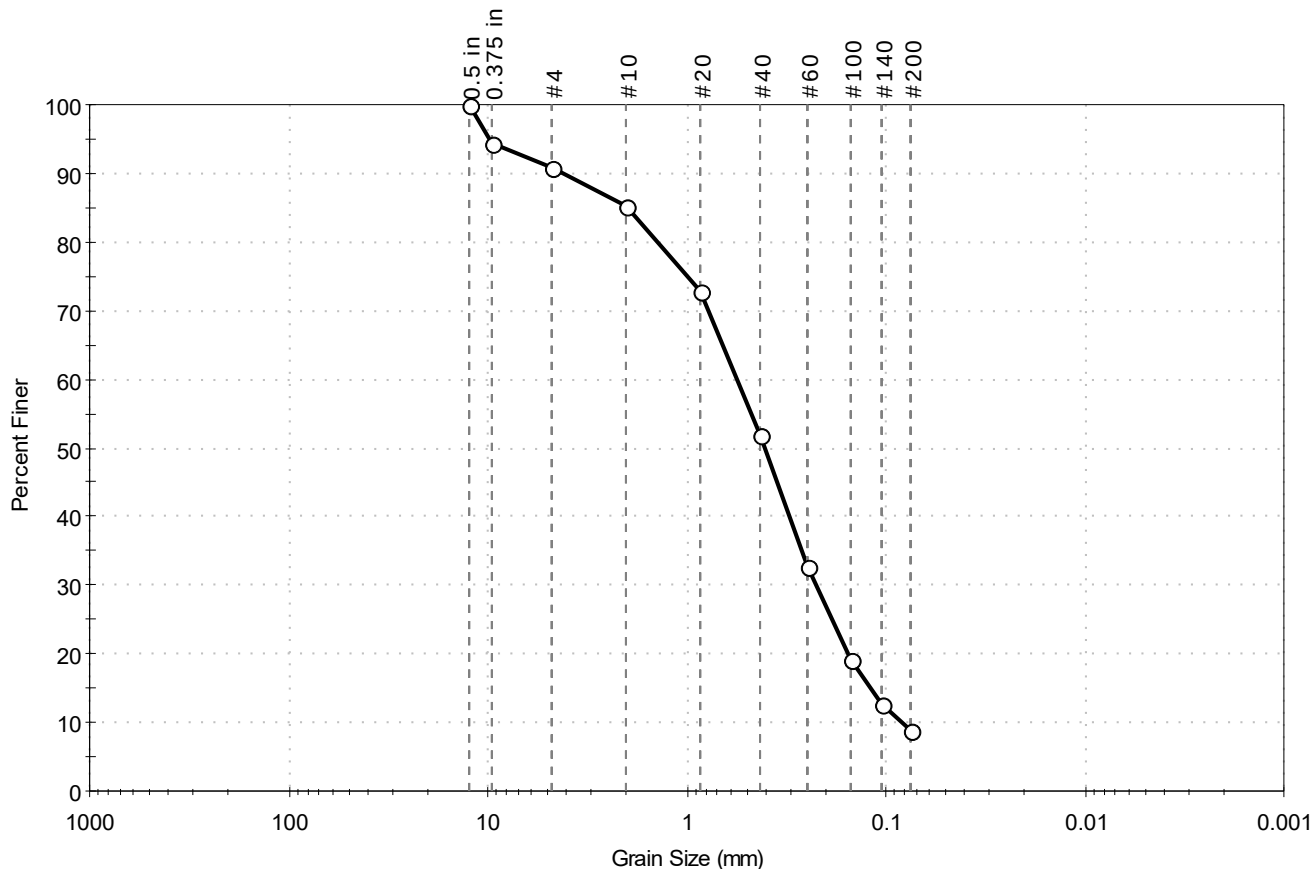
### Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                     |                               |              |            |
|---------------------|-------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.         |              |            |
| Project:            | Steeplegate Mall Pump Station |              |            |
| Location:           | Concord, NH                   | Project No:  | GTX-318317 |
| Boring ID:          | HA23-3                        | Sample Type: | bag        |
| Sample ID:          | S3                            | Test Date:   | 12/26/23   |
| Depth :             | 4.0-6.0                       | Test Id:     | 751101     |
| Test Comment:       | ---                           |              |            |
| Visual Description: | Moist, brown sand with silt   |              |            |
| Sample Comment:     | ---                           |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 9.0      | 82.2   | 8.8                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.5 in     | 12.50          | 100           |               |          |
| 0.375 in   | 9.50           | 94            |               |          |
| #4         | 4.75           | 91            |               |          |
| #10        | 2.00           | 85            |               |          |
| #20        | 0.85           | 73            |               |          |
| #40        | 0.42           | 52            |               |          |
| #60        | 0.25           | 33            |               |          |
| #100       | 0.15           | 19            |               |          |
| #140       | 0.11           | 13            |               |          |
| #200       | 0.075          | 8.8           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 1.9600 mm | D <sub>30</sub> = 0.2251 mm |
| D <sub>60</sub> = 0.5543 mm | D <sub>15</sub> = 0.1205 mm |
| D <sub>50</sub> = 0.4021 mm | D <sub>10</sub> = 0.0837 mm |
| C <sub>u</sub> = 6.622      | C <sub>c</sub> = 1.092      |

### Classification

ASTM N/A

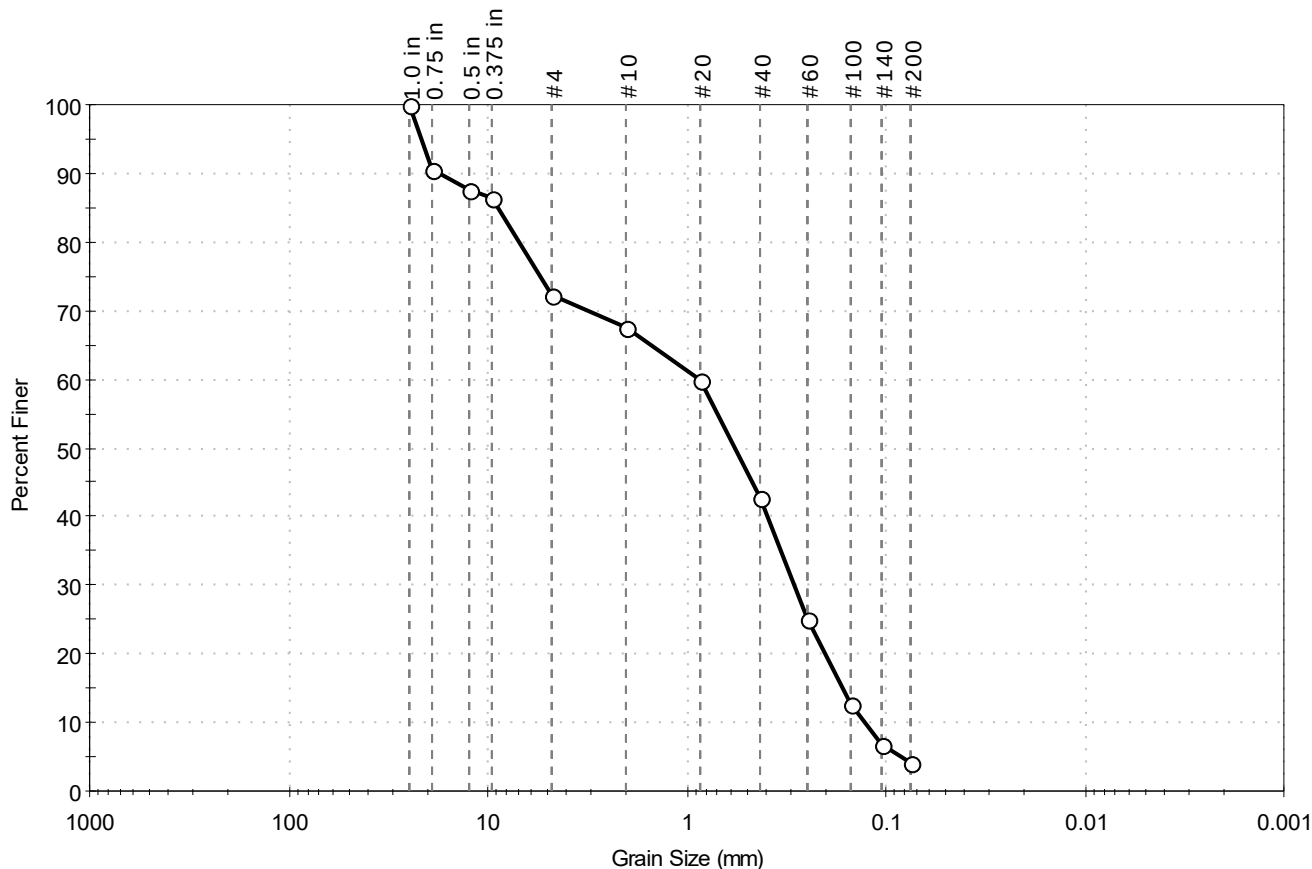
AASHTO Fine Sand (A-3 (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
Sand/Gravel Hardness : HARD

|                     |                                         |              |            |
|---------------------|-----------------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.                   |              |            |
| Project:            | Steeplegate Mall Pump Station           |              |            |
| Location:           | Concord, NH                             | Project No:  | GTX-318317 |
| Boring ID:          | HA23-3                                  | Sample Type: | bag        |
| Sample ID:          | S6                                      | Test Date:   | 12/26/23   |
| Depth :             | 15.0-17.0                               | Test Id:     | 751102     |
| Test Comment:       | ---                                     |              |            |
| Visual Description: | Moist, brownish yellow sand with gravel |              |            |
| Sample Comment:     | ---                                     |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 27.9     | 68.1   | 4.0                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 1.0 in     | 25.00          | 100           |               |          |
| 0.75 in    | 19.00          | 90            |               |          |
| 0.5 in     | 12.50          | 88            |               |          |
| 0.375 in   | 9.50           | 86            |               |          |
| #4         | 4.75           | 72            |               |          |
| #10        | 2.00           | 68            |               |          |
| #20        | 0.85           | 60            |               |          |
| #40        | 0.42           | 43            |               |          |
| #60        | 0.25           | 25            |               |          |
| #100       | 0.15           | 13            |               |          |
| #140       | 0.11           | 7             |               |          |
| #200       | 0.075          | 4.0           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 8.8561 mm | D <sub>30</sub> = 0.2905 mm |
| D <sub>60</sub> = 0.8738 mm | D <sub>15</sub> = 0.1651 mm |
| D <sub>50</sub> = 0.5712 mm | D <sub>10</sub> = 0.1282 mm |
| C <sub>u</sub> = 6.816      | C <sub>c</sub> = 0.753      |

### Classification

**ASTM** Poorly graded SAND with Gravel (SP)

**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

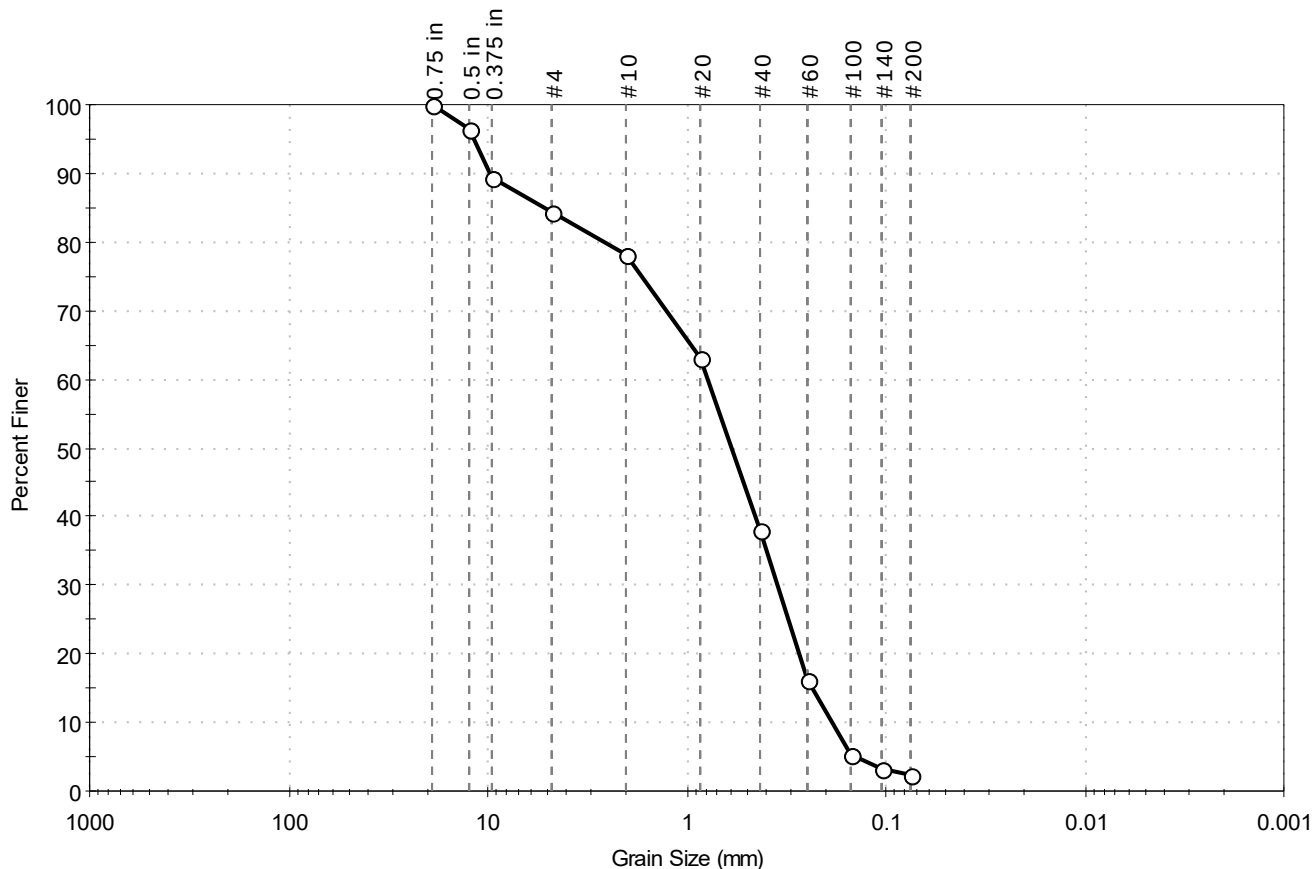
### Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

|                     |                                         |              |            |
|---------------------|-----------------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.                   |              |            |
| Project:            | Steeplegate Mall Pump Station           |              |            |
| Location:           | Concord, NH                             | Project No:  | GTX-318317 |
| Boring ID:          | HA23-4                                  | Sample Type: | bag        |
| Sample ID:          | S3                                      | Test Date:   | 12/26/23   |
| Depth :             | 5.0-7.0                                 | Test Id:     | 751103     |
| Test Comment:       | ---                                     |              |            |
| Visual Description: | Moist, brownish yellow sand with gravel |              |            |
| Sample Comment:     | ---                                     |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 15.6     | 82.2   | 2.2                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.75 in    | 19.00          | 100           |               |          |
| 0.5 in     | 12.50          | 96            |               |          |
| 0.375 in   | 9.50           | 89            |               |          |
| #4         | 4.75           | 84            |               |          |
| #10        | 2.00           | 78            |               |          |
| #20        | 0.85           | 63            |               |          |
| #40        | 0.425          | 38            |               |          |
| #60        | 0.25           | 16            |               |          |
| #100       | 0.15           | 5             |               |          |
| #140       | 0.11           | 3             |               |          |
| #200       | 0.075          | 2.2           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 5.1849 mm | D <sub>30</sub> = 0.3502 mm |
| D <sub>60</sub> = 0.7804 mm | D <sub>15</sub> = 0.2367 mm |
| D <sub>50</sub> = 0.5925 mm | D <sub>10</sub> = 0.1871 mm |
| C <sub>u</sub> = 4.171      | C <sub>c</sub> = 0.840      |

### Classification

**ASTM** Poorly graded SAND with Gravel (SP)

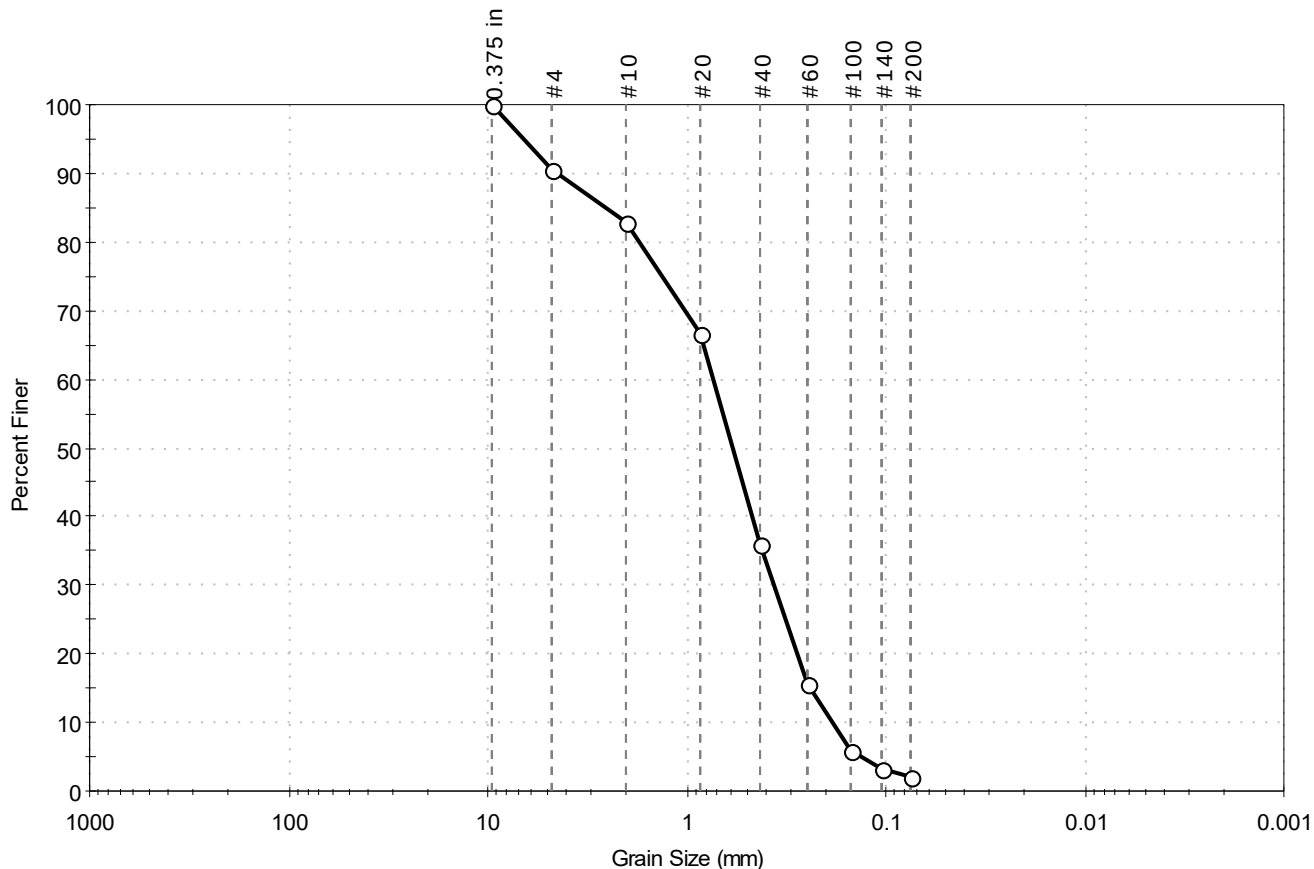
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR  
Sand/Gravel Hardness : HARD

|                     |                               |              |            |
|---------------------|-------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.         |              |            |
| Project:            | Steeplegate Mall Pump Station |              |            |
| Location:           | Concord, NH                   | Project No:  | GTX-318317 |
| Boring ID:          | HA23-4                        | Sample Type: | bag        |
| Sample ID:          | S4                            | Test Date:   | 12/26/23   |
| Depth :             | 10.0-12.0                     | Test Id:     | 751104     |
| Test Comment:       | ---                           |              |            |
| Visual Description: | Moist, yellowish brown sand   |              |            |
| Sample Comment:     | ---                           |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 9.5      | 88.4   | 2.1                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 90            |               |          |
| #10        | 2.00           | 83            |               |          |
| #20        | 0.85           | 67            |               |          |
| #40        | 0.42           | 36            |               |          |
| #60        | 0.25           | 16            |               |          |
| #100       | 0.15           | 6             |               |          |
| #140       | 0.11           | 3             |               |          |
| #200       | 0.075          | 2.1           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 2.5696 mm | D <sub>30</sub> = 0.3631 mm |
| D <sub>60</sub> = 0.7328 mm | D <sub>15</sub> = 0.2416 mm |
| D <sub>50</sub> = 0.5837 mm | D <sub>10</sub> = 0.1861 mm |
| C <sub>u</sub> = 3.938      | C <sub>c</sub> = 0.967      |

### Classification

**ASTM** Poorly graded SAND (SP)

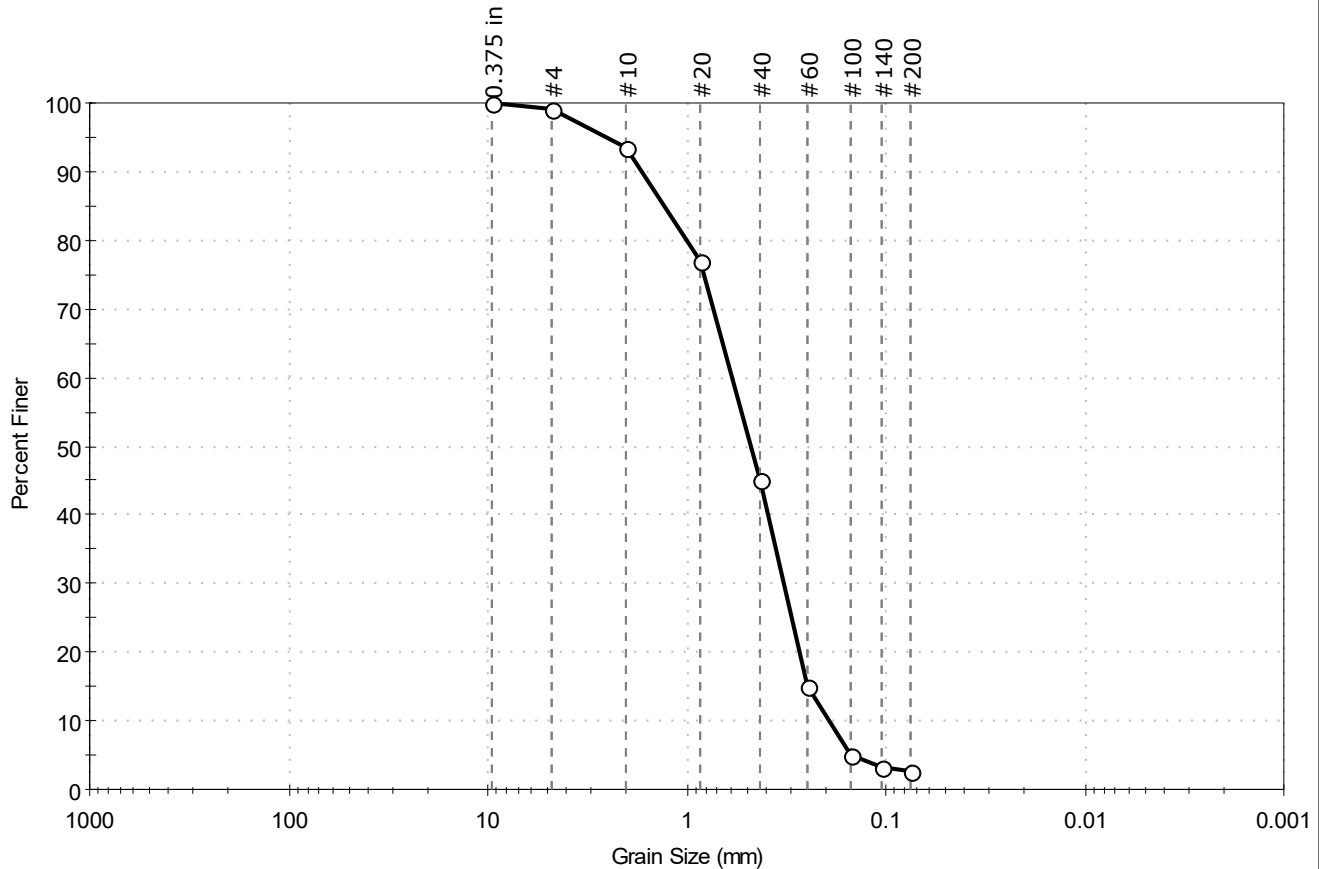
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR  
Sand/Gravel Hardness : HARD

|                                                 |                        |
|-------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                   | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer    |                        |
| Location: Concord, NH                           |                        |
| Boring ID: HA24-3                               | Sample Type: Bag       |
| Sample ID: S2                                   | Test Date: 08/07/24    |
| Depth: 3-5 FT                                   | Test Id: 780017        |
| Test Comment: ---                               | Tested By: ajl         |
| Visual Description: Moist, yellowish brown sand | Checked By: GA         |
| Sample Comment: ---                             |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 1.0      | 96.5   | 2.5                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 99            |               |          |
| #10        | 2.00           | 94            |               |          |
| #20        | 0.85           | 77            |               |          |
| #40        | 0.42           | 45            |               |          |
| #60        | 0.25           | 15            |               |          |
| #100       | 0.15           | 5             |               |          |
| #140       | 0.11           | 3             |               |          |
| #200       | 0.075          | 2.5           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 1.2825 \text{ mm}$        $D_{30} = 0.3254 \text{ mm}$   
 $D_{60} = 0.5863 \text{ mm}$        $D_{15} = 0.2504 \text{ mm}$   
 $D_{50} = 0.4713 \text{ mm}$        $D_{10} = 0.1944 \text{ mm}$   
 $C_u = 3.016$        $C_c = 0.929$

### Classification

**ASTM** Poorly graded SAND (SP)

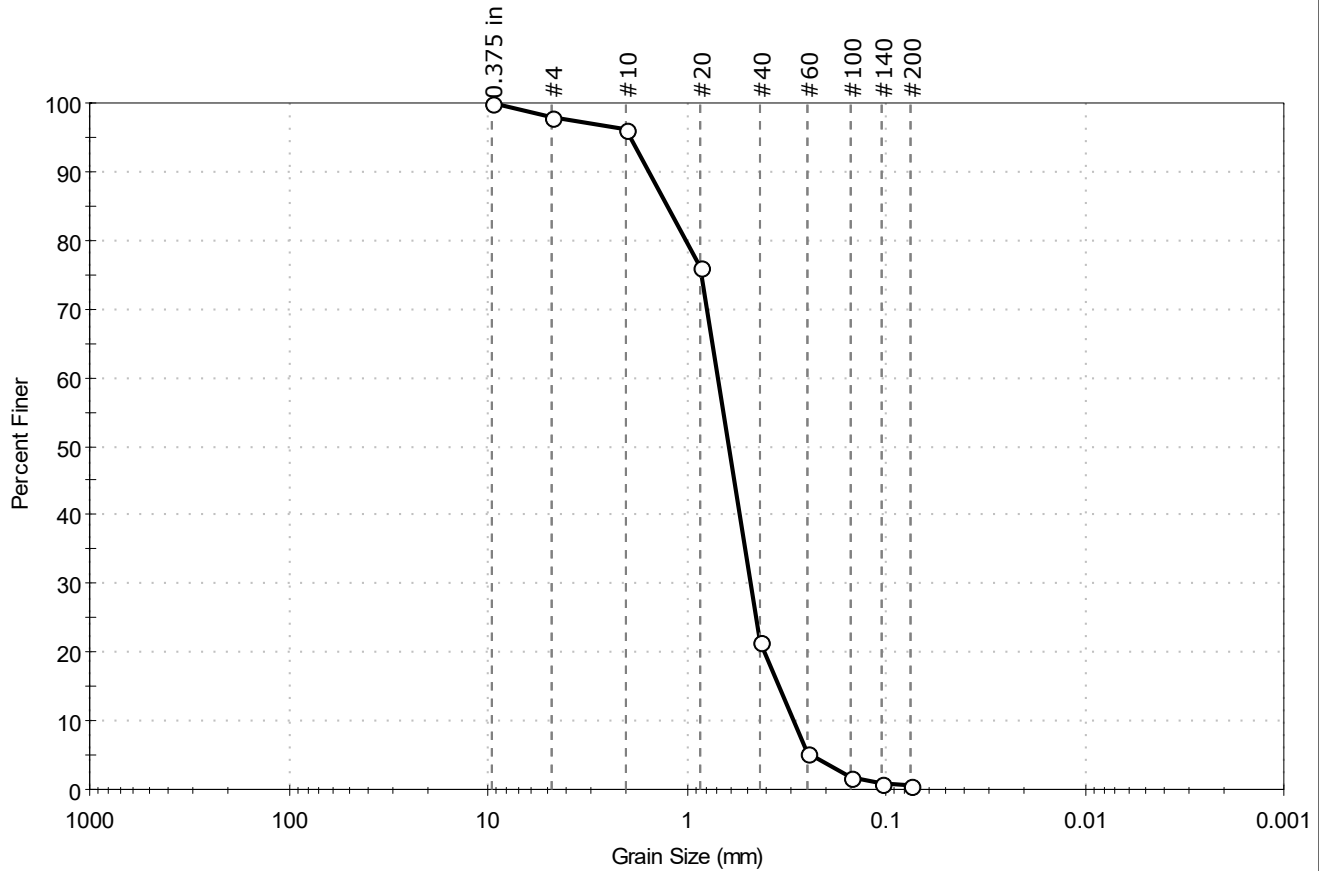
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD

|                                                       |                        |
|-------------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                         | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer          |                        |
| Location: Concord, NH                                 |                        |
| Boring ID: HA24-3                                     | Sample Type: Bag       |
| Sample ID: S4                                         | Test Date: 08/12/24    |
| Depth: 7-9 FT                                         | Test Id: 780018        |
| Test Comment: ---                                     | Tested By: ajl         |
| Visual Description: Moist, light yellowish brown sand | Checked By: GA         |
| Sample Comment: ---                                   |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 2.0      | 97.4   | 0.6                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 98            |               |          |
| #10        | 2.00           | 96            |               |          |
| #20        | 0.85           | 76            |               |          |
| #40        | 0.42           | 22            |               |          |
| #60        | 0.25           | 5             |               |          |
| #100       | 0.15           | 2             |               |          |
| #140       | 0.11           | 1             |               |          |
| #200       | 0.075          | 0.6           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 1.2487 \text{ mm}$        $D_{30} = 0.4734 \text{ mm}$   
 $D_{60} = 0.6937 \text{ mm}$        $D_{15} = 0.3426 \text{ mm}$   
 $D_{50} = 0.6107 \text{ mm}$        $D_{10} = 0.2905 \text{ mm}$   
 $C_u = 2.388$        $C_c = 1.112$

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

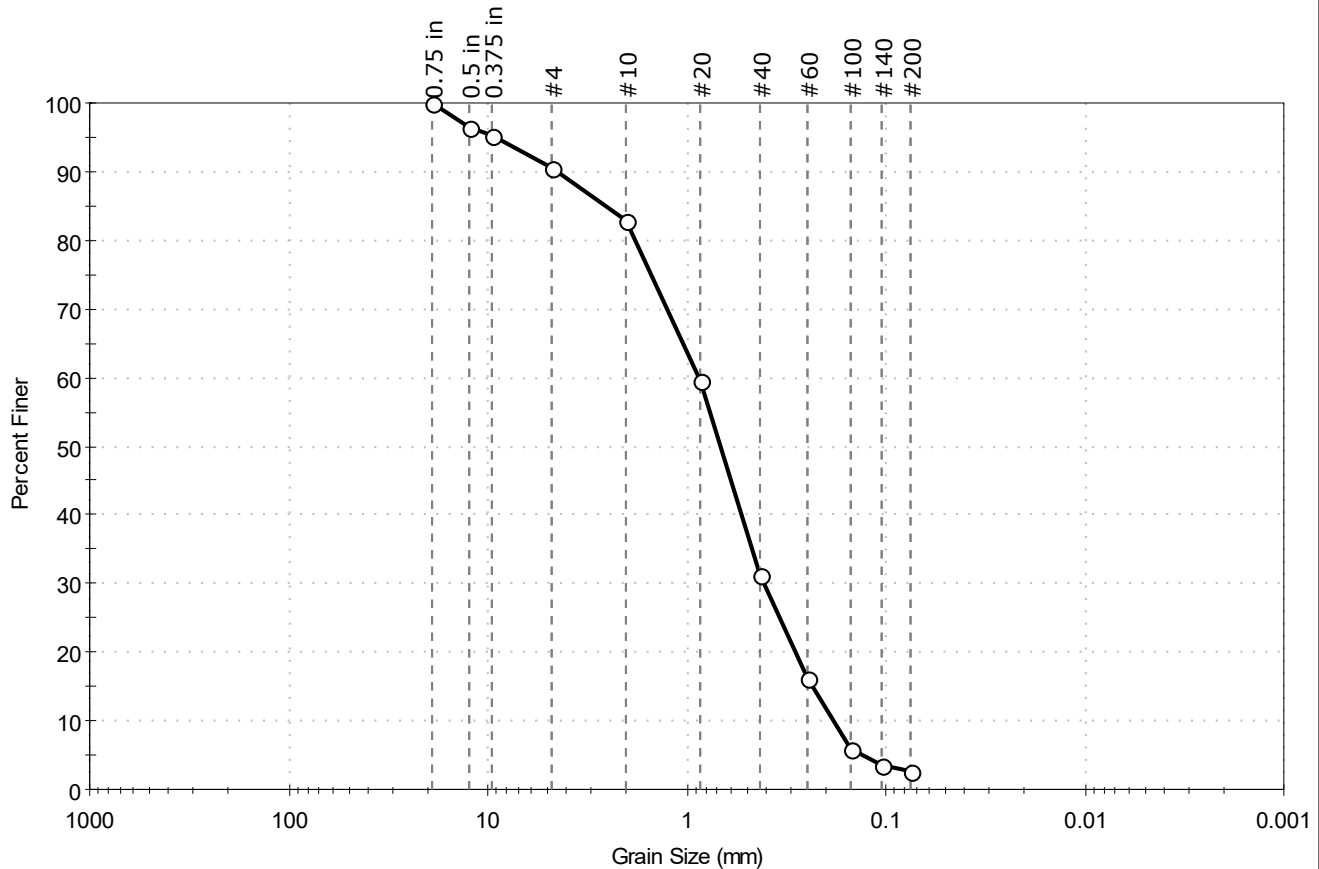
### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                                                       |                        |
|-------------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                         | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer          |                        |
| Location: Concord, NH                                 |                        |
| Boring ID: HA24-8                                     | Sample Type: Bag       |
| Sample ID: S3                                         | Test Date: 08/09/24    |
| Depth: 5-7 FT                                         | Test Id: 780019        |
| Test Comment: ---                                     | Tested By: ajl         |
| Visual Description: Moist, light yellowish brown sand | Checked By: GA         |
| Sample Comment: ---                                   |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 9.3      | 88.0   | 2.7                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.75 in    | 19.00          | 100           |               |          |
| 0.5 in     | 12.50          | 96            |               |          |
| 0.375 in   | 9.50           | 95            |               |          |
| #4         | 4.75           | 91            |               |          |
| #10        | 2.00           | 83            |               |          |
| #20        | 0.85           | 60            |               |          |
| #40        | 0.42           | 31            |               |          |
| #60        | 0.25           | 16            |               |          |
| #100       | 0.15           | 6             |               |          |
| #140       | 0.11           | 4             |               |          |
| #200       | 0.075          | 2.7           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 2.5008 \text{ mm}$        $D_{30} = 0.4062 \text{ mm}$   
 $D_{60} = 0.8651 \text{ mm}$        $D_{15} = 0.2337 \text{ mm}$   
 $D_{50} = 0.6730 \text{ mm}$        $D_{10} = 0.1828 \text{ mm}$   
 $C_u = 4.732$        $C_c = 1.043$

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

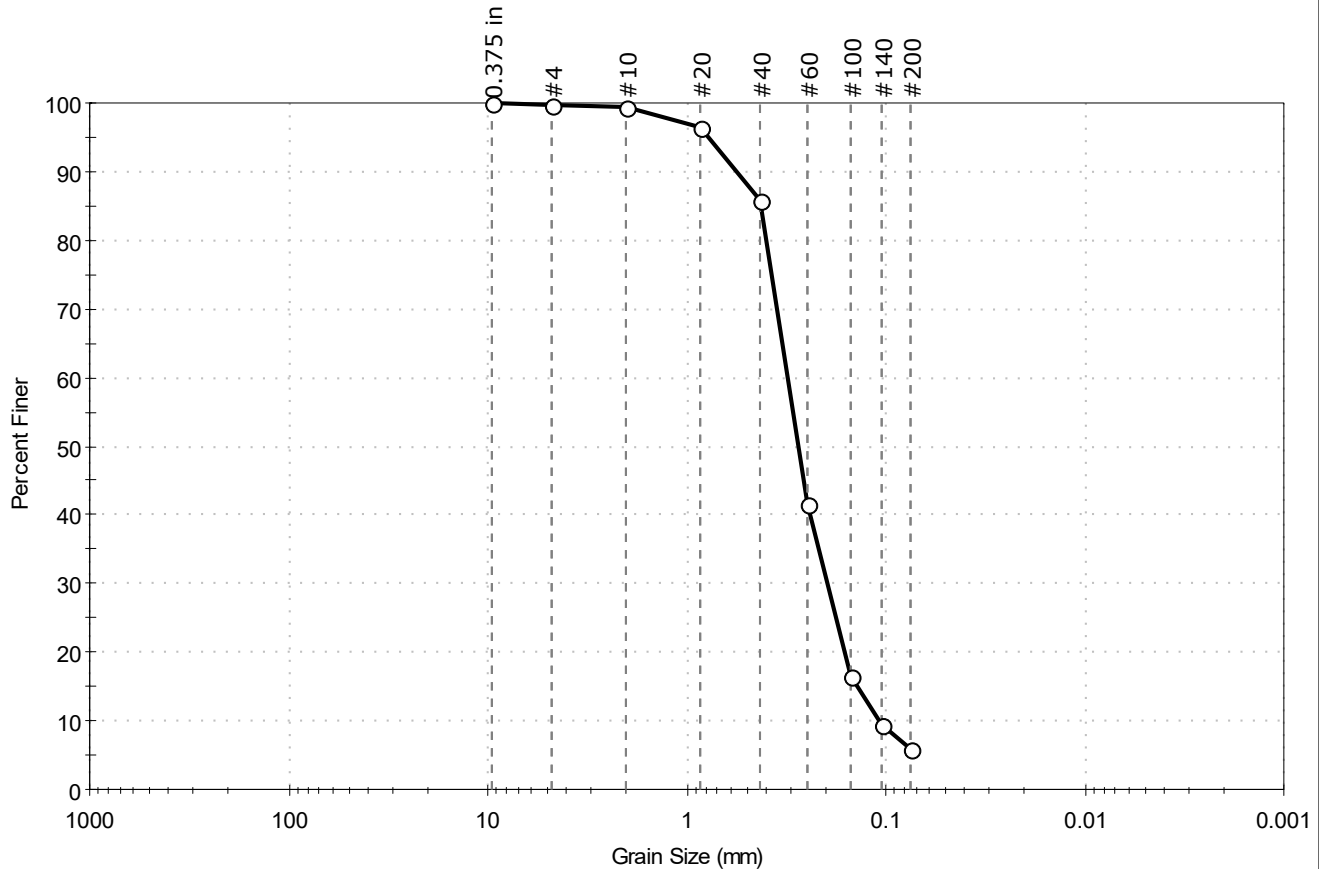
### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD



|                                                                 |                        |                     |
|-----------------------------------------------------------------|------------------------|---------------------|
| Client: Haley & Aldrich, Inc.                                   | Project No: GTX-319534 |                     |
| Project: Steeplegate Mall Force Main & Sewer                    |                        |                     |
| Location: Concord, NH                                           | Boring ID: HA24-8      | Sample Type: Bag    |
|                                                                 | Sample ID: S5          | Test Date: 08/09/24 |
|                                                                 | Depth: 10-12 FT        | Test Id: 780020     |
| Test Comment: ---                                               |                        |                     |
| Visual Description: Moist, light yellowish brown sand with silt |                        |                     |
| Sample Comment: ---                                             |                        |                     |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.1      | 94.0   | 5.9                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 99            |               |          |
| #20        | 0.85           | 97            |               |          |
| #40        | 0.42           | 86            |               |          |
| #60        | 0.25           | 42            |               |          |
| #100       | 0.15           | 16            |               |          |
| #140       | 0.11           | 9             |               |          |
| #200       | 0.075          | 5.9           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.4209$  mm       $D_{30} = 0.1976$  mm  
 $D_{60} = 0.3120$  mm       $D_{15} = 0.1395$  mm  
 $D_{50} = 0.2768$  mm       $D_{10} = 0.1095$  mm  
 $C_u = 2.849$        $C_c = 1.143$

### Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

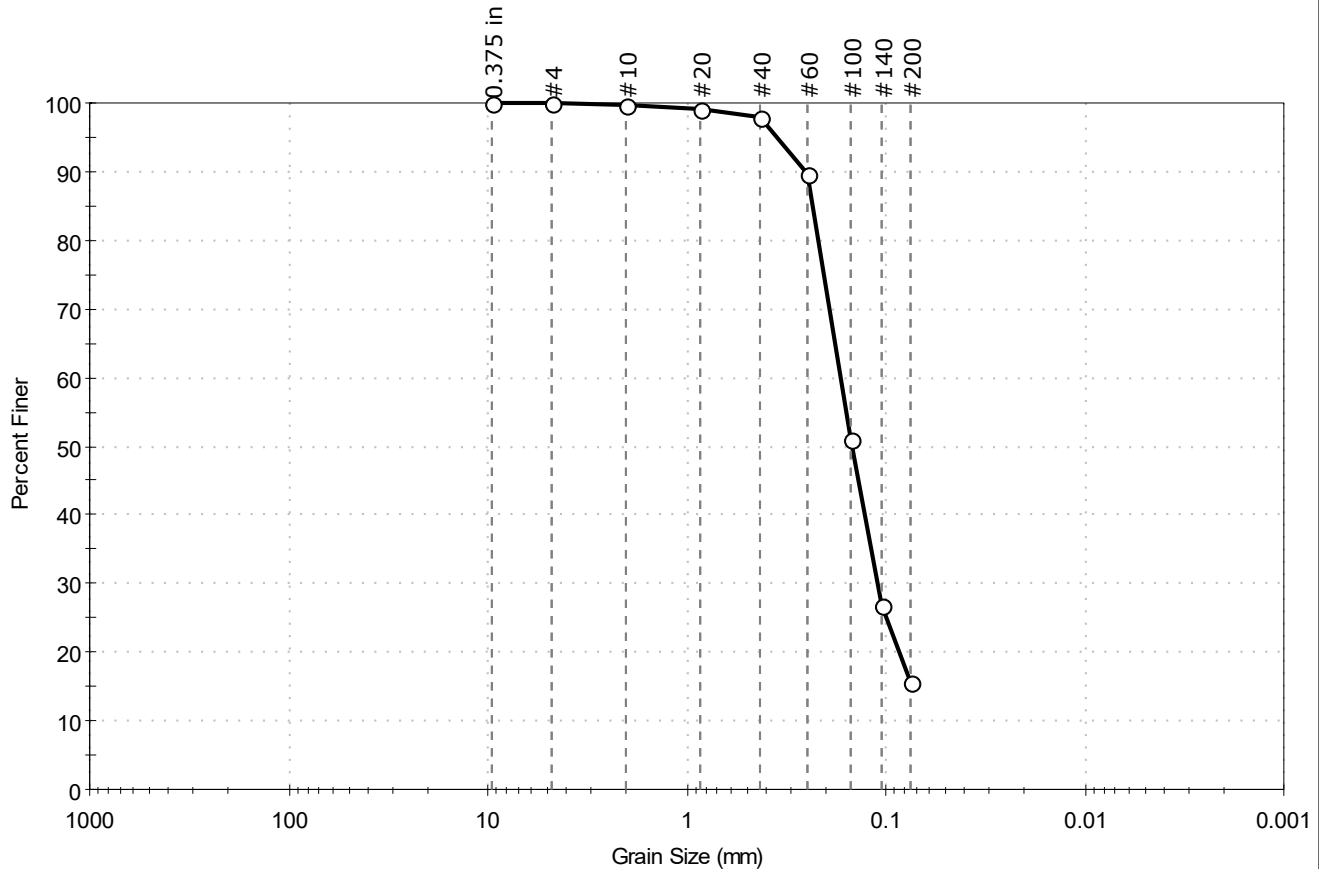
### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                                                  |                        |
|--------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                    | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer     |                        |
| Location: Concord, NH                            |                        |
| Boring ID: HA24-13                               | Sample Type: Bag       |
| Sample ID: S4                                    | Test Date: 08/12/24    |
| Depth: 7-9 FT                                    | Test Id: 780021        |
| Test Comment: ---                                | Tested By: ajl         |
| Visual Description: Moist, pale brown silty sand | Checked By: GA         |
| Sample Comment: ---                              |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.1      | 84.1   | 15.8               |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 100           |               |          |
| #20        | 0.85           | 99            |               |          |
| #40        | 0.42           | 98            |               |          |
| #60        | 0.25           | 90            |               |          |
| #100       | 0.15           | 51            |               |          |
| #140       | 0.11           | 27            |               |          |
| #200       | 0.075          | 16            |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.2350$  mm       $D_{30} = 0.1108$  mm  
 $D_{60} = 0.1687$  mm       $D_{15} = \text{N/A}$   
 $D_{50} = 0.1476$  mm       $D_{10} = \text{N/A}$   
 $C_u = \text{N/A}$        $C_c = \text{N/A}$

### Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

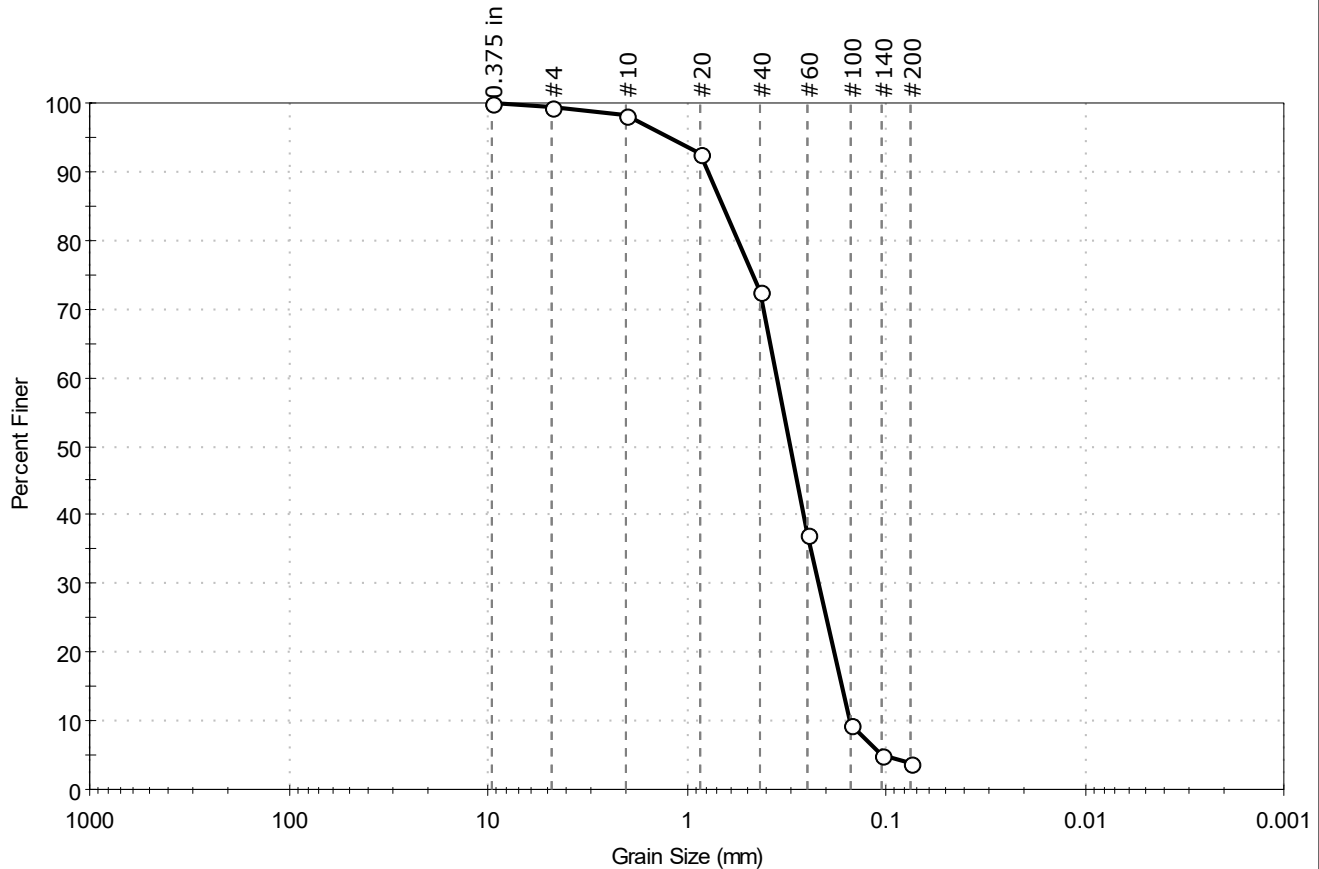
### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                                              |                        |
|----------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer |                        |
| Location: Concord, NH                        |                        |
| Boring ID: HA24-13                           | Sample Type: Bag       |
| Sample ID: S5                                | Test Date: 08/09/24    |
| Depth: 10-12 FT                              | Test Id: 780022        |
| Test Comment: ---                            | Tested By: ajl         |
| Visual Description: Moist, pale brown sand   | Checked By: GA         |
| Sample Comment: ---                          |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.6      | 95.7   | 3.7                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 99            |               |          |
| #10        | 2.00           | 98            |               |          |
| #20        | 0.85           | 93            |               |          |
| #40        | 0.42           | 72            |               |          |
| #60        | 0.25           | 37            |               |          |
| #100       | 0.15           | 9             |               |          |
| #140       | 0.11           | 5             |               |          |
| #200       | 0.075          | 3.7           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.6542$  mm       $D_{30} = 0.2194$  mm  
 $D_{60} = 0.3527$  mm       $D_{15} = 0.1663$  mm  
 $D_{50} = 0.3035$  mm       $D_{10} = 0.1517$  mm  
 $C_u = 2.325$        $C_c = 0.900$

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Fine Sand (A-3 (1))

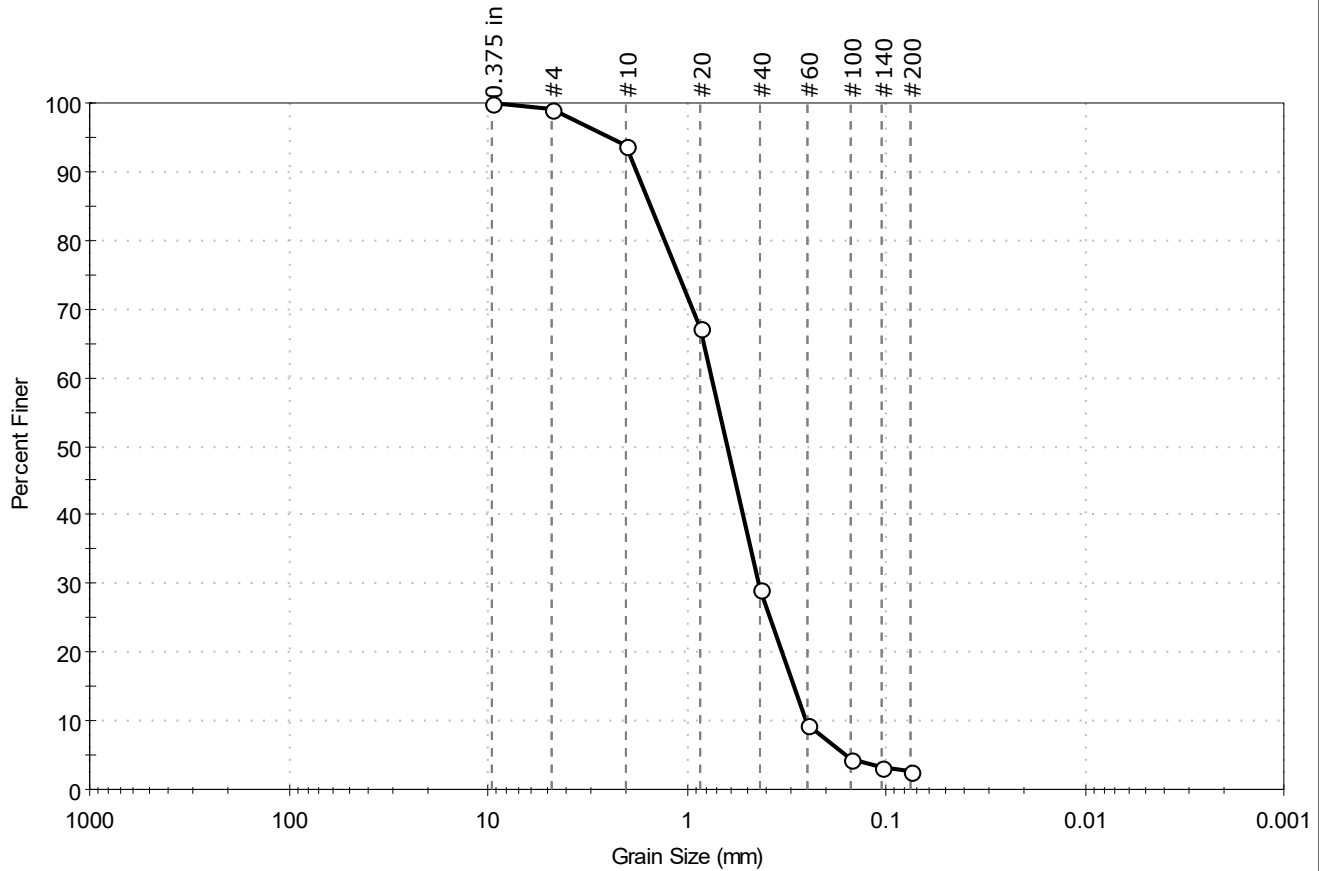
### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                                                 |                        |
|-------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                   | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer    |                        |
| Location: Concord, NH                           |                        |
| Boring ID: HA24-18                              | Sample Type: Bag       |
| Sample ID: S2                                   | Test Date: 08/09/24    |
| Depth: 2.5-4.5 FT                               | Test Id: 780023        |
| Test Comment: ---                               | Tested By: ajl         |
| Visual Description: Moist, brownish yellow sand | Checked By: GA         |
| Sample Comment: ---                             |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.8      | 96.6   | 2.6                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 99            |               |          |
| #10        | 2.00           | 94            |               |          |
| #20        | 0.85           | 67            |               |          |
| #40        | 0.42           | 29            |               |          |
| #60        | 0.25           | 9             |               |          |
| #100       | 0.15           | 4             |               |          |
| #140       | 0.11           | 3             |               |          |
| #200       | 0.075          | 2.6           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 1.5003 \text{ mm}$        $D_{30} = 0.4312 \text{ mm}$   
 $D_{60} = 0.7437 \text{ mm}$        $D_{15} = 0.2900 \text{ mm}$   
 $D_{50} = 0.6202 \text{ mm}$        $D_{10} = 0.2534 \text{ mm}$   
 $C_u = 2.935$        $C_c = 0.987$

### Classification

**ASTM** Poorly graded SAND (SP)

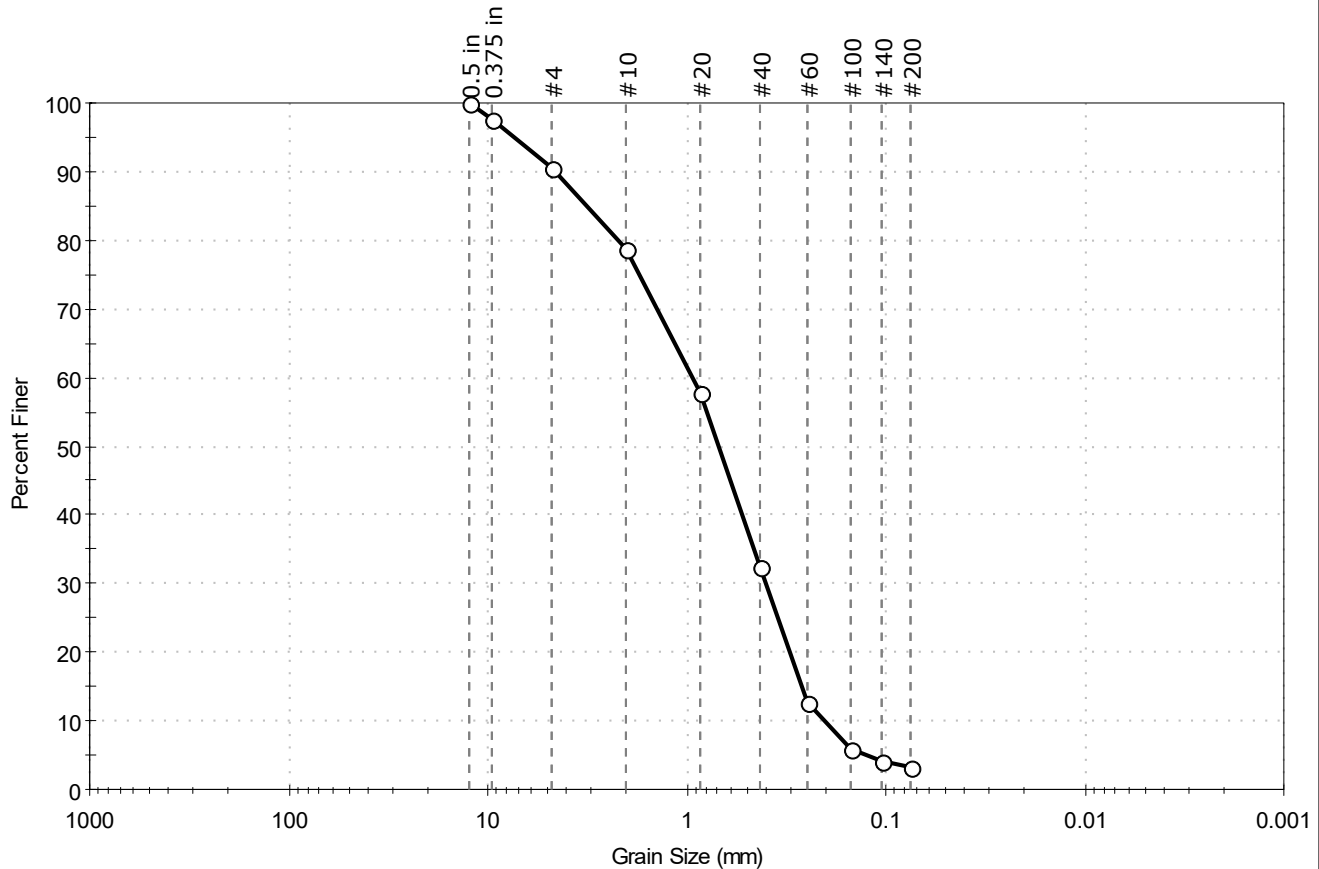
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD

|                                                      |                        |
|------------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                        | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer         |                        |
| Location: Concord, NH                                |                        |
| Boring ID: HA24-18                                   | Sample Type: Bag       |
| Sample ID: S3                                        | Test Date: 08/12/24    |
| Depth: 5-7 FT                                        | Test Id: 780024        |
| Test Comment: ---                                    | Tested By: ajl         |
| Visual Description: Moist, dark yellowish brown sand | Checked By: GA         |
| Sample Comment: ---                                  |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 9.5      | 87.4   | 3.1                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.5 in     | 12.50          | 100           |               |          |
| 0.375 in   | 9.50           | 98            |               |          |
| #4         | 4.75           | 91            |               |          |
| #10        | 2.00           | 79            |               |          |
| #20        | 0.85           | 58            |               |          |
| #40        | 0.42           | 33            |               |          |
| #60        | 0.25           | 13            |               |          |
| #100       | 0.15           | 6             |               |          |
| #140       | 0.11           | 4             |               |          |
| #200       | 0.075          | 3.1           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 3.1514 \text{ mm}$        $D_{30} = 0.3971 \text{ mm}$   
 $D_{60} = 0.9241 \text{ mm}$        $D_{15} = 0.2662 \text{ mm}$   
 $D_{50} = 0.6842 \text{ mm}$        $D_{10} = 0.2054 \text{ mm}$   
 $C_u = 4.499$        $C_c = 0.831$

### Classification

**ASTM** Poorly graded SAND (SP)

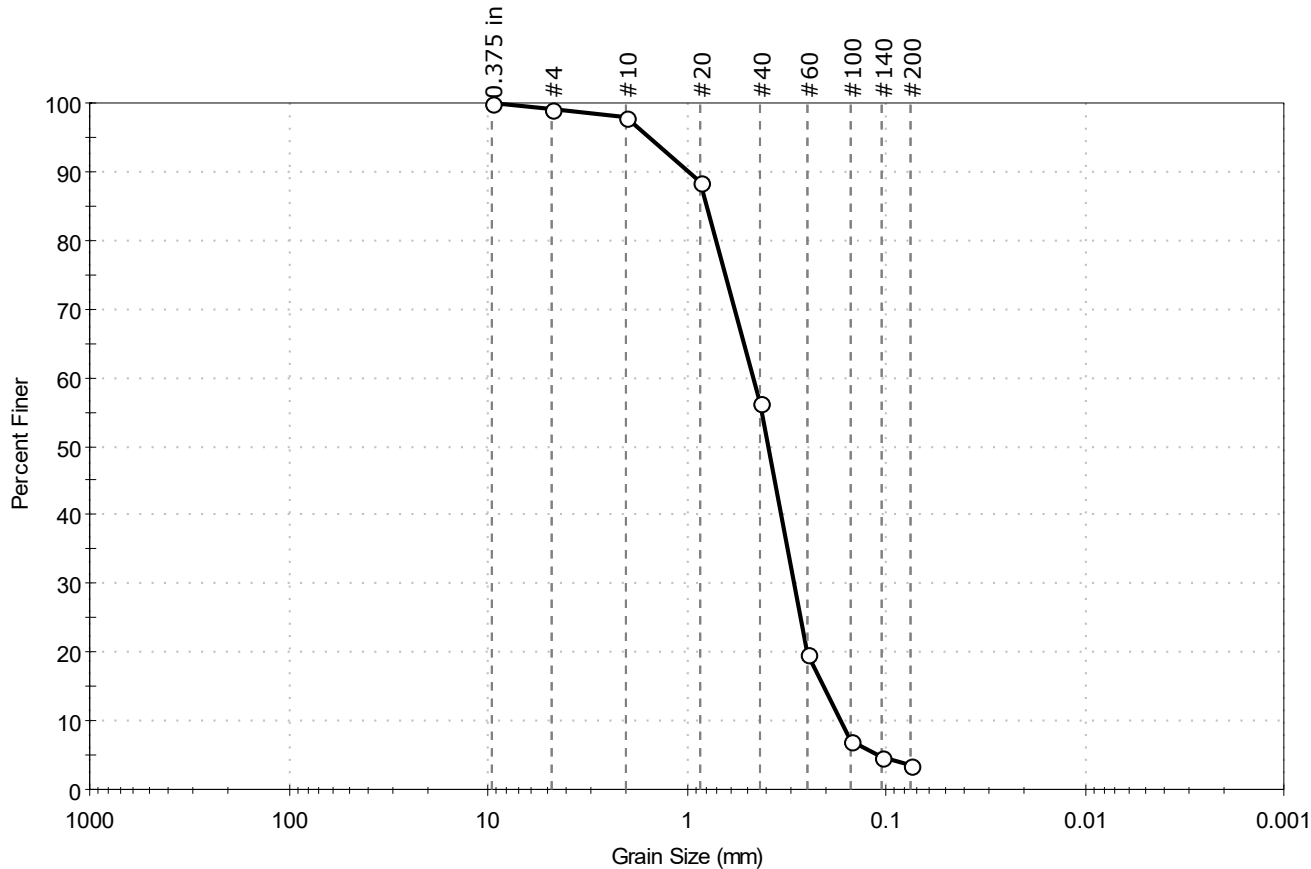
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD

|                                                 |                        |
|-------------------------------------------------|------------------------|
| Client: Haley & Aldrich, Inc.                   | Project No: GTX-319534 |
| Project: Steeplegate Mall Force Main & Sewer    |                        |
| Location: Concord, NH                           |                        |
| Boring ID: HA24-23                              | Sample Type: Bag       |
| Sample ID: S3                                   | Test Date: 08/09/24    |
| Depth: 5-7 FT                                   | Test Id: 780025        |
| Test Comment: ---                               | Tested By: ajl         |
| Visual Description: Moist, brownish yellow sand | Checked By: GA         |
| Sample Comment: ---                             |                        |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.7      | 95.7   | 3.6                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 99            |               |          |
| #10        | 2.00           | 98            |               |          |
| #20        | 0.85           | 89            |               |          |
| #40        | 0.42           | 56            |               |          |
| #60        | 0.25           | 20            |               |          |
| #100       | 0.15           | 7             |               |          |
| #140       | 0.11           | 5             |               |          |
| #200       | 0.075          | 3.6           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.7877 \text{ mm}$        $D_{30} = 0.2902 \text{ mm}$   
 $D_{60} = 0.4609 \text{ mm}$        $D_{15} = 0.2065 \text{ mm}$   
 $D_{50} = 0.3883 \text{ mm}$        $D_{10} = 0.1689 \text{ mm}$   
 $C_u = 2.729$        $C_c = 1.082$

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Fine Sand (A-3 (1))

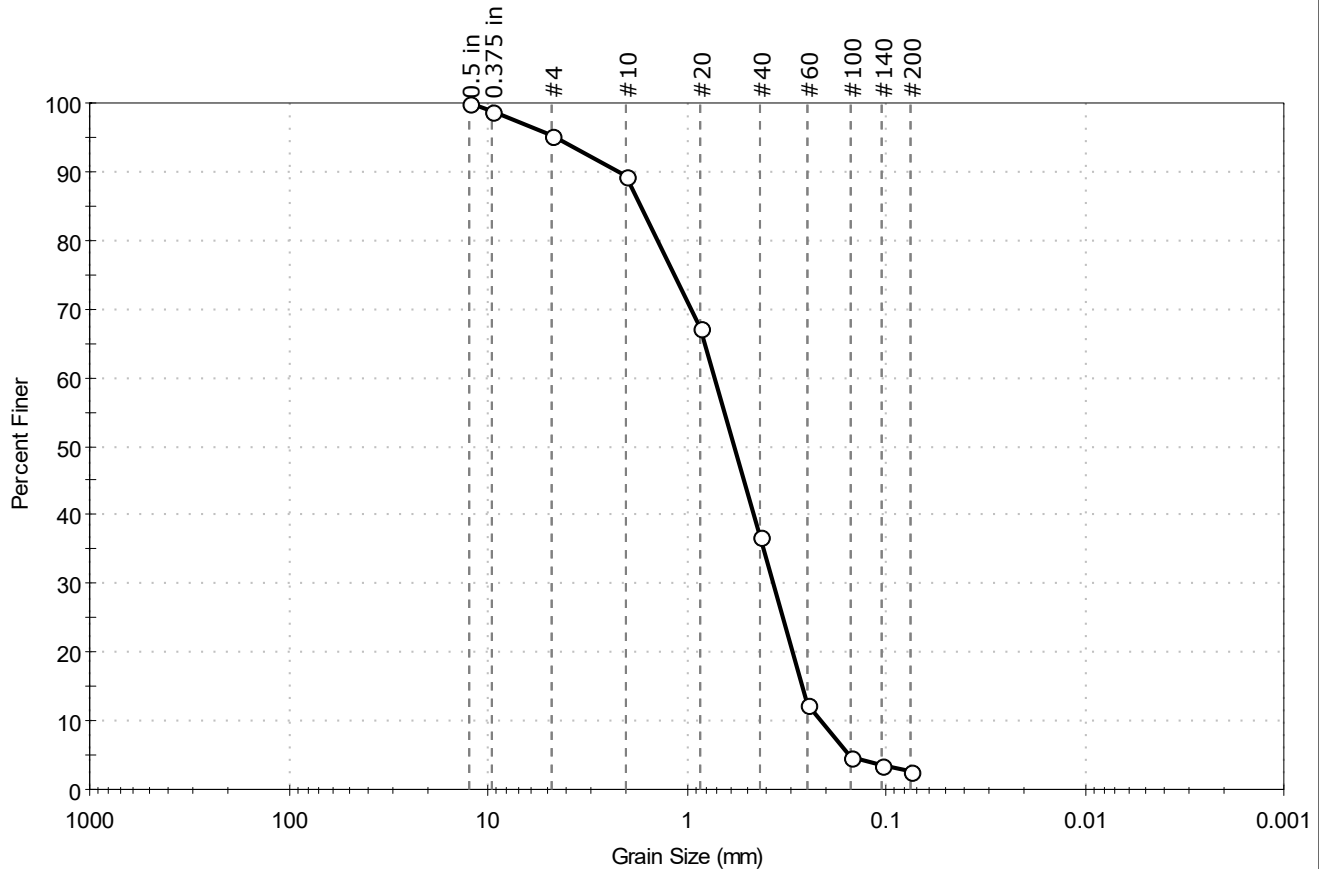
### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                                                 |                        |                     |
|-------------------------------------------------|------------------------|---------------------|
| Client: Haley & Aldrich, Inc.                   | Project No: GTX-319534 |                     |
| Project: Steeplegate Mall Force Main & Sewer    |                        |                     |
| Location: Concord, NH                           | Boring ID: HA24-23     | Sample Type: Bag    |
|                                                 | Sample ID: S5          | Test Date: 08/12/24 |
|                                                 | Depth: 10-12           | Test Id: 780026     |
| Test Comment: ---                               |                        |                     |
| Visual Description: Moist, brownish yellow sand |                        |                     |
| Sample Comment: ---                             |                        |                     |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 4.7      | 92.7   | 2.6                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.5 in     | 12.50          | 100           |               |          |
| 0.375 in   | 9.50           | 99            |               |          |
| #4         | 4.75           | 95            |               |          |
| #10        | 2.00           | 89            |               |          |
| #20        | 0.85           | 67            |               |          |
| #40        | 0.42           | 37            |               |          |
| #60        | 0.25           | 12            |               |          |
| #100       | 0.15           | 5             |               |          |
| #140       | 0.11           | 3             |               |          |
| #200       | 0.075          | 2.6           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 1.6937 \text{ mm}$        $D_{30} = 0.3657 \text{ mm}$   
 $D_{60} = 0.7183 \text{ mm}$        $D_{15} = 0.2648 \text{ mm}$   
 $D_{50} = 0.5719 \text{ mm}$        $D_{10} = 0.2135 \text{ mm}$   
 $C_u = 3.364$        $C_c = 0.872$

### Classification

**ASTM** Poorly graded SAND (SP)

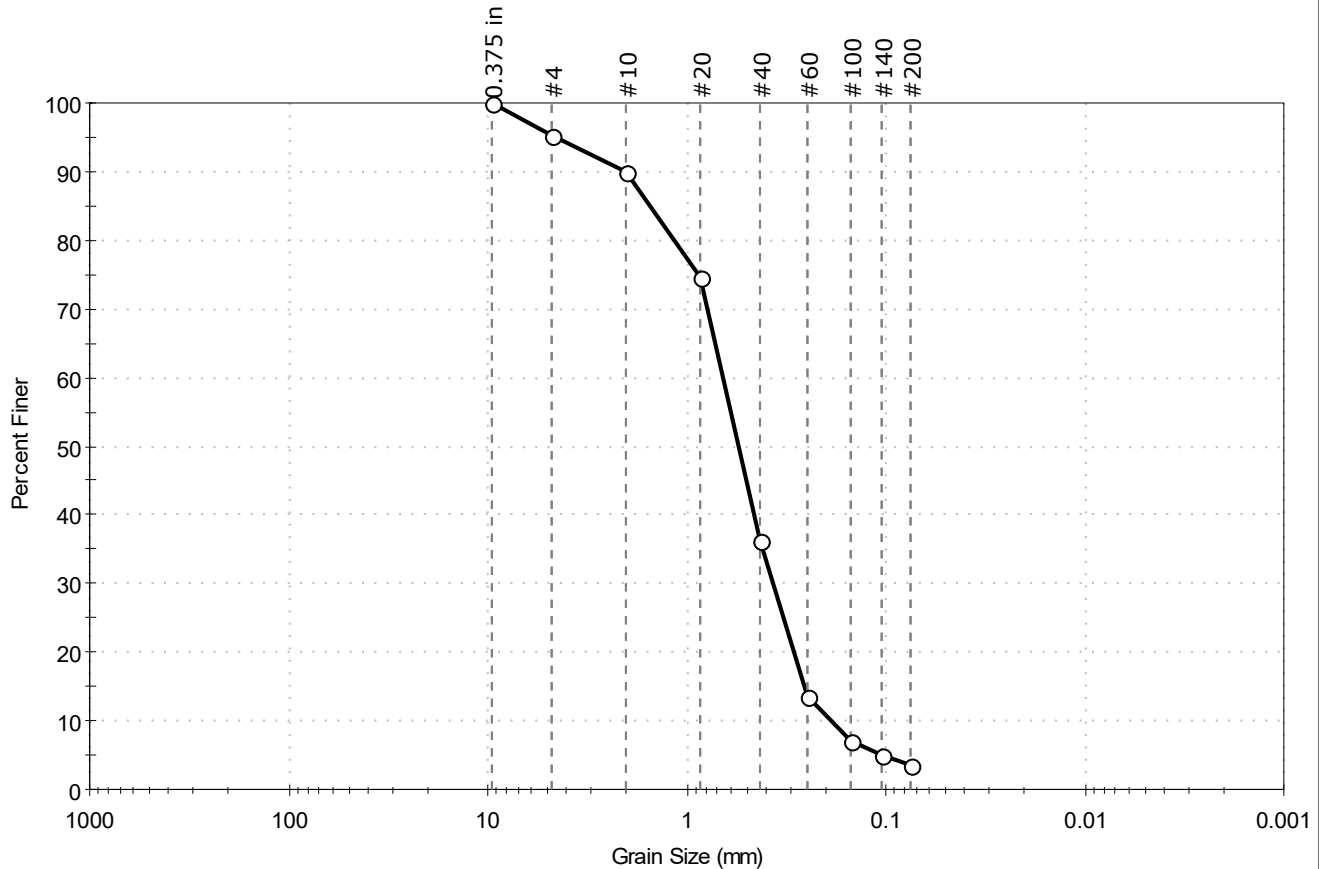
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD

|                                                 |                        |                |
|-------------------------------------------------|------------------------|----------------|
| Client: Haley & Aldrich, Inc.                   | Project No: GTX-319534 |                |
| Project: Steeplegate Mall Force Main & Sewer    |                        |                |
| Location: Concord, NH                           |                        |                |
| Boring ID: HA24-28                              | Sample Type: Bag       | Tested By: ajl |
| Sample ID: S3                                   | Test Date: 08/09/24    | Checked By: GA |
| Depth: 5-7 FT                                   | Test Id: 780027        |                |
| Test Comment: ---                               |                        |                |
| Visual Description: Moist, yellowish brown sand |                        |                |
| Sample Comment: ---                             |                        |                |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 4.7      | 91.7   | 3.6                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 95            |               |          |
| #10        | 2.00           | 90            |               |          |
| #20        | 0.85           | 75            |               |          |
| #40        | 0.42           | 36            |               |          |
| #60        | 0.25           | 14            |               |          |
| #100       | 0.15           | 7             |               |          |
| #140       | 0.11           | 5             |               |          |
| #200       | 0.075          | 3.6           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 1.5149$  mm       $D_{30} = 0.3665$  mm  
 $D_{60} = 0.6519$  mm       $D_{15} = 0.2577$  mm  
 $D_{50} = 0.5442$  mm       $D_{10} = 0.1887$  mm  
 $C_u = 3.455$                    $C_c = 1.092$

### Classification

ASTM Poorly graded SAND (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

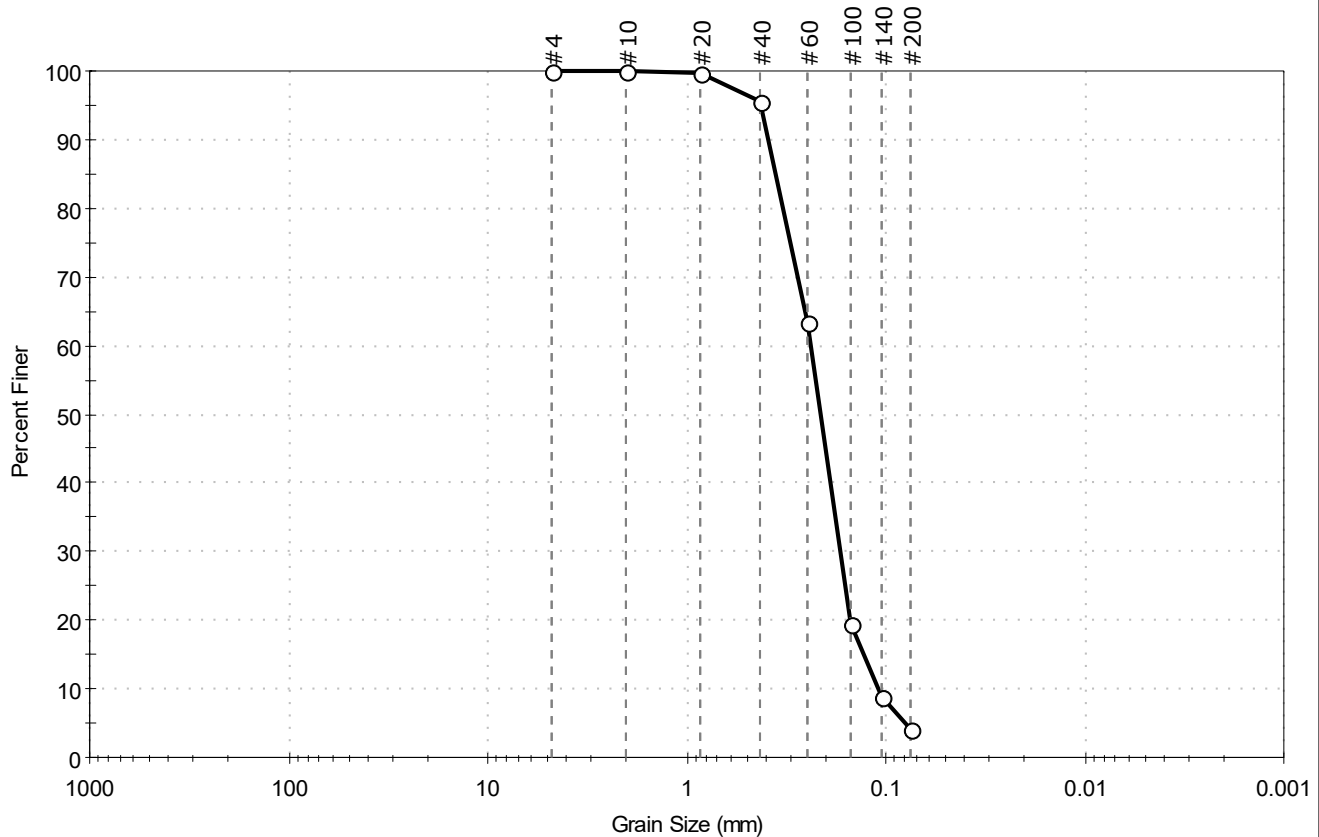
### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD



|                                                       |                        |                     |
|-------------------------------------------------------|------------------------|---------------------|
| Client: Haley & Aldrich, Inc.                         | Project No: GTX-319534 |                     |
| Project: Steeplegate Mall Force Main & Sewer          |                        |                     |
| Location: Concord, NH                                 | Boring ID: HA24-28     | Sample Type: Bag    |
|                                                       | Sample ID: S5          | Test Date: 08/09/24 |
|                                                       | Depth: 10-12 FT        | Test Id: 780028     |
| Test Comment: ---                                     |                        |                     |
| Visual Description: Moist, light yellowish brown sand |                        |                     |
| Sample Comment: ---                                   |                        |                     |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.0      | 96.0   | 4.0                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 100           |               |          |
| #20        | 0.85           | 100           |               |          |
| #40        | 0.42           | 96            |               |          |
| #60        | 0.25           | 63            |               |          |
| #100       | 0.15           | 20            |               |          |
| #140       | 0.11           | 9             |               |          |
| #200       | 0.075          | 4.0           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.3568$  mm       $D_{30} = 0.1694$  mm  
 $D_{60} = 0.2405$  mm       $D_{15} = 0.1294$  mm  
 $D_{50} = 0.2140$  mm       $D_{10} = 0.1102$  mm  
 $C_u = 2.182$        $C_c = 1.083$

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Fine Sand (A-3 (1))

### Sample/Test Description

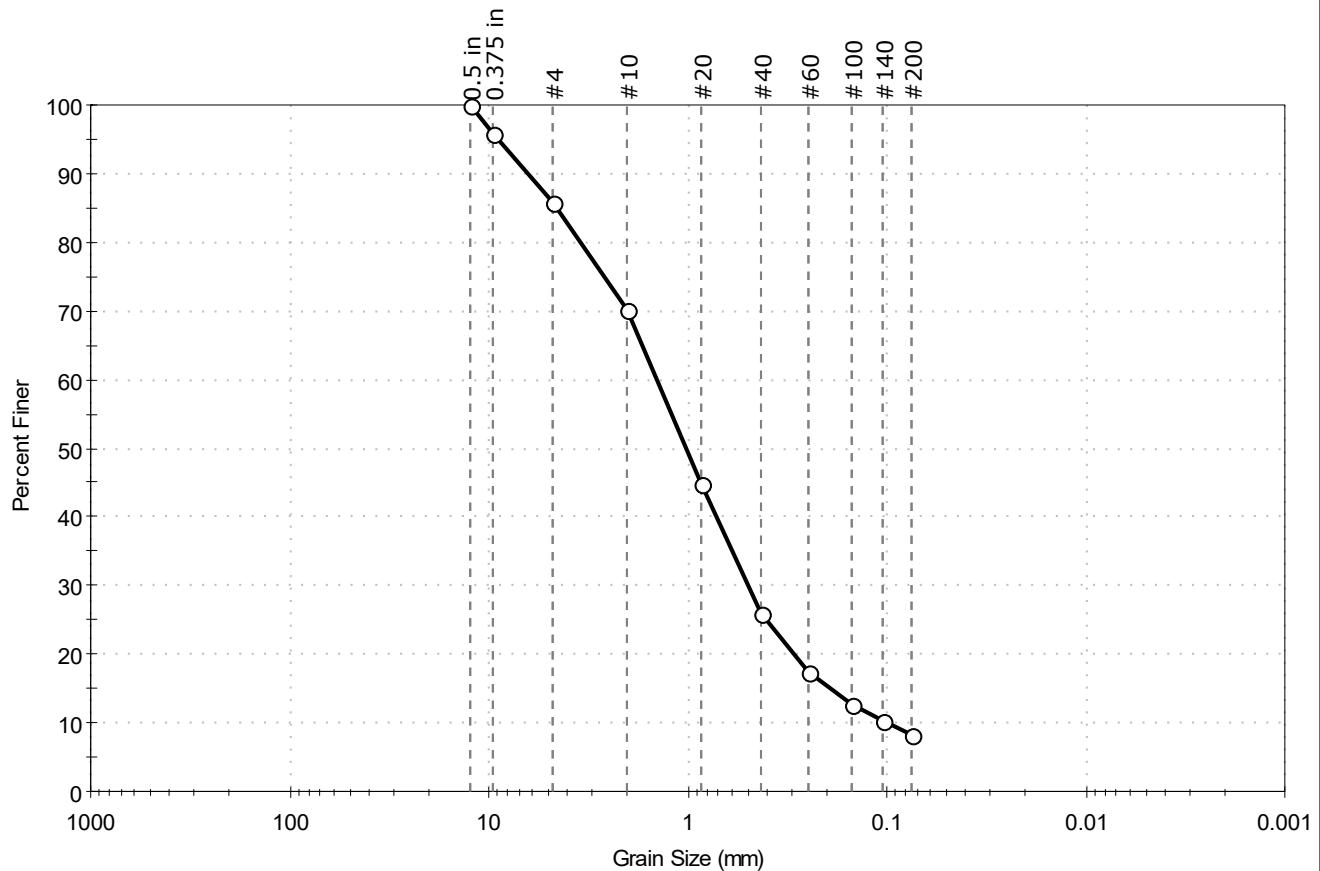
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---



|                     |                                            |              |            |
|---------------------|--------------------------------------------|--------------|------------|
| Client:             | Haley & Aldrich, Inc.                      |              |            |
| Project:            | Steeplegate Mall Force Main & Sewer        |              |            |
| Location:           | Concord, NH                                | Project No:  | GTX-319534 |
| Boring ID:          | HA24-33                                    | Sample Type: | Bag        |
| Sample ID:          | S3                                         | Test Date:   | 08/07/24   |
| Depth :             | 5-7 FT                                     | Test Id:     | 780029     |
| Test Comment:       | ---                                        |              |            |
| Visual Description: | Moist, dark yellowish brown sand with silt |              |            |
| Sample Comment:     | ---                                        |              |            |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 14.2     | 77.5   | 8.3                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.5 in     | 12.50          | 100           |               |          |
| 0.375 in   | 9.50           | 96            |               |          |
| #4         | 4.75           | 86            |               |          |
| #10        | 2.00           | 70            |               |          |
| #20        | 0.85           | 45            |               |          |
| #40        | 0.42           | 26            |               |          |
| #60        | 0.25           | 17            |               |          |
| #100       | 0.15           | 13            |               |          |
| #140       | 0.11           | 10            |               |          |
| #200       | 0.075          | 8.3           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

|                             |                             |
|-----------------------------|-----------------------------|
| D <sub>85</sub> = 4.5475 mm | D <sub>30</sub> = 0.4927 mm |
| D <sub>60</sub> = 1.4167 mm | D <sub>15</sub> = 0.1947 mm |
| D <sub>50</sub> = 1.0109 mm | D <sub>10</sub> = 0.0992 mm |
| C <sub>u</sub> = 14.281     | C <sub>c</sub> = 1.727      |

### Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

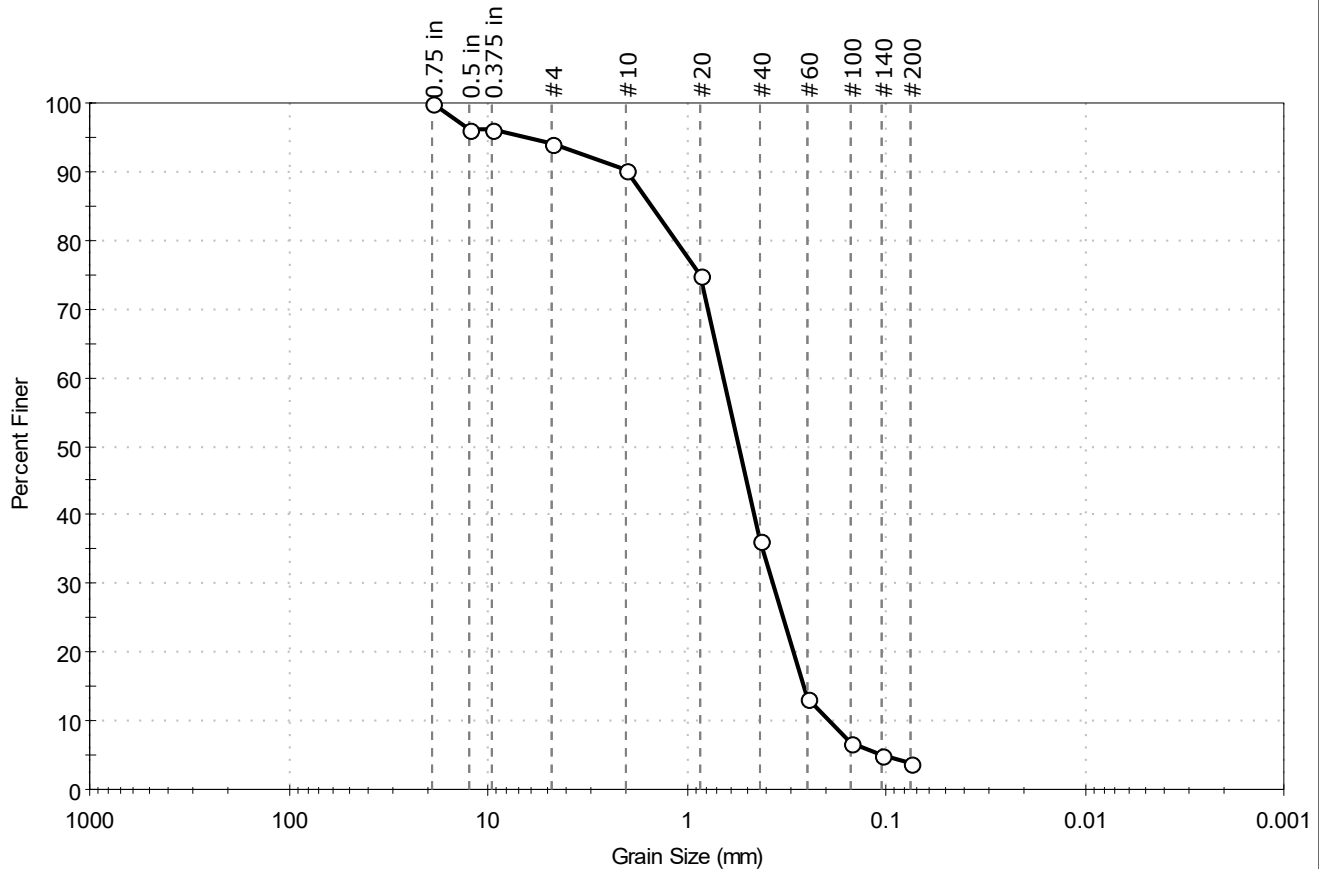
### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

|                                              |                        |                     |
|----------------------------------------------|------------------------|---------------------|
| Client: Haley & Aldrich, Inc.                | Project No: GTX-319534 |                     |
| Project: Steeplegate Mall Force Main & Sewer |                        |                     |
| Location: Concord, NH                        | Boring ID: HA24-33     | Sample Type: Bag    |
|                                              | Sample ID: S4          | Test Date: 08/09/24 |
|                                              | Depth: 7-9 FT          | Test Id: 780030     |
| Test Comment: ---                            |                        |                     |
| Visual Description: Moist, brown sand        |                        |                     |
| Sample Comment: ---                          |                        |                     |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 5.9      | 90.3   | 3.8                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.75 in    | 19.00          | 100           |               |          |
| 0.5 in     | 12.50          | 96            |               |          |
| 0.375 in   | 9.50           | 96            |               |          |
| #4         | 4.75           | 94            |               |          |
| #10        | 2.00           | 90            |               |          |
| #20        | 0.85           | 75            |               |          |
| #40        | 0.42           | 36            |               |          |
| #60        | 0.25           | 13            |               |          |
| #100       | 0.15           | 7             |               |          |
| #140       | 0.11           | 5             |               |          |
| #200       | 0.075          | 3.8           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 1.4887 \text{ mm}$        $D_{30} = 0.3668 \text{ mm}$   
 $D_{60} = 0.6505 \text{ mm}$        $D_{15} = 0.2599 \text{ mm}$   
 $D_{50} = 0.5431 \text{ mm}$        $D_{10} = 0.1933 \text{ mm}$   
 $C_u = 3.365$        $C_c = 1.070$

### Classification

**ASTM** Poorly graded SAND (SP)

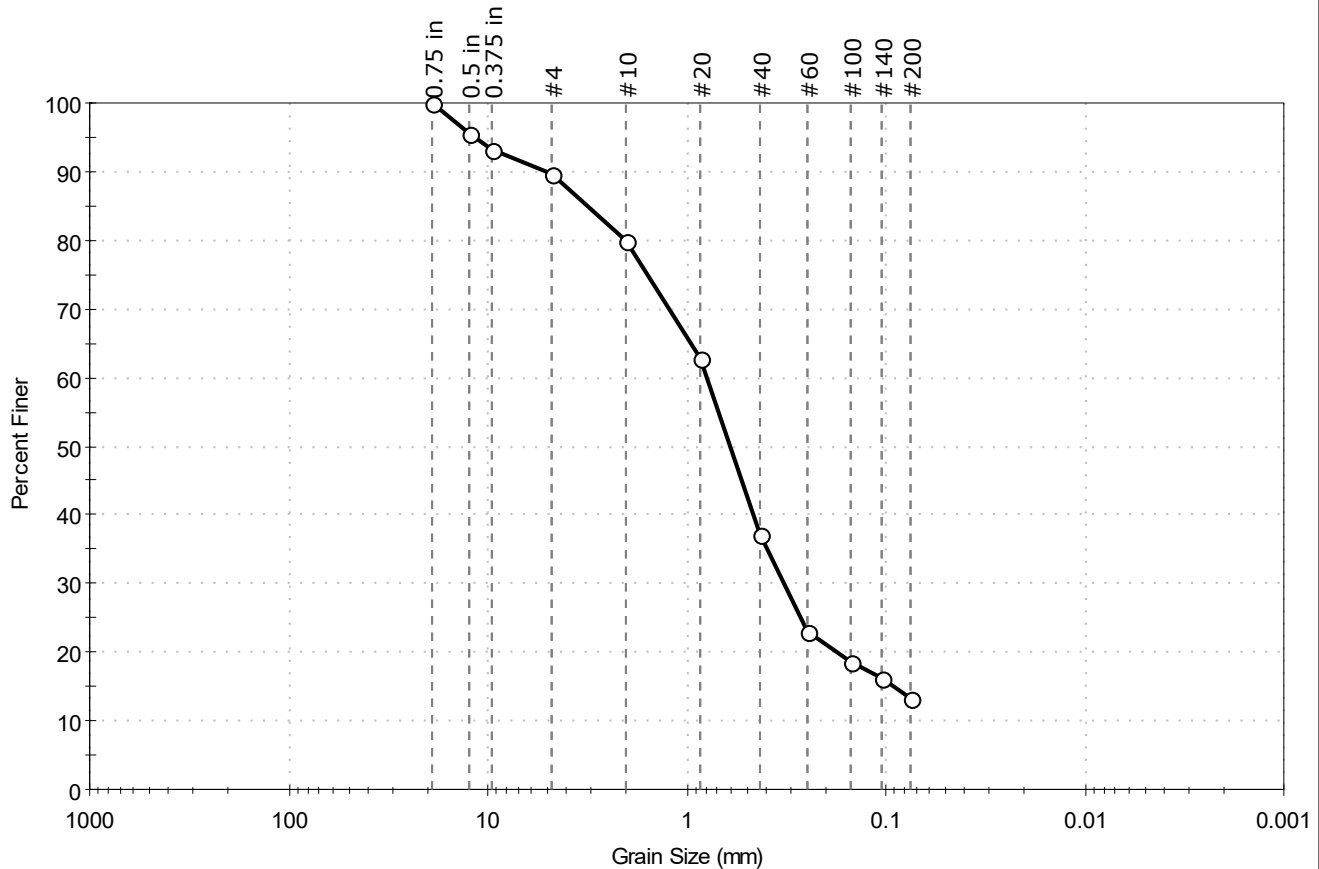
**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD

|                                                            |                        |                     |
|------------------------------------------------------------|------------------------|---------------------|
| Client: Haley & Aldrich, Inc.                              | Project No: GTX-319534 |                     |
| Project: Steeplegate Mall Force Main & Sewer               |                        |                     |
| Location: Concord, NH                                      | Boring ID: HA24-38     | Sample Type: Bag    |
|                                                            | Sample ID: S2          | Test Date: 08/09/24 |
|                                                            | Depth: 2.5-4.5 FT      | Test Id: 780031     |
| Test Comment: ---                                          |                        |                     |
| Visual Description: Moist, dark yellowish brown silty sand |                        |                     |
| Sample Comment: ---                                        |                        |                     |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 10.4     | 76.3   | 13.3               |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.75 in    | 19.00          | 100           |               |          |
| 0.5 in     | 12.50          | 96            |               |          |
| 0.375 in   | 9.50           | 93            |               |          |
| #4         | 4.75           | 90            |               |          |
| #10        | 2.00           | 80            |               |          |
| #20        | 0.85           | 63            |               |          |
| #40        | 0.42           | 37            |               |          |
| #60        | 0.25           | 23            |               |          |
| #100       | 0.15           | 19            |               |          |
| #140       | 0.11           | 16            |               |          |
| #200       | 0.075          | 13            |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 3.1374 \text{ mm}$        $D_{30} = 0.3244 \text{ mm}$   
 $D_{60} = 0.7880 \text{ mm}$        $D_{15} = 0.0914 \text{ mm}$   
 $D_{50} = 0.6016 \text{ mm}$        $D_{10} = \text{N/A}$   
 $C_u = \text{N/A}$        $C_c = \text{N/A}$

### Classification

ASTM N/A

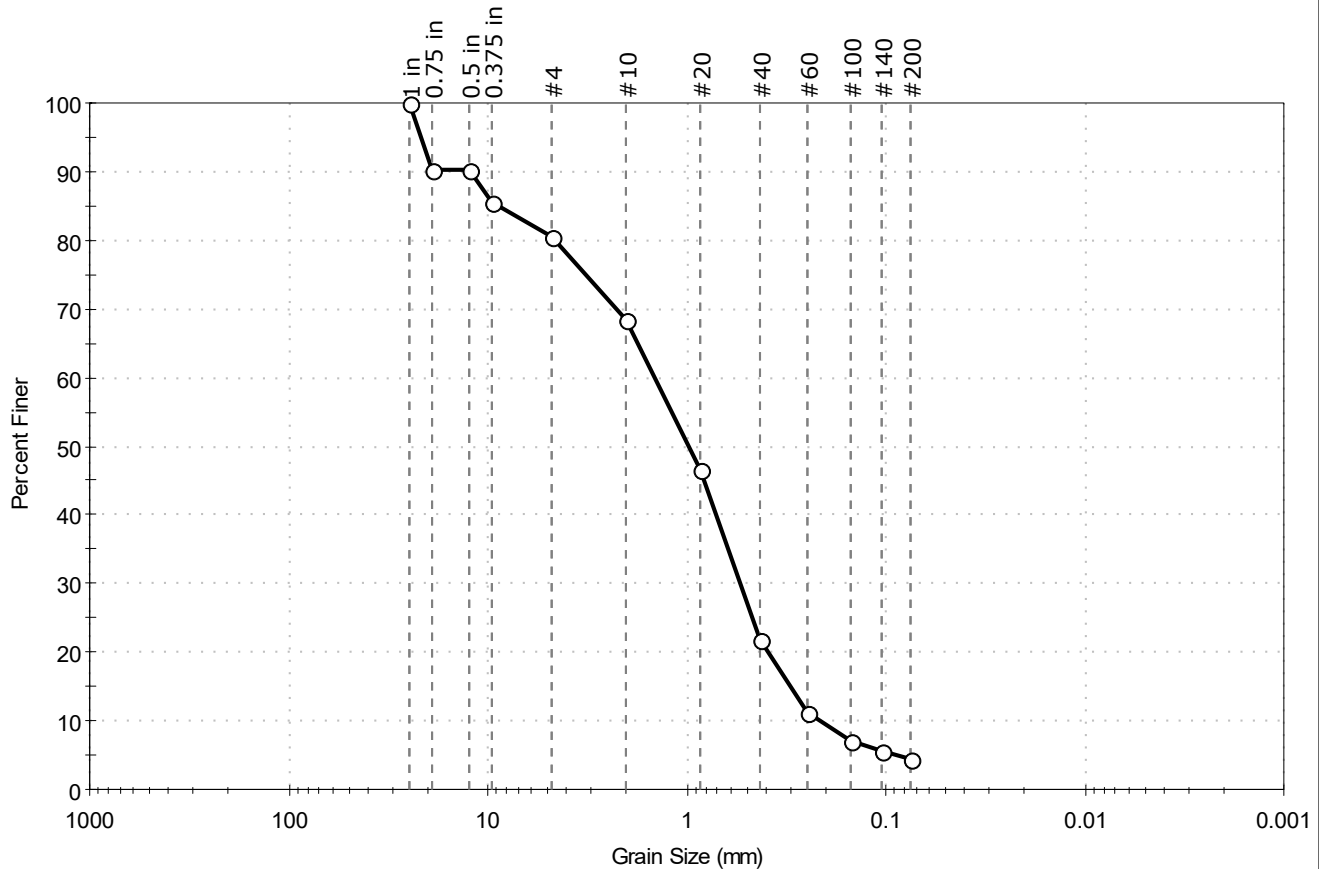
AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR  
 Sand/Gravel Hardness : HARD

|                                                             |                        |                |
|-------------------------------------------------------------|------------------------|----------------|
| Client: Haley & Aldrich, Inc.                               | Project No: GTX-319534 |                |
| Project: Steeplegate Mall Force Main & Sewer                |                        |                |
| Location: Concord, NH                                       |                        |                |
| Boring ID: HA24-38                                          | Sample Type: Bag       | Tested By: ajl |
| Sample ID: S4                                               | Test Date: 08/07/24    | Checked By: GA |
| Depth: 7-9 FT                                               | Test Id: 780032        |                |
| Test Comment: ---                                           |                        |                |
| Visual Description: Moist, yellowish brown sand with gravel |                        |                |
| Sample Comment: ---                                         |                        |                |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 19.6     | 76.0   | 4.4                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 1 in       | 25.00          | 100           |               |          |
| 0.75 in    | 19.00          | 90            |               |          |
| 0.5 in     | 12.50          | 90            |               |          |
| 0.375 in   | 9.50           | 85            |               |          |
| #4         | 4.75           | 80            |               |          |
| #10        | 2.00           | 68            |               |          |
| #20        | 0.85           | 47            |               |          |
| #40        | 0.42           | 22            |               |          |
| #60        | 0.25           | 11            |               |          |
| #100       | 0.15           | 7             |               |          |
| #140       | 0.11           | 6             |               |          |
| #200       | 0.075          | 4.4           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 8.9210 \text{ mm}$        $D_{30} = 0.5337 \text{ mm}$   
 $D_{60} = 1.4404 \text{ mm}$        $D_{15} = 0.3016 \text{ mm}$   
 $D_{50} = 0.9744 \text{ mm}$        $D_{10} = 0.2144 \text{ mm}$   
 $C_u = 6.718$        $C_c = 0.922$

### Classification

**ASTM** Poorly graded SAND with Gravel (SP)

**AASHTO** Stone Fragments, Gravel and Sand (A-1-b (1))

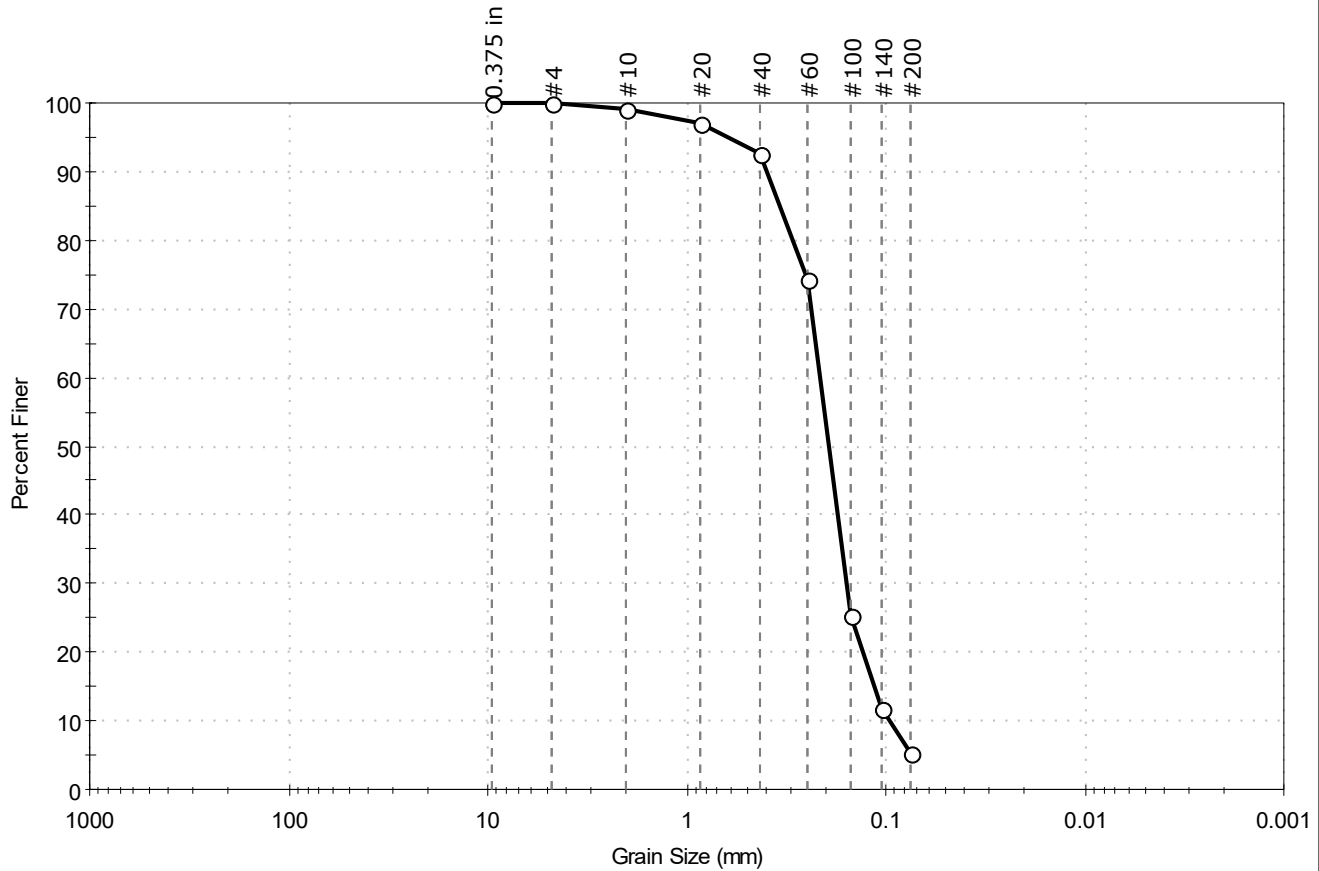
### Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

|                                                                |                        |                     |
|----------------------------------------------------------------|------------------------|---------------------|
| Client: Haley & Aldrich, Inc.                                  | Project No: GTX-319534 |                     |
| Project: Steeplegate Mall Force Main & Sewer                   |                        |                     |
| Location: Concord, NH                                          | Boring ID: HA24-43     | Sample Type: Bag    |
|                                                                | Sample ID: S3          | Test Date: 08/07/24 |
|                                                                | Depth: 5-7 FT          | Test Id: 780033     |
| Test Comment: ---                                              |                        |                     |
| Visual Description: Moist, light yelloish brown sand with silt |                        |                     |
| Sample Comment: ---                                            |                        |                     |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.1      | 94.5   | 5.4                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| 0.375 in   | 9.50           | 100           |               |          |
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 99            |               |          |
| #20        | 0.85           | 97            |               |          |
| #40        | 0.42           | 93            |               |          |
| #60        | 0.25           | 74            |               |          |
| #100       | 0.15           | 25            |               |          |
| #140       | 0.11           | 12            |               |          |
| #200       | 0.075          | 5.4           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.3418 \text{ mm}$        $D_{30} = 0.1575 \text{ mm}$   
 $D_{60} = 0.2155 \text{ mm}$        $D_{15} = 0.1153 \text{ mm}$   
 $D_{50} = 0.1941 \text{ mm}$        $D_{10} = 0.0966 \text{ mm}$   
 $C_u = 2.231$        $C_c = 1.192$

### Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

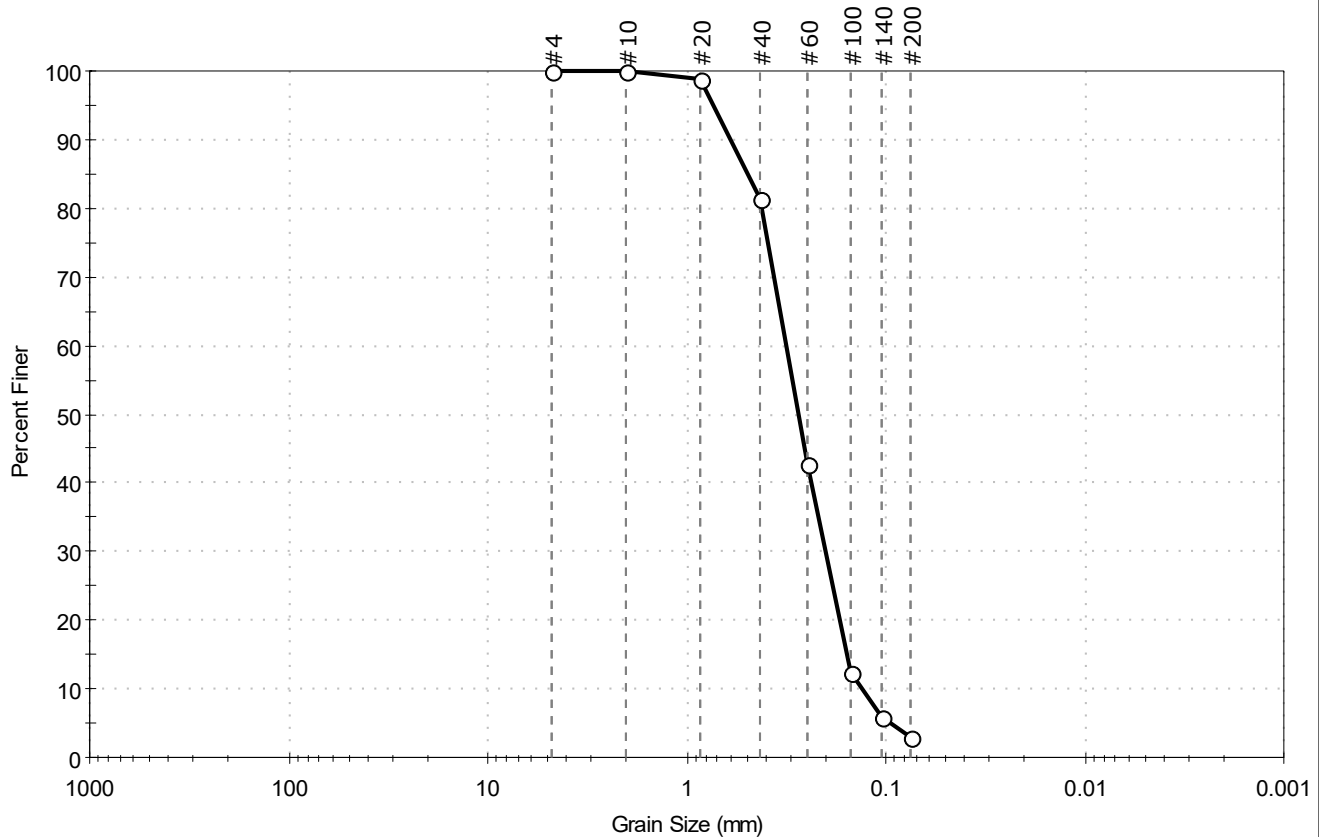
### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

|                                              |                        |                |
|----------------------------------------------|------------------------|----------------|
| Client: Haley & Aldrich, Inc.                | Project No: GTX-319534 |                |
| Project: Steeplegate Mall Force Main & Sewer |                        |                |
| Location: Concord, NH                        |                        |                |
| Boring ID: HA24-43                           | Sample Type: Bag       | Tested By: ajl |
| Sample ID: S4                                | Test Date: 08/07/24    | Checked By: GA |
| Depth: 7-9 FT                                | Test Id: 780034        |                |
| Test Comment: ---                            |                        |                |
| Visual Description: Moist, pale brown sand   |                        |                |
| Sample Comment: ---                          |                        |                |

## Particle Size Analysis - ASTM D6913



| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|----------|----------|--------|--------------------|
| —        | 0.0      | 96.9   | 3.1                |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|------------|----------------|---------------|---------------|----------|
| #4         | 4.75           | 100           |               |          |
| #10        | 2.00           | 100           |               |          |
| #20        | 0.85           | 99            |               |          |
| #40        | 0.42           | 81            |               |          |
| #60        | 0.25           | 43            |               |          |
| #100       | 0.15           | 12            |               |          |
| #140       | 0.11           | 6             |               |          |
| #200       | 0.075          | 3.1           |               |          |
|            |                |               |               |          |
|            |                |               |               |          |

### Coefficients

$D_{85} = 0.4912$  mm       $D_{30} = 0.2019$  mm  
 $D_{60} = 0.3172$  mm       $D_{15} = 0.1568$  mm  
 $D_{50} = 0.2765$  mm       $D_{10} = 0.1324$  mm  
 $C_u = 2.396$        $C_c = 0.971$

### Classification

**ASTM** Poorly graded SAND (SP)

**AASHTO** Fine Sand (A-3 (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

## APPENDIX D

### Analytical Laboratory Test Results



## HA24-3 and HA24-8 Test Results



## ANALYTICAL REPORT

|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Lab Number:     | L2431573                                                      |
| Client:         | Haley & Aldrich<br>3 Bedford Farms Drive<br>Bedford, NH 03110 |
| ATTN:           | Erin Force                                                    |
| Phone:          | (603) 391-3332                                                |
| Project Name:   | STEEPLEGATE MALL FORCE MAIN                                   |
| Project Number: | 0208898-001                                                   |
| Report Date:    | 06/13/24                                                      |

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| <b>Alpha<br/>Sample ID</b> | <b>Client ID</b> | <b>Matrix</b> | <b>Sample<br/>Location</b> | <b>Collection<br/>Date/Time</b> | <b>Receive Date</b> |
|----------------------------|------------------|---------------|----------------------------|---------------------------------|---------------------|
| L2431573-01                | HA24-3_1-3       | SOIL          | CONCORD, NH                | 06/06/24 08:15                  | 06/06/24            |
| L2431573-02                | HA24-3_5-7       | SOIL          | CONCORD, NH                | 06/06/24 08:30                  | 06/06/24            |
| L2431573-03                | HA24-8_2-5       | SOIL          | CONCORD, NH                | 06/06/24 11:10                  | 06/06/24            |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### Case Narrative (continued)

#### Sample Receipt

The analyses performed were specified by the client.

#### Semivolatile Organics by SIM

L2431573-01D, -02D, and -03D: The sample has elevated detection limits due to the dilution required by the sample matrix.

L2431573-01D and -02D: The surrogate recoveries are below the acceptance criteria for 2-fluorophenol (0%), phenol-d6 (0%), nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%), 2,4,6-tribromophenol (0%), and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

#### Total Metals

L2431573-01 through -03: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

The WG1933066-1 Method Blank, associated with L2431573-01 through -03, has a concentration above the reporting limit for chromium. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Kelly O'Neill

Title: Technical Director/Representative

Date: 06/13/24

# ORGANICS

# **VOLATILES**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/11/24 10:45  
**Analyst:** AJK  
**Percent Solids:** 98%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.6  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.56 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.56 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.5  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.56 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.5  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.5  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |



**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**SAMPLE RESULTS**

Lab ID: L2431573-01  
 Client ID: HA24-3\_1-3  
 Sample Location: CONCORD, NH

Date Collected: 06/06/24 08:15  
 Date Received: 06/06/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 28   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.5  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.4  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.5  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.5  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 90  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 100        |           | 70-130              |
| Toluene-d8            | 98         |           | 70-130              |
| 4-Bromofluorobenzene  | 104        |           | 70-130              |
| Dibromofluoromethane  | 99         |           | 70-130              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/11/24 11:11  
**Analyst:** AJK  
**Percent Solids:** 97%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.5  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.6  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.55 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.55 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.4  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.55 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.55 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.55 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.55 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.55 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.4  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.55 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.55 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.4  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.6  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**SAMPLE RESULTS**

Lab ID: L2431573-02  
 Client ID: HA24-3\_5-7  
 Sample Location: CONCORD, NH

Date Collected: 06/06/24 08:30  
 Date Received: 06/06/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.55 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 27   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.4  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.55 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.3  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.4  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.4  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 88  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 98         |           | 70-130              |
| Toluene-d8            | 99         |           | 70-130              |
| 4-Bromofluorobenzene  | 105        |           | 70-130              |
| Dibromofluoromethane  | 98         |           | 70-130              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/11/24 11:37  
**Analyst:** AJK  
**Percent Solids:** 97%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.3  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.6  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.53 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.53 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.3  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.53 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.53 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.53 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.53 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.53 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.3  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.53 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.53 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.3  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.1  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.6  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**SAMPLE RESULTS**

Lab ID: L2431573-03  
 Client ID: HA24-8\_2-5  
 Sample Location: CONCORD, NH

Date Collected: 06/06/24 11:10  
 Date Received: 06/06/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.53 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.1  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.1  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.1  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 27   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.1  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.3  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.53 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.1  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.1  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.1  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.2  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.3  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.3  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.1 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.1 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 21  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 85  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 99         |           | 70-130              |
| Toluene-d8            | 97         |           | 70-130              |
| 4-Bromofluorobenzene  | 103        |           | 70-130              |
| Dibromofluoromethane  | 99         |           | 70-130              |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260D  
 Analytical Date: 06/11/24 09:00  
 Analyst: AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1933326-5 |        |           |       |      |     |
| Methylene chloride                                                                          | ND     |           | ug/kg | 5.0  | --  |
| 1,1-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| Chloroform                                                                                  | ND     |           | ug/kg | 1.5  | --  |
| Carbon tetrachloride                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloropropane                                                                         | ND     |           | ug/kg | 1.0  | --  |
| Dibromochloromethane                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,1,2-Trichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| Tetrachloroethene                                                                           | ND     |           | ug/kg | 0.50 | --  |
| Chlorobenzene                                                                               | ND     |           | ug/kg | 0.50 | --  |
| Trichlorofluoromethane                                                                      | ND     |           | ug/kg | 4.0  | --  |
| 1,2-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1-Trichloroethane                                                                       | ND     |           | ug/kg | 0.50 | --  |
| Bromodichloromethane                                                                        | ND     |           | ug/kg | 0.50 | --  |
| trans-1,3-Dichloropropene                                                                   | ND     |           | ug/kg | 1.0  | --  |
| cis-1,3-Dichloropropene                                                                     | ND     |           | ug/kg | 0.50 | --  |
| 1,3-Dichloropropene, Total                                                                  | ND     |           | ug/kg | 0.50 | --  |
| 1,1-Dichloropropene                                                                         | ND     |           | ug/kg | 0.50 | --  |
| Bromoform                                                                                   | ND     |           | ug/kg | 4.0  | --  |
| 1,1,2,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Benzene                                                                                     | ND     |           | ug/kg | 0.50 | --  |
| Toluene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Ethylbenzene                                                                                | ND     |           | ug/kg | 1.0  | --  |
| Chloromethane                                                                               | ND     |           | ug/kg | 4.0  | --  |
| Bromomethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| Vinyl chloride                                                                              | ND     |           | ug/kg | 1.0  | --  |
| Chloroethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| 1,1-Dichloroethene                                                                          | ND     |           | ug/kg | 1.0  | --  |
| trans-1,2-Dichloroethene                                                                    | ND     |           | ug/kg | 1.5  | --  |
| Trichloroethene                                                                             | ND     |           | ug/kg | 0.50 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/11/24 09:00  
 Analyst: AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1933326-5 |        |           |       |      |     |
| 1,2-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,3-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,4-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| Methyl tert butyl ether                                                                     | ND     |           | ug/kg | 2.0  | --  |
| p/m-Xylene                                                                                  | ND     |           | ug/kg | 2.0  | --  |
| o-Xylene                                                                                    | ND     |           | ug/kg | 1.0  | --  |
| Xylenes, Total                                                                              | ND     |           | ug/kg | 1.0  | --  |
| cis-1,2-Dichloroethene                                                                      | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloroethene, Total                                                                   | ND     |           | ug/kg | 1.0  | --  |
| Dibromomethane                                                                              | ND     |           | ug/kg | 2.0  | --  |
| 1,2,3-Trichloropropane                                                                      | ND     |           | ug/kg | 2.0  | --  |
| Styrene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Dichlorodifluoromethane                                                                     | ND     |           | ug/kg | 10   | --  |
| Acetone                                                                                     | ND     |           | ug/kg | 25   | --  |
| Carbon disulfide                                                                            | ND     |           | ug/kg | 10   | --  |
| 2-Butanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| 4-Methyl-2-pentanone                                                                        | ND     |           | ug/kg | 10   | --  |
| 2-Hexanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| Bromochloromethane                                                                          | ND     |           | ug/kg | 2.0  | --  |
| Tetrahydrofuran                                                                             | ND     |           | ug/kg | 4.0  | --  |
| 2,2-Dichloropropane                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,2-Dibromoethane                                                                           | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Bromobenzene                                                                                | ND     |           | ug/kg | 2.0  | --  |
| n-Butylbenzene                                                                              | ND     |           | ug/kg | 1.0  | --  |
| sec-Butylbenzene                                                                            | ND     |           | ug/kg | 1.0  | --  |
| tert-Butylbenzene                                                                           | ND     |           | ug/kg | 2.0  | --  |
| 1,3,5-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| o-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0  | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260D  
**Analytical Date:** 06/11/24 09:00  
**Analyst:** AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL  | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1933326-5 |        |           |       |     |     |
| p-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0 | --  |
| 1,2-Dibromo-3-chloropropane                                                                 | ND     |           | ug/kg | 3.0 | --  |
| Hexachlorobutadiene                                                                         | ND     |           | ug/kg | 4.0 | --  |
| Isopropylbenzene                                                                            | ND     |           | ug/kg | 1.0 | --  |
| p-Isopropyltoluene                                                                          | ND     |           | ug/kg | 1.0 | --  |
| Naphthalene                                                                                 | ND     |           | ug/kg | 4.0 | --  |
| n-Propylbenzene                                                                             | ND     |           | ug/kg | 1.0 | --  |
| 1,2,3-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,3,5-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Ethyl ether                                                                                 | ND     |           | ug/kg | 2.0 | --  |
| Isopropyl Ether                                                                             | ND     |           | ug/kg | 2.0 | --  |
| Tert-Butyl Alcohol                                                                          | ND     |           | ug/kg | 20  | --  |
| Ethyl-Tert-Butyl-Ether                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Tertiary-Amyl Methyl Ether                                                                  | ND     |           | ug/kg | 2.0 | --  |
| 1,4-Dioxane                                                                                 | ND     |           | ug/kg | 80  | --  |

| Surrogate             | %Recovery | Qualifier | Acceptance Criteria |
|-----------------------|-----------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 96        |           | 70-130              |
| Toluene-d8            | 98        |           | 70-130              |
| 4-Bromofluorobenzene  | 104       |           | 70-130              |
| Dibromofluoromethane  | 97        |           | 70-130              |



# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1933326-3 WG1933326-4 |                  |      |                   |      |                     |     |      |               |
| Methylene chloride                                                                                             | 89               |      | 91                |      | 70-130              | 2   |      | 30            |
| 1,1-Dichloroethane                                                                                             | 86               |      | 88                |      | 70-130              | 2   |      | 30            |
| Chloroform                                                                                                     | 90               |      | 92                |      | 70-130              | 2   |      | 30            |
| Carbon tetrachloride                                                                                           | 91               |      | 94                |      | 70-130              | 3   |      | 30            |
| 1,2-Dichloropropane                                                                                            | 89               |      | 91                |      | 70-130              | 2   |      | 30            |
| Dibromochloromethane                                                                                           | 103              |      | 103               |      | 70-130              | 0   |      | 30            |
| 1,1,2-Trichloroethane                                                                                          | 95               |      | 95                |      | 70-130              | 0   |      | 30            |
| Tetrachloroethene                                                                                              | 86               |      | 88                |      | 70-130              | 2   |      | 30            |
| Chlorobenzene                                                                                                  | 92               |      | 93                |      | 70-130              | 1   |      | 30            |
| Trichlorofluoromethane                                                                                         | 85               |      | 88                |      | 70-139              | 3   |      | 30            |
| 1,2-Dichloroethane                                                                                             | 88               |      | 89                |      | 70-130              | 1   |      | 30            |
| 1,1,1-Trichloroethane                                                                                          | 91               |      | 94                |      | 70-130              | 3   |      | 30            |
| Bromodichloromethane                                                                                           | 95               |      | 97                |      | 70-130              | 2   |      | 30            |
| trans-1,3-Dichloropropene                                                                                      | 98               |      | 98                |      | 70-130              | 0   |      | 30            |
| cis-1,3-Dichloropropene                                                                                        | 87               |      | 88                |      | 70-130              | 1   |      | 30            |
| 1,1-Dichloropropene                                                                                            | 80               |      | 83                |      | 70-130              | 4   |      | 30            |
| Bromoform                                                                                                      | 100              |      | 100               |      | 70-130              | 0   |      | 30            |
| 1,1,2,2-Tetrachloroethane                                                                                      | 94               |      | 97                |      | 70-130              | 3   |      | 30            |
| Benzene                                                                                                        | 91               |      | 93                |      | 70-130              | 2   |      | 30            |
| Toluene                                                                                                        | 89               |      | 91                |      | 70-130              | 2   |      | 30            |
| Ethylbenzene                                                                                                   | 90               |      | 93                |      | 70-130              | 3   |      | 30            |
| Chloromethane                                                                                                  | 67               |      | 68                |      | 52-130              | 1   |      | 30            |
| Bromomethane                                                                                                   | 59               |      | 59                |      | 57-147              | 0   |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2431573

**Report Date:** 06/13/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1933326-3 WG1933326-4 |                  |      |                   |      |                     |     |      |               |
| Vinyl chloride                                                                                                 | 67               |      | 68                |      | 67-130              | 1   |      | 30            |
| Chloroethane                                                                                                   | 73               |      | 75                |      | 50-151              | 3   |      | 30            |
| 1,1-Dichloroethene                                                                                             | 80               |      | 83                |      | 65-135              | 4   |      | 30            |
| trans-1,2-Dichloroethene                                                                                       | 87               |      | 88                |      | 70-130              | 1   |      | 30            |
| Trichloroethene                                                                                                | 92               |      | 93                |      | 70-130              | 1   |      | 30            |
| 1,2-Dichlorobenzene                                                                                            | 97               |      | 97                |      | 70-130              | 0   |      | 30            |
| 1,3-Dichlorobenzene                                                                                            | 95               |      | 96                |      | 70-130              | 1   |      | 30            |
| 1,4-Dichlorobenzene                                                                                            | 96               |      | 96                |      | 70-130              | 0   |      | 30            |
| Methyl tert butyl ether                                                                                        | 98               |      | 98                |      | 66-130              | 0   |      | 30            |
| p/m-Xylene                                                                                                     | 84               |      | 86                |      | 70-130              | 2   |      | 30            |
| o-Xylene                                                                                                       | 82               |      | 83                |      | 70-130              | 1   |      | 30            |
| cis-1,2-Dichloroethene                                                                                         | 89               |      | 91                |      | 70-130              | 2   |      | 30            |
| Dibromomethane                                                                                                 | 96               |      | 96                |      | 70-130              | 0   |      | 30            |
| 1,2,3-Trichloropropane                                                                                         | 93               |      | 93                |      | 68-130              | 0   |      | 30            |
| Styrene                                                                                                        | 84               |      | 86                |      | 70-130              | 2   |      | 30            |
| Dichlorodifluoromethane                                                                                        | 67               |      | 69                |      | 30-146              | 3   |      | 30            |
| Acetone                                                                                                        | 90               |      | 90                |      | 54-140              | 0   |      | 30            |
| Carbon disulfide                                                                                               | 80               |      | 83                |      | 59-130              | 4   |      | 30            |
| 2-Butanone                                                                                                     | 92               |      | 94                |      | 70-130              | 2   |      | 30            |
| 4-Methyl-2-pentanone                                                                                           | 93               |      | 94                |      | 70-130              | 1   |      | 30            |
| 2-Hexanone                                                                                                     | 97               |      | 98                |      | 70-130              | 1   |      | 30            |
| Bromochloromethane                                                                                             | 96               |      | 98                |      | 70-130              | 2   |      | 30            |
| Tetrahydrofuran                                                                                                | 89               |      | 91                |      | 66-130              | 2   |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2431573

**Report Date:** 06/13/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1933326-3 WG1933326-4 |                  |      |                   |      |                     |     |      |               |
| 2,2-Dichloropropane                                                                                            | 90               |      | 93                |      | 70-130              | 3   |      | 30            |
| 1,2-Dibromoethane                                                                                              | 101              |      | 102               |      | 70-130              | 1   |      | 30            |
| 1,1,1,2-Tetrachloroethane                                                                                      | 93               |      | 95                |      | 70-130              | 2   |      | 30            |
| Bromobenzene                                                                                                   | 95               |      | 96                |      | 70-130              | 1   |      | 30            |
| n-Butylbenzene                                                                                                 | 95               |      | 97                |      | 70-130              | 2   |      | 30            |
| sec-Butylbenzene                                                                                               | 93               |      | 95                |      | 70-130              | 2   |      | 30            |
| tert-Butylbenzene                                                                                              | 93               |      | 95                |      | 70-130              | 2   |      | 30            |
| 1,3,5-Trichlorobenzene                                                                                         | 99               |      | 98                |      | 70-139              | 1   |      | 30            |
| o-Chlorotoluene                                                                                                | 92               |      | 96                |      | 70-130              | 4   |      | 30            |
| p-Chlorotoluene                                                                                                | 94               |      | 94                |      | 70-130              | 0   |      | 30            |
| 1,2-Dibromo-3-chloropropane                                                                                    | 104              |      | 106               |      | 68-130              | 2   |      | 30            |
| Hexachlorobutadiene                                                                                            | 93               |      | 95                |      | 67-130              | 2   |      | 30            |
| Isopropylbenzene                                                                                               | 86               |      | 87                |      | 70-130              | 1   |      | 30            |
| p-Isopropyltoluene                                                                                             | 87               |      | 88                |      | 70-130              | 1   |      | 30            |
| Naphthalene                                                                                                    | 114              |      | 112               |      | 70-130              | 2   |      | 30            |
| n-Propylbenzene                                                                                                | 93               |      | 95                |      | 70-130              | 2   |      | 30            |
| 1,2,3-Trichlorobenzene                                                                                         | 102              |      | 102               |      | 70-130              | 0   |      | 30            |
| 1,2,4-Trichlorobenzene                                                                                         | 106              |      | 103               |      | 70-130              | 3   |      | 30            |
| 1,3,5-Trimethylbenzene                                                                                         | 93               |      | 96                |      | 70-130              | 3   |      | 30            |
| 1,2,4-Trimethylbenzene                                                                                         | 92               |      | 93                |      | 70-130              | 1   |      | 30            |
| Ethyl ether                                                                                                    | 97               |      | 97                |      | 67-130              | 0   |      | 30            |
| Isopropyl Ether                                                                                                | 90               |      | 91                |      | 66-130              | 1   |      | 30            |
| Tert-Butyl Alcohol                                                                                             | 108              |      | 109               |      | 70-130              | 1   |      | 30            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24

| <b>Parameter</b>                                                                                               | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|----------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1933326-3 WG1933326-4 |                          |             |                           |             |                             |            |             |                       |
| Ethyl-Tert-Butyl-Ether                                                                                         | 95                       |             | 96                        |             | 70-130                      | 1          |             | 30                    |
| Tertiary-Amyl Methyl Ether                                                                                     | 98                       |             | 99                        |             | 70-130                      | 1          |             | 30                    |
| 1,4-Dioxane                                                                                                    | 100                      |             | 98                        |             | 65-136                      | 2          |             | 30                    |

| <b>Surrogate</b>      | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|-----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 1,2-Dichloroethane-d4 | 95                       |             | 95                        |             | 70-130                         |
| Toluene-d8            | 99                       |             | 99                        |             | 70-130                         |
| 4-Bromofluorobenzene  | 103                      |             | 103                       |             | 70-130                         |
| Dibromofluoromethane  | 99                       |             | 100                       |             | 70-130                         |

# SEMIVOLATILES



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/13/24 11:58  
**Analyst:** SZ  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/12/24 12:42

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 550 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 130 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 380 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 360 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 230 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 800 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 540 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | 480    |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 60         |           | 25-120              |
| Phenol-d6            | 59         |           | 10-120              |
| Nitrobenzene-d5      | 70         |           | 23-120              |
| 2-Fluorobiphenyl     | 74         |           | 30-120              |
| 2,4,6-Tribromophenol | 65         |           | 10-136              |
| 4-Terphenyl-d14      | 64         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01      D  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/13/24 13:22  
**Analyst:** JJW  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/12/24 12:42

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 170 | --  | 25              |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| Fluoranthene                                         | 11000  |           | ug/kg | 170 | --  | 25              |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| Naphthalene                                          | ND     |           | ug/kg | 170 | --  | 25              |
| Benzo(a)anthracene                                   | 5700   |           | ug/kg | 170 | --  | 25              |
| Benzo(a)pyrene                                       | 6000   |           | ug/kg | 170 | --  | 25              |
| Benzo(b)fluoranthene                                 | 8400   |           | ug/kg | 170 | --  | 25              |
| Benzo(k)fluoranthene                                 | 2500   |           | ug/kg | 170 | --  | 25              |
| Chrysene                                             | 5000   |           | ug/kg | 170 | --  | 25              |
| Acenaphthylene                                       | 2600   |           | ug/kg | 170 | --  | 25              |
| Anthracene                                           | 1600   |           | ug/kg | 170 | --  | 25              |
| Benzo(ghi)perylene                                   | 3400   |           | ug/kg | 170 | --  | 25              |
| Fluorene                                             | 260    |           | ug/kg | 170 | --  | 25              |
| Phenanthrene                                         | 3700   |           | ug/kg | 170 | --  | 25              |
| Dibenzo(a,h)anthracene                               | 760    |           | ug/kg | 170 | --  | 25              |
| Indeno(1,2,3-cd)Pyrene                               | 4400   |           | ug/kg | 170 | --  | 25              |
| Pyrene                                               | 8700   |           | ug/kg | 170 | --  | 25              |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| Pentachlorophenol                                    | ND     |           | ug/kg | 670 | --  | 25              |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 170 | --  | 25              |
| Hexachloroethane                                     | ND     |           | ug/kg | 170 | --  | 25              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01      D  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 0          | Q         | 25-120              |
| Phenol-d6            | 0          | Q         | 10-120              |
| Nitrobenzene-d5      | 0          | Q         | 23-120              |
| 2-Fluorobiphenyl     | 0          | Q         | 30-120              |
| 2,4,6-Tribromophenol | 0          | Q         | 10-136              |
| 4-Terphenyl-d14      | 0          | Q         | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/13/24 12:21  
**Analyst:** SZ  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/12/24 12:42

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 550 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 130 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 380 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 330 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 360 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 230 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 800 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 430 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 540 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | 280    |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 60         |           | 25-120              |
| Phenol-d6            | 51         |           | 10-120              |
| Nitrobenzene-d5      | 78         |           | 23-120              |
| 2-Fluorobiphenyl     | 85         |           | 30-120              |
| 2,4,6-Tribromophenol | 69         |           | 10-136              |
| 4-Terphenyl-d14      | 73         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02      D  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/13/24 13:38  
**Analyst:** JJW  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/12/24 12:42

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 170 | --  | 25              |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| Fluoranthene                                         | 5500   |           | ug/kg | 170 | --  | 25              |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| Naphthalene                                          | ND     |           | ug/kg | 170 | --  | 25              |
| Benzo(a)anthracene                                   | 4000   |           | ug/kg | 170 | --  | 25              |
| Benzo(a)pyrene                                       | 4800   |           | ug/kg | 170 | --  | 25              |
| Benzo(b)fluoranthene                                 | 6900   |           | ug/kg | 170 | --  | 25              |
| Benzo(k)fluoranthene                                 | 1800   |           | ug/kg | 170 | --  | 25              |
| Chrysene                                             | 3600   |           | ug/kg | 170 | --  | 25              |
| Acenaphthylene                                       | 2400   |           | ug/kg | 170 | --  | 25              |
| Anthracene                                           | 1100   |           | ug/kg | 170 | --  | 25              |
| Benzo(ghi)perylene                                   | 2800   |           | ug/kg | 170 | --  | 25              |
| Fluorene                                             | 190    |           | ug/kg | 170 | --  | 25              |
| Phenanthrene                                         | 1800   |           | ug/kg | 170 | --  | 25              |
| Dibenzo(a,h)anthracene                               | 640    |           | ug/kg | 170 | --  | 25              |
| Indeno(1,2,3-cd)Pyrene                               | 3700   |           | ug/kg | 170 | --  | 25              |
| Pyrene                                               | 4800   |           | ug/kg | 170 | --  | 25              |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 170 | --  | 25              |
| Pentachlorophenol                                    | ND     |           | ug/kg | 670 | --  | 25              |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 170 | --  | 25              |
| Hexachloroethane                                     | ND     |           | ug/kg | 170 | --  | 25              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02      D  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 0          | Q         | 25-120              |
| Phenol-d6            | 0          | Q         | 10-120              |
| Nitrobenzene-d5      | 0          | Q         | 23-120              |
| 2-Fluorobiphenyl     | 0          | Q         | 30-120              |
| 2,4,6-Tribromophenol | 0          | Q         | 10-136              |
| 4-Terphenyl-d14      | 0          | Q         | 18-120              |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/13/24 10:48  
**Analyst:** SZ  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/12/24 12:42

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 560 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 390 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 360 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 810 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 550 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 61         |           | 25-120              |
| Phenol-d6            | 62         |           | 10-120              |
| Nitrobenzene-d5      | 68         |           | 23-120              |
| 2-Fluorobiphenyl     | 70         |           | 30-120              |
| 2,4,6-Tribromophenol | 65         |           | 10-136              |
| 4-Terphenyl-d14      | 67         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03      D  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/13/24 10:22  
**Analyst:** JJW  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/12/24 12:42

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 34  | --  | 5               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| Fluoranthene                                         | 540    |           | ug/kg | 34  | --  | 5               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| Naphthalene                                          | ND     |           | ug/kg | 34  | --  | 5               |
| Benzo(a)anthracene                                   | 570    |           | ug/kg | 34  | --  | 5               |
| Benzo(a)pyrene                                       | 900    |           | ug/kg | 34  | --  | 5               |
| Benzo(b)fluoranthene                                 | 1200   |           | ug/kg | 34  | --  | 5               |
| Benzo(k)fluoranthene                                 | 330    |           | ug/kg | 34  | --  | 5               |
| Chrysene                                             | 540    |           | ug/kg | 34  | --  | 5               |
| Acenaphthylene                                       | 470    |           | ug/kg | 34  | --  | 5               |
| Anthracene                                           | 190    |           | ug/kg | 34  | --  | 5               |
| Benzo(ghi)perylene                                   | 560    |           | ug/kg | 34  | --  | 5               |
| Fluorene                                             | ND     |           | ug/kg | 34  | --  | 5               |
| Phenanthrene                                         | 160    |           | ug/kg | 34  | --  | 5               |
| Dibenzo(a,h)anthracene                               | 140    |           | ug/kg | 34  | --  | 5               |
| Indeno(1,2,3-cd)Pyrene                               | 740    |           | ug/kg | 34  | --  | 5               |
| Pyrene                                               | 570    |           | ug/kg | 34  | --  | 5               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 140 | --  | 5               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 34  | --  | 5               |
| Hexachloroethane                                     | ND     |           | ug/kg | 34  | --  | 5               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03      D  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 65         |           | 25-120              |
| Phenol-d6            | 74         |           | 10-120              |
| Nitrobenzene-d5      | 89         |           | 23-120              |
| 2-Fluorobiphenyl     | 68         |           | 30-120              |
| 2,4,6-Tribromophenol | 104        |           | 10-136              |
| 4-Terphenyl-d14      | 53         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/13/24 00:13  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/11/24 16:53

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1932861-1 |        |           |       |     |     |
| Acenaphthene                                                                             | ND     |           | ug/kg | 130 | --  |
| Benzidine                                                                                | ND     |           | ug/kg | 540 | --  |
| 1,2,4-Trichlorobenzene                                                                   | ND     |           | ug/kg | 160 | --  |
| Hexachlorobenzene                                                                        | ND     |           | ug/kg | 98  | --  |
| Bis(2-chloroethyl)ether                                                                  | ND     |           | ug/kg | 150 | --  |
| 2-Chloronaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,2-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,3-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,4-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 3,3'-Dichlorobenzidine                                                                   | ND     |           | ug/kg | 160 | --  |
| 2,4-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| 2,6-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| Azobenzene                                                                               | ND     |           | ug/kg | 160 | --  |
| Fluoranthene                                                                             | ND     |           | ug/kg | 98  | --  |
| 4-Chlorophenyl phenyl ether                                                              | ND     |           | ug/kg | 160 | --  |
| 4-Bromophenyl phenyl ether                                                               | ND     |           | ug/kg | 160 | --  |
| Bis(2-chloroisopropyl)ether                                                              | ND     |           | ug/kg | 200 | --  |
| Bis(2-chloroethoxy)methane                                                               | ND     |           | ug/kg | 180 | --  |
| Hexachlorobutadiene                                                                      | ND     |           | ug/kg | 160 | --  |
| Hexachlorocyclopentadiene                                                                | ND     |           | ug/kg | 470 | --  |
| Hexachloroethane                                                                         | ND     |           | ug/kg | 130 | --  |
| Isophorone                                                                               | ND     |           | ug/kg | 150 | --  |
| Naphthalene                                                                              | ND     |           | ug/kg | 160 | --  |
| Nitrobenzene                                                                             | ND     |           | ug/kg | 150 | --  |
| NDPA/DPA                                                                                 | ND     |           | ug/kg | 130 | --  |
| n-Nitrosodi-n-propylamine                                                                | ND     |           | ug/kg | 160 | --  |
| Bis(2-ethylhexyl)phthalate                                                               | ND     |           | ug/kg | 160 | --  |
| Butyl benzyl phthalate                                                                   | ND     |           | ug/kg | 160 | --  |
| Di-n-butylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/13/24 00:13  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/11/24 16:53

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1932861-1 |        |           |       |     |     |
| Di-n-octylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |
| Diethyl phthalate                                                                        | ND     |           | ug/kg | 160 | --  |
| Dimethyl phthalate                                                                       | ND     |           | ug/kg | 160 | --  |
| Benzo(a)anthracene                                                                       | ND     |           | ug/kg | 98  | --  |
| Benzo(a)pyrene                                                                           | ND     |           | ug/kg | 130 | --  |
| Benzo(b)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Benzo(k)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Chrysene                                                                                 | ND     |           | ug/kg | 98  | --  |
| Acenaphthylene                                                                           | ND     |           | ug/kg | 130 | --  |
| Anthracene                                                                               | ND     |           | ug/kg | 98  | --  |
| Benzo(ghi)perylene                                                                       | ND     |           | ug/kg | 130 | --  |
| Fluorene                                                                                 | ND     |           | ug/kg | 160 | --  |
| Phenanthrene                                                                             | ND     |           | ug/kg | 98  | --  |
| Dibenzo(a,h)anthracene                                                                   | ND     |           | ug/kg | 98  | --  |
| Indeno(1,2,3-cd)pyrene                                                                   | ND     |           | ug/kg | 130 | --  |
| Pyrene                                                                                   | ND     |           | ug/kg | 98  | --  |
| Biphenyl                                                                                 | ND     |           | ug/kg | 370 | --  |
| Aniline                                                                                  | ND     |           | ug/kg | 200 | --  |
| 4-Chloroaniline                                                                          | ND     |           | ug/kg | 160 | --  |
| 1-Methylnaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 2-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 4-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| Dibenzofuran                                                                             | ND     |           | ug/kg | 160 | --  |
| 2-Methylnaphthalene                                                                      | ND     |           | ug/kg | 200 | --  |
| n-Nitrosodimethylamine                                                                   | ND     |           | ug/kg | 330 | --  |
| 2,4,6-Trichlorophenol                                                                    | ND     |           | ug/kg | 98  | --  |
| p-Chloro-m-cresol                                                                        | ND     |           | ug/kg | 160 | --  |
| 2-Chlorophenol                                                                           | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/13/24 00:13  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/11/24 16:53

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1932861-1 |        |           |       |     |     |
| 2,4-Dichlorophenol                                                                       | ND     |           | ug/kg | 150 | --  |
| 2,4-Dimethylphenol                                                                       | ND     |           | ug/kg | 160 | --  |
| 2-Nitrophenol                                                                            | ND     |           | ug/kg | 350 | --  |
| 4-Nitrophenol                                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4-Dinitrophenol                                                                        | ND     |           | ug/kg | 780 | --  |
| 4,6-Dinitro-o-cresol                                                                     | ND     |           | ug/kg | 420 | --  |
| Pentachlorophenol                                                                        | ND     |           | ug/kg | 130 | --  |
| Phenol                                                                                   | ND     |           | ug/kg | 160 | --  |
| 2-Methylphenol                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Methylphenol/4-Methylphenol                                                            | ND     |           | ug/kg | 240 | --  |
| 2,4,5-Trichlorophenol                                                                    | ND     |           | ug/kg | 160 | --  |
| Benzoic Acid                                                                             | ND     |           | ug/kg | 530 | --  |
| Benzyl Alcohol                                                                           | ND     |           | ug/kg | 160 | --  |
| Carbazole                                                                                | ND     |           | ug/kg | 160 | --  |
| Pyridine                                                                                 | ND     |           | ug/kg | 180 | --  |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 74        |           | 25-120              |
| Phenol-d6            | 72        |           | 10-120              |
| Nitrobenzene-d5      | 76        |           | 23-120              |
| 2-Fluorobiphenyl     | 82        |           | 30-120              |
| 2,4,6-Tribromophenol | 108       |           | 10-136              |
| 4-Terphenyl-d14      | 84        |           | 18-120              |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/13/24 11:40  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/11/24 16:53

| Parameter                                                                                    | Result | Qualifier | Units | RL  | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1932862-1 |        |           |       |     |     |
| Acenaphthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| 2-Chloronaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Fluoranthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Hexachlorobutadiene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Naphthalene                                                                                  | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)anthracene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)pyrene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Benzo(b)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Benzo(k)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Chrysene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Acenaphthylene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Anthracene                                                                                   | ND     |           | ug/kg | 6.5 | --  |
| Benzo(ghi)perylene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Fluorene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Phenanthrene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Dibenzo(a,h)anthracene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Indeno(1,2,3-cd)Pyrene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Pyrene                                                                                       | ND     |           | ug/kg | 6.5 | --  |
| 1-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| 2-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Pentachlorophenol                                                                            | ND     |           | ug/kg | 26  | --  |
| Hexachlorobenzene                                                                            | ND     |           | ug/kg | 6.5 | --  |
| Hexachloroethane                                                                             | ND     |           | ug/kg | 6.5 | --  |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/13/24 11:40  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/11/24 16:53

| Parameter                                                                                    | Result | Qualifier | Units | RL | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1932862-1 |        |           |       |    |     |

| Surrogate            | %Recovery | Qualifier | Acceptance<br>Criteria |
|----------------------|-----------|-----------|------------------------|
| 2-Fluorophenol       | 61        |           | 25-120                 |
| Phenol-d6            | 67        |           | 10-120                 |
| Nitrobenzene-d5      | 89        |           | 23-120                 |
| 2-Fluorobiphenyl     | 72        |           | 30-120                 |
| 2,4,6-Tribromophenol | 76        |           | 10-136                 |
| 4-Terphenyl-d14      | 65        |           | 18-120                 |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2431573

**Report Date:** 06/13/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1932861-2 WG1932861-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                | 69               |      | 77                |      | 31-137              | 11  |      | 50            |
| Benzidine                                                                                                   | 35               |      | 39                |      | 10-66               | 11  |      | 50            |
| 1,2,4-Trichlorobenzene                                                                                      | 71               |      | 79                |      | 38-107              | 11  |      | 50            |
| Hexachlorobenzene                                                                                           | 81               |      | 89                |      | 40-140              | 9   |      | 50            |
| Bis(2-chloroethyl)ether                                                                                     | 62               |      | 70                |      | 40-140              | 12  |      | 50            |
| 2-Chloronaphthalene                                                                                         | 73               |      | 82                |      | 40-140              | 12  |      | 50            |
| 1,2-Dichlorobenzene                                                                                         | 69               |      | 74                |      | 40-140              | 7   |      | 50            |
| 1,3-Dichlorobenzene                                                                                         | 67               |      | 73                |      | 40-140              | 9   |      | 50            |
| 1,4-Dichlorobenzene                                                                                         | 66               |      | 72                |      | 28-104              | 9   |      | 50            |
| 3,3'-Dichlorobenzidine                                                                                      | 65               |      | 73                |      | 40-140              | 12  |      | 50            |
| 2,4-Dinitrotoluene                                                                                          | 79               |      | 91                |      | 40-132              | 14  |      | 50            |
| 2,6-Dinitrotoluene                                                                                          | 87               |      | 95                |      | 40-140              | 9   |      | 50            |
| Azobenzene                                                                                                  | 69               |      | 77                |      | 40-140              | 11  |      | 50            |
| Fluoranthene                                                                                                | 70               |      | 82                |      | 40-140              | 16  |      | 50            |
| 4-Chlorophenyl phenyl ether                                                                                 | 68               |      | 78                |      | 40-140              | 14  |      | 50            |
| 4-Bromophenyl phenyl ether                                                                                  | 74               |      | 84                |      | 40-140              | 13  |      | 50            |
| Bis(2-chloroisopropyl)ether                                                                                 | 43               |      | 48                |      | 40-140              | 11  |      | 50            |
| Bis(2-chloroethoxy)methane                                                                                  | 66               |      | 75                |      | 40-117              | 13  |      | 50            |
| Hexachlorobutadiene                                                                                         | 74               |      | 84                |      | 40-140              | 13  |      | 50            |
| Hexachlorocyclopentadiene                                                                                   | 90               |      | 99                |      | 40-140              | 10  |      | 50            |
| Hexachloroethane                                                                                            | 70               |      | 78                |      | 40-140              | 11  |      | 50            |
| Isophorone                                                                                                  | 68               |      | 77                |      | 40-140              | 12  |      | 50            |
| Naphthalene                                                                                                 | 67               |      | 73                |      | 40-140              | 9   |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2431573

**Report Date:** 06/13/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1932861-2 WG1932861-3 |                  |      |                   |      |                     |     |      |               |
| Nitrobenzene                                                                                                | 70               |      | 79                |      | 40-140              | 12  |      | 50            |
| NDPA/DPA                                                                                                    | 70               |      | 79                |      | 36-157              | 12  |      | 50            |
| n-Nitrosodi-n-propylamine                                                                                   | 70               |      | 77                |      | 32-121              | 10  |      | 50            |
| Bis(2-ethylhexyl)phthalate                                                                                  | 82               |      | 93                |      | 40-140              | 13  |      | 50            |
| Butyl benzyl phthalate                                                                                      | 81               |      | 95                |      | 40-140              | 16  |      | 50            |
| Di-n-butylphthalate                                                                                         | 77               |      | 88                |      | 40-140              | 13  |      | 50            |
| Di-n-octylphthalate                                                                                         | 86               |      | 99                |      | 40-140              | 14  |      | 50            |
| Diethyl phthalate                                                                                           | 72               |      | 82                |      | 40-140              | 13  |      | 50            |
| Dimethyl phthalate                                                                                          | 77               |      | 85                |      | 40-140              | 10  |      | 50            |
| Benzo(a)anthracene                                                                                          | 69               |      | 80                |      | 40-140              | 15  |      | 50            |
| Benzo(a)pyrene                                                                                              | 72               |      | 82                |      | 40-140              | 13  |      | 50            |
| Benzo(b)fluoranthene                                                                                        | 71               |      | 80                |      | 40-140              | 12  |      | 50            |
| Benzo(k)fluoranthene                                                                                        | 72               |      | 84                |      | 40-140              | 15  |      | 50            |
| Chrysene                                                                                                    | 67               |      | 75                |      | 40-140              | 11  |      | 50            |
| Acenaphthylene                                                                                              | 74               |      | 80                |      | 40-140              | 8   |      | 50            |
| Anthracene                                                                                                  | 69               |      | 79                |      | 40-140              | 14  |      | 50            |
| Benzo(ghi)perylene                                                                                          | 71               |      | 80                |      | 40-140              | 12  |      | 50            |
| Fluorene                                                                                                    | 69               |      | 77                |      | 40-140              | 11  |      | 50            |
| Phenanthrene                                                                                                | 68               |      | 76                |      | 40-140              | 11  |      | 50            |
| Dibenzo(a,h)anthracene                                                                                      | 74               |      | 82                |      | 40-140              | 10  |      | 50            |
| Indeno(1,2,3-cd)pyrene                                                                                      | 74               |      | 81                |      | 40-140              | 9   |      | 50            |
| Pyrene                                                                                                      | 70               |      | 79                |      | 35-142              | 12  |      | 50            |
| Biphenyl                                                                                                    | 68               |      | 74                |      | 37-127              | 8   |      | 50            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1932861-2 WG1932861-3 |                  |      |                   |      |                     |     |      |               |
| Aniline                                                                                                     | 55               |      | 59                |      | 40-140              | 7   |      | 50            |
| 4-Chloroaniline                                                                                             | 61               |      | 71                |      | 40-140              | 15  |      | 50            |
| 1-Methylnaphthalene                                                                                         | 76               |      | 85                |      | 26-130              | 11  |      | 50            |
| 2-Nitroaniline                                                                                              | 85               |      | 94                |      | 47-134              | 10  |      | 50            |
| 3-Nitroaniline                                                                                              | 61               |      | 67                |      | 26-129              | 9   |      | 50            |
| 4-Nitroaniline                                                                                              | 66               |      | 75                |      | 41-125              | 13  |      | 50            |
| Dibenzofuran                                                                                                | 69               |      | 78                |      | 40-140              | 12  |      | 50            |
| 2-Methylnaphthalene                                                                                         | 76               |      | 82                |      | 40-140              | 8   |      | 50            |
| n-Nitrosodimethylamine                                                                                      | 65               |      | 69                |      | 22-100              | 6   |      | 50            |
| 2,4,6-Trichlorophenol                                                                                       | 79               |      | 90                |      | 30-130              | 13  |      | 50            |
| p-Chloro-m-cresol                                                                                           | 78               |      | 88                |      | 26-103              | 12  |      | 50            |
| 2-Chlorophenol                                                                                              | 71               |      | 78                |      | 25-102              | 9   |      | 50            |
| 2,4-Dichlorophenol                                                                                          | 77               |      | 88                |      | 30-130              | 13  |      | 50            |
| 2,4-Dimethylphenol                                                                                          | 86               |      | 98                |      | 30-130              | 13  |      | 50            |
| 2-Nitrophenol                                                                                               | 87               |      | 98                |      | 30-130              | 12  |      | 50            |
| 4-Nitrophenol                                                                                               | 80               |      | 94                |      | 11-114              | 16  |      | 50            |
| 2,4-Dinitrophenol                                                                                           | 84               |      | 95                |      | 4-130               | 12  |      | 50            |
| 4,6-Dinitro-o-cresol                                                                                        | 85               |      | 97                |      | 10-130              | 13  |      | 50            |
| Pentachlorophenol                                                                                           | 84               |      | 93                |      | 17-109              | 10  |      | 50            |
| Phenol                                                                                                      | 62               |      | 70                |      | 26-90               | 12  |      | 50            |
| 2-Methylphenol                                                                                              | 71               |      | 79                |      | 30-130              | 11  |      | 50            |
| 3-Methylphenol/4-Methylphenol                                                                               | 76               |      | 86                |      | 30-130              | 12  |      | 50            |
| 2,4,5-Trichlorophenol                                                                                       | 82               |      | 93                |      | 30-130              | 13  |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCS<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1932861-2 WG1932861-3 |                  |      |                  |      |                     |     |      |               |
| Benzoic Acid                                                                                                | 66               |      | 70               |      | 10-110              | 6   |      | 50            |
| Benzyl Alcohol                                                                                              | 73               |      | 84               |      | 40-140              | 14  |      | 50            |
| Carbazole                                                                                                   | 68               |      | 77               |      | 54-128              | 12  |      | 50            |
| Pyridine                                                                                                    | 49               |      | 52               |      | 10-93               | 6   |      | 50            |

| Surrogate            | LCS<br>%Recovery | Qual | LCS<br>%Recovery | Qual | Acceptance<br>Criteria |
|----------------------|------------------|------|------------------|------|------------------------|
| 2-Fluorophenol       | 73               |      | 81               |      | 25-120                 |
| Phenol-d6            | 69               |      | 78               |      | 10-120                 |
| Nitrobenzene-d5      | 72               |      | 83               |      | 23-120                 |
| 2-Fluorobiphenyl     | 75               |      | 84               |      | 30-120                 |
| 2,4,6-Tribromophenol | 104              |      | 112              |      | 10-136                 |
| 4-Terphenyl-d14      | 71               |      | 83               |      | 18-120                 |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2431573

**Project Number:** 0208898-001

**Report Date:** 06/13/24

| Parameter                                                                                                       | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1932862-2 WG1932862-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                    | 60               |      | 72                |      | 40-140              | 18  |      | 50            |
| 2-Chloronaphthalene                                                                                             | 66               |      | 79                |      | 40-140              | 18  |      | 50            |
| Fluoranthene                                                                                                    | 69               |      | 82                |      | 40-140              | 17  |      | 50            |
| Hexachlorobutadiene                                                                                             | 79               |      | 93                |      | 34-107              | 16  |      | 50            |
| Naphthalene                                                                                                     | 61               |      | 72                |      | 40-140              | 17  |      | 50            |
| Benzo(a)anthracene                                                                                              | 79               |      | 96                |      | 40-140              | 19  |      | 50            |
| Benzo(a)pyrene                                                                                                  | 81               |      | 97                |      | 40-140              | 18  |      | 50            |
| Benzo(b)fluoranthene                                                                                            | 74               |      | 88                |      | 40-140              | 17  |      | 50            |
| Benzo(k)fluoranthene                                                                                            | 63               |      | 77                |      | 40-140              | 20  |      | 50            |
| Chrysene                                                                                                        | 65               |      | 79                |      | 40-140              | 19  |      | 50            |
| Acenaphthylene                                                                                                  | 70               |      | 84                |      | 40-140              | 18  |      | 50            |
| Anthracene                                                                                                      | 67               |      | 80                |      | 40-140              | 18  |      | 50            |
| Benzo(ghi)perylene                                                                                              | 72               |      | 87                |      | 40-140              | 19  |      | 50            |
| Fluorene                                                                                                        | 68               |      | 82                |      | 40-140              | 19  |      | 50            |
| Phenanthrene                                                                                                    | 61               |      | 73                |      | 40-140              | 18  |      | 50            |
| Dibenzo(a,h)anthracene                                                                                          | 86               |      | 104               |      | 40-140              | 19  |      | 50            |
| Indeno(1,2,3-cd)Pyrene                                                                                          | 109              |      | 131               |      | 40-140              | 18  |      | 50            |
| Pyrene                                                                                                          | 66               |      | 80                |      | 35-142              | 19  |      | 50            |
| 1-Methylnaphthalene                                                                                             | 64               |      | 76                |      | 40-140              | 17  |      | 50            |
| 2-Methylnaphthalene                                                                                             | 68               |      | 80                |      | 40-140              | 16  |      | 50            |
| Pentachlorophenol                                                                                               | 66               |      | 88                |      | 17-109              | 29  |      | 50            |
| Hexachlorobenzene                                                                                               | 62               |      | 74                |      | 40-140              | 18  |      | 50            |
| Hexachloroethane                                                                                                | 75               |      | 87                |      | 29-106              | 15  |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEELEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                       | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1932862-2 WG1932862-3 |                  |      |                   |      |                     |     |      |               |

| Surrogate            | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria |
|----------------------|------------------|------|-------------------|------|------------------------|
| 2-Fluorophenol       | 56               |      | 65                |      | 25-120                 |
| Phenol-d6            | 61               |      | 73                |      | 10-120                 |
| Nitrobenzene-d5      | 76               |      | 89                |      | 23-120                 |
| 2-Fluorobiphenyl     | 61               |      | 72                |      | 30-120                 |
| 2,4,6-Tribromophenol | 71               |      | 85                |      | 10-136                 |
| 4-Terphenyl-d14      | 57               |      | 68                |      | 18-120                 |

# **PETROLEUM HYDROCARBONS**



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/11/24 00:06  
**Analyst:** ALL  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 04:52

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 457000     |           | ug/kg     | 32400               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 74         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02      D  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/11/24 10:11  
**Analyst:** MTC  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 04:52

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 549000     |           | ug/kg     | 65600               | --  | 2               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 80         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/10/24 23:41  
**Analyst:** ALL  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 04:52

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 68100      |           | ug/kg     | 33300               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 75         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/10/24 09:47  
**Analyst:** LMR

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/09/24 12:00

| Parameter                                                                                    | Result | Qualifier | Units | RL    | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-------|-----|
| Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01-03 Batch: WG1931754-1 |        |           |       |       |     |
| TPH (C10-C36)                                                                                | ND     |           | ug/kg | 33100 | --  |

| Surrogate   | %Recovery | Qualifier | Acceptance<br>Criteria |
|-------------|-----------|-----------|------------------------|
| o-Terphenyl | 73        |           | 40-140                 |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                           | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 Batch: WG1931754-2 |                  |      |                   |      |                     |     |      |               |
| TPH (C10-C36)                                                                                       | 53               |      | -                 |      | 40-140              | -   |      | 40            |

| Surrogate   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria |
|-------------|------------------|------|-------------------|------|------------------------|
| o-Terphenyl | 57               |      |                   |      | 40-140                 |

# PCBS

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/11/24 02:23  
**Analyst:** RMP  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 02:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/10/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/10/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 47.1 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 47.1 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 72         |           | 30-150              | A      |
| Decachlorobiphenyl           | 63         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 66         |           | 30-150              | B      |
| Decachlorobiphenyl           | 70         |           | 30-150              | B      |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/11/24 02:30  
**Analyst:** RMP  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 02:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/10/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/10/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 48.9 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 48.9 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 76         |           | 30-150              | A      |
| Decachlorobiphenyl           | 60         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 67         |           | 30-150              | B      |
| Decachlorobiphenyl           | 64         |           | 30-150              | B      |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

**SAMPLE RESULTS**

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/11/24 02:38  
**Analyst:** RMP  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 02:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/10/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/10/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 48.2 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 48.2 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 76         |           | 30-150              | A      |
| Decachlorobiphenyl           | 56         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 74         |           | 30-150              | B      |
| Decachlorobiphenyl           | 59         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8082A  
**Analytical Date:** 06/11/24 02:00  
**Analyst:** RMP

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/10/24 02:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/10/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/10/24

| Parameter                                                                                 | Result | Qualifier | Units | RL   | MDL | Column |
|-------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-03 Batch: WG1931850-1 |        |           |       |      |     |        |
| Aroclor 1016                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1221                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1232                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1242                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1248                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1254                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1260                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1262                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| Aroclor 1268                                                                              | ND     |           | ug/kg | 49.1 | --  | A      |
| PCBs, Total                                                                               | ND     |           | ug/kg | 49.1 | --  | A      |

| Surrogate                    | %Recovery | Qualifier | Acceptance<br>Criteria | Column |
|------------------------------|-----------|-----------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 94        |           | 30-150                 | A      |
| Decachlorobiphenyl           | 84        |           | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 85        |           | 30-150                 | B      |
| Decachlorobiphenyl           | 91        |           | 30-150                 | B      |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24

| <b>Parameter</b>                                                                                             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> | <b>Column</b> |
|--------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|---------------|
| Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-03 Batch: WG1931850-2 WG1931850-3 |                          |             |                           |             |                             |            |             |                       |               |
| Aroclor 1016                                                                                                 | 97                       |             | 108                       |             | 40-140                      | 11         |             | 50                    | A             |
| Aroclor 1260                                                                                                 | 97                       |             | 98                        |             | 40-140                      | 1          |             | 50                    | A             |

| <b>Surrogate</b>             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> | <b>Column</b> |
|------------------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|---------------|
| 2,4,5,6-Tetrachloro-m-xylene | 91                       |             | 99                        |             | 30-150                         | A             |
| Decachlorobiphenyl           | 99                       |             | 98                        |             | 30-150                         | A             |
| 2,4,5,6-Tetrachloro-m-xylene | 89                       |             | 92                        |             | 30-150                         | B             |
| Decachlorobiphenyl           | 93                       |             | 96                        |             | 30-150                         | B             |

## METALS

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**SAMPLE RESULTS**

Lab ID: L2431573-01

Date Collected: 06/06/24 08:15

Client ID: HA24-3\_1-3

Date Received: 06/06/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 98%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.30   |           | mg/kg | 0.767 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |
| Barium, Total                | 18.8   |           | mg/kg | 0.767 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |
| Cadmium, Total               | ND     |           | mg/kg | 0.767 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |
| Chromium, Total              | 10.4   |           | mg/kg | 0.767 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |
| Lead, Total                  | 5.65   |           | mg/kg | 3.84  | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |
| Mercury, Total               | ND     |           | mg/kg | 0.065 | --  | 1                  | 06/12/24 11:10   | 06/13/24 10:44   | EPA 7471B      | 1,7471B              | JWN     |
| Selenium, Total              | ND     |           | mg/kg | 1.53  | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |
| Silver, Total                | ND     |           | mg/kg | 0.384 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:31   | EPA 3050B      | 1,6010D              | HJM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**SAMPLE RESULTS**

Lab ID: L2431573-02

Date Collected: 06/06/24 08:30

Client ID: HA24-3\_5-7

Date Received: 06/06/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 97%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.26   |           | mg/kg | 0.807 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |
| Barium, Total                | 17.1   |           | mg/kg | 0.807 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |
| Cadmium, Total               | ND     |           | mg/kg | 0.807 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |
| Chromium, Total              | 6.59   |           | mg/kg | 0.807 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |
| Lead, Total                  | 5.09   |           | mg/kg | 4.04  | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |
| Mercury, Total               | ND     |           | mg/kg | 0.066 | --  | 1                  | 06/12/24 11:10   | 06/13/24 10:48   | EPA 7471B      | 1,7471B              | JWN     |
| Selenium, Total              | ND     |           | mg/kg | 1.61  | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |
| Silver, Total                | ND     |           | mg/kg | 0.404 | --  | 2                  | 06/12/24 09:15   | 06/12/24 19:37   | EPA 3050B      | 1,6010D              | HJM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**SAMPLE RESULTS**

Lab ID: L2431573-03

Date Collected: 06/06/24 11:10

Client ID: HA24-8\_2-5

Date Received: 06/06/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 97%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.04   |           | mg/kg | 0.772 | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |
| Barium, Total                | 14.5   |           | mg/kg | 0.772 | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |
| Cadmium, Total               | ND     |           | mg/kg | 0.772 | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |
| Chromium, Total              | 5.16   |           | mg/kg | 0.772 | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |
| Lead, Total                  | ND     |           | mg/kg | 3.86  | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |
| Mercury, Total               | ND     |           | mg/kg | 0.066 | --  | 1                  | 06/12/24 11:10   | 06/13/24 10:51   | EPA 7471B      | 1,7471B              | JWN     |
| Selenium, Total              | ND     |           | mg/kg | 1.54  | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |
| Silver, Total                | ND     |           | mg/kg | 0.386 | --  | 2                  | 06/12/24 09:15   | 06/12/24 20:21   | EPA 3050B      | 1,6010D              | HJM     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2431573

Project Number: 0208898-001

Report Date: 06/13/24

## Method Blank Analysis Batch Quality Control

| Parameter                                                            | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|----------------------------------------------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1933066-1 |        |           |       |       |     |                    |                  |                  |                      |         |
| Arsenic, Total                                                       | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |
| Barium, Total                                                        | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |
| Cadmium, Total                                                       | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |
| Chromium, Total                                                      | 0.422  |           | mg/kg | 0.400 | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |
| Lead, Total                                                          | ND     |           | mg/kg | 2.00  | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |
| Selenium, Total                                                      | ND     |           | mg/kg | 0.800 | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |
| Silver, Total                                                        | ND     |           | mg/kg | 0.200 | --  | 1                  | 06/12/24 09:15   | 06/12/24 19:15   | 1,6010D              | HJM     |

### Prep Information

Digestion Method: EPA 3050B

| Parameter                                                            | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|----------------------------------------------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1933070-1 |        |           |       |       |     |                    |                  |                  |                      |         |
| Mercury, Total                                                       | ND     |           | mg/kg | 0.083 | --  | 1                  | 06/12/24 11:10   | 06/13/24 09:49   | 1,7471B              | JWN     |

### Prep Information

Digestion Method: EPA 7471B





## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|-----------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1933066-2 |                  |      |                   |      |                     |     |      |            |
| Arsenic, Total                                                              | 91               |      | -                 |      | 80-120              | -   |      |            |
| Barium, Total                                                               | 96               |      | -                 |      | 80-120              | -   |      |            |
| Cadmium, Total                                                              | 96               |      | -                 |      | 80-120              | -   |      |            |
| Chromium, Total                                                             | 95               |      | -                 |      | 80-120              | -   |      |            |
| Lead, Total                                                                 | 98               |      | -                 |      | 80-120              | -   |      |            |
| Selenium, Total                                                             | 97               |      | -                 |      | 80-120              | -   |      |            |
| Silver, Total                                                               | 98               |      | -                 |      | 80-120              | -   |      |            |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1933070-2 |                  |      |                   |      |                     |     |      |            |
| Mercury, Total                                                              | 101              |      | -                 |      | 80-120              | -   |      |            |

# **Matrix Spike Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                                                 | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1933066-3 WG1933066-4 QC Sample: L2432744-12 Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Arsenic, Total                                                                                                                            | 1.73          | 12       | 13.0     | 94           |      | 12.9      | 90            |      | 75-125          | 1   |      | 20         |
| Barium, Total                                                                                                                             | 178           | 200      | 342      | 82           |      | 344       | 80            |      | 75-125          | 1   |      | 20         |
| Cadmium, Total                                                                                                                            | ND            | 5.29     | 4.85     | 92           |      | 5.02      | 91            |      | 75-125          | 3   |      | 20         |
| Chromium, Total                                                                                                                           | 15.2          | 20       | 34.4     | 96           |      | 35.6      | 98            |      | 75-125          | 3   |      | 20         |
| Lead, Total                                                                                                                               | 12.8          | 52.9     | 63.7     | 96           |      | 65.2      | 95            |      | 75-125          | 2   |      | 20         |
| Selenium, Total                                                                                                                           | ND            | 12       | 11.9     | 99           |      | 12.7      | 102           |      | 75-125          | 7   |      | 20         |
| Silver, Total                                                                                                                             | ND            | 4.99     | 4.74     | 95           |      | 5.02      | 97            |      | 75-125          | 6   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1933066-7 WG1933066-8 QC Sample: L2432744-20 Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Arsenic, Total                                                                                                                            | 2.85          | 12.7     | 16.1     | 104          |      | 15.3      | 99            |      | 75-125          | 5   |      | 20         |
| Barium, Total                                                                                                                             | 37.0          | 211      | 239      | 96           |      | 231       | 93            |      | 75-125          | 3   |      | 20         |
| Cadmium, Total                                                                                                                            | ND            | 5.6      | 5.24     | 94           |      | 5.20      | 94            |      | 75-125          | 1   |      | 20         |
| Chromium, Total                                                                                                                           | 7.69          | 21.1     | 26.0     | 87           |      | 25.8      | 87            |      | 75-125          | 1   |      | 20         |
| Lead, Total                                                                                                                               | 10.5          | 56       | 67.1     | 101          |      | 68.8      | 105           |      | 75-125          | 3   |      | 20         |
| Selenium, Total                                                                                                                           | ND            | 12.7     | 14.9     | 118          |      | 14.4      | 115           |      | 75-125          | 3   |      | 20         |
| Silver, Total                                                                                                                             | ND            | 5.28     | 5.31     | 100          |      | 5.32      | 102           |      | 75-125          | 0   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1933070-3 WG1933070-4 QC Sample: L2432744-12 Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Mercury, Total                                                                                                                            | ND            | 1.66     | 1.73     | 104          |      | 1.78      | 106           |      | 80-120          | 3   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1933070-5 WG1933070-6 QC Sample: L2432744-20 Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Mercury, Total                                                                                                                            | ND            | 1.71     | 1.82     | 106          |      | 1.83      | 106           |      | 80-120          | 1   |      | 20         |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Serial Dilution  
Analysis  
Batch Quality Control**

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                                       | Native Sample | Serial Dilution | Units | % D | Qual | RPD Limits |
|---------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------|-------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1933066-10 QC Sample: L2432744-20 Client ID: DUP Sample |               |                 |       |     |      |            |
| Barium, Total                                                                                                                   | 37.0          | 37.1            | mg/kg | 0   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1933066-6 QC Sample: L2432744-12 Client ID: DUP Sample  |               |                 |       |     |      |            |
| Barium, Total                                                                                                                   | 178           | 176             | mg/kg | 1   |      | 20         |

# **INORGANICS & MISCELLANEOUS**

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### SAMPLE RESULTS

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/12/24 17:35 | 1,1030            | REM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### SAMPLE RESULTS

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/12/24 17:35 | 1,1030            | REM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### SAMPLE RESULTS

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/12/24 17:35 | 1,1030            | REM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### SAMPLE RESULTS

**Lab ID:** L2431573-01  
**Client ID:** HA24-3\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:15  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 97.9   |           | %     | 0.100 | NA  | 1               | -              | 06/07/24 01:55 | 121,2540G         | WJM     |
| pH (H)                              | 6.81   |           | SU    | -     | NA  | 1               | -              | 06/11/24 04:46 | 1,9045D           | CAR     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/11/24 16:56 | 06/11/24 18:23 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/11/24 16:56 | 06/11/24 18:42 | 125,7.3           | JLB     |





**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### SAMPLE RESULTS

**Lab ID:** L2431573-02  
**Client ID:** HA24-3\_5-7  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 08:30  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 97.0   |           | %     | 0.100 | NA  | 1               | -              | 06/07/24 01:55 | 121,2540G         | WJM     |
| pH (H)                              | 6.77   |           | SU    | -     | NA  | 1               | -              | 06/11/24 04:46 | 1,9045D           | CAR     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/11/24 16:56 | 06/11/24 18:25 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/11/24 16:56 | 06/11/24 18:42 | 125,7.3           | JLB     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

### SAMPLE RESULTS

**Lab ID:** L2431573-03  
**Client ID:** HA24-8\_2-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/06/24 11:10  
**Date Received:** 06/06/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 97.3   |           | %     | 0.100 | NA  | 1               | -              | 06/07/24 01:55 | 121,2540G         | WJM     |
| pH (H)                              | 6.33   |           | SU    | -     | NA  | 1               | -              | 06/11/24 04:46 | 1,9045D           | CAR     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/11/24 16:56 | 06/11/24 18:25 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/11/24 16:56 | 06/11/24 18:42 | 125,7.3           | JLB     |



**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2431573**Project Number:** 0208898-001**Report Date:** 06/13/24**Method Blank Analysis**  
**Batch Quality Control**

| Parameter                                                                   | Result | Qualifier | Units | RL | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|-----------------------------------------------------------------------------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------------|---------|
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1932816-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Cyanide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/11/24 16:56   | 06/11/24 18:15   | 125,7.3              | JLB     |
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1932818-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Sulfide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/11/24 16:56   | 06/11/24 18:35   | 125,7.3              | JLB     |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                          | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1932375-1 |                  |      |                   |      |                     |     |      |            |
| pH                                                                                 | 100              |      | -                 |      | 99-101              | -   |      |            |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1932816-2 |                  |      |                   |      |                     |     |      |            |
| Cyanide, Reactive                                                                  | 120              |      | -                 |      | 30-125              | -   |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1932818-2 |                  |      |                   |      |                     |     |      |            |
| Sulfide, Reactive                                                                  | 122              |      | -                 |      | 60-125              | -   |      | 40         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2431573  
**Report Date:** 06/13/24

| Parameter                                                                                                                             | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1930897-1 QC Sample: L2431154-03 Client ID: DUP Sample |               |                  |       |     |      |            |
| Solids, Total                                                                                                                         | 83.2          | 82.1             | %     | 1   |      | 20         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1932375-2 QC Sample: L2430031-05 Client ID: DUP Sample |               |                  |       |     |      |            |
| pH                                                                                                                                    | 7.78          | 7.85             | SU    | 1   |      | 5          |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1932816-3 QC Sample: L2431573-03 Client ID: HA24-8_2-5 |               |                  |       |     |      |            |
| Cyanide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1932818-3 QC Sample: L2431573-03 Client ID: HA24-8_2-5 |               |                  |       |     |      |            |
| Sulfide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

Serial\_No:06132416:27  
**Lab Number:** L2431573  
**Report Date:** 06/13/24

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

#### Cooler Information

**Cooler**                      **Custody Seal**  
A                                  Absent

#### Container Information

| Container ID | Container Type                         | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal   | Frozen Date/Time | Analysis(*)                                                                                                                           |
|--------------|----------------------------------------|--------|------------|----------|------------|------|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| L2431573-01A | Vial MeOH preserved                    | A      | NA         |          | 5.0        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-01B | Vial water preserved                   | A      | NA         |          | 5.0        | Y    | Absent | 06-JUN-24 20:38  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-01C | Vial water preserved                   | A      | NA         |          | 5.0        | Y    | Absent | 06-JUN-24 20:38  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-01D | Plastic 2oz unpreserved for TS         | A      | NA         |          | 5.0        | Y    | Absent |                  | TS(7)                                                                                                                                 |
| L2431573-01E | Metals Only-Glass 60mL/2oz unpreserved | A      | NA         |          | 5.0        | Y    | Absent |                  | AS-Ti(180),BA-Ti(180),AG-Ti(180),CR-Ti(180),SE-Ti(180),PB-Ti(180),HG-T(28),CD-Ti(180)                                                 |
| L2431573-01F | Glass 500ml/16oz unpreserved           | A      | NA         |          | 5.0        | Y    | Absent |                  | HEXCR-RELOG(),IGNIT-1030(14),REACTS(14),8270TCL(14),HOLD-WETCHEM(),PH-9045(1),8270TCL-SIM(14),REACTCN(14),PCB-8082(365),TPH-DRO-D(14) |
| L2431573-02A | Vial MeOH preserved                    | A      | NA         |          | 5.0        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-02B | Vial water preserved                   | A      | NA         |          | 5.0        | Y    | Absent | 06-JUN-24 20:38  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-02C | Vial water preserved                   | A      | NA         |          | 5.0        | Y    | Absent | 06-JUN-24 20:38  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-02D | Plastic 2oz unpreserved for TS         | A      | NA         |          | 5.0        | Y    | Absent |                  | TS(7)                                                                                                                                 |
| L2431573-02E | Metals Only-Glass 60mL/2oz unpreserved | A      | NA         |          | 5.0        | Y    | Absent |                  | BA-Ti(180),AS-Ti(180),AG-Ti(180),CR-Ti(180),SE-Ti(180),PB-Ti(180),HG-T(28),CD-Ti(180)                                                 |
| L2431573-02F | Glass 500ml/16oz unpreserved           | A      | NA         |          | 5.0        | Y    | Absent |                  | IGNIT-1030(14),8270TCL(14),REACTS(14),HEXCR-RELOG(),HOLD-WETCHEM(),PH-9045(1),8270TCL-SIM(14),PCB-8082(365),TPH-DRO-D(14),REACTCN(14) |
| L2431573-03A | Vial MeOH preserved                    | A      | NA         |          | 5.0        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-03B | Vial water preserved                   | A      | NA         |          | 5.0        | Y    | Absent | 06-JUN-24 20:38  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-03C | Vial water preserved                   | A      | NA         |          | 5.0        | Y    | Absent | 06-JUN-24 20:38  | 8260HLW-NH(14)                                                                                                                        |
| L2431573-03D | Plastic 2oz unpreserved for TS         | A      | NA         |          | 5.0        | Y    | Absent |                  | TS(7)                                                                                                                                 |
| L2431573-03E | Metals Only-Glass 60mL/2oz unpreserved | A      | NA         |          | 5.0        | Y    | Absent |                  | BA-Ti(180),AS-Ti(180),AG-Ti(180),CR-Ti(180),SE-Ti(180),PB-Ti(180),HG-T(28),CD-Ti(180)                                                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

Serial\_No:06132416:27  
**Lab Number:** L2431573  
**Report Date:** 06/13/24

**Container Information**

| <b>Container ID</b> | <b>Container Type</b>        | <b>Cooler</b> | <b>Initial<br/>pH</b> | <b>Final<br/>pH</b> | <b>Temp<br/>deg C</b> | <b>Pres</b> | <b>Seal</b> | <b>Frozen<br/>Date/Time</b> | <b>Analysis(*)</b>                                                                                                                                    |
|---------------------|------------------------------|---------------|-----------------------|---------------------|-----------------------|-------------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| L2431573-03F        | Glass 500ml/16oz unpreserved | A             | NA                    |                     | 5.0                   | Y           | Absent      |                             | HEXCR-<br>RELOG(),8270TCL(14),REACTS(14),IGNIT-<br>1030(14),HOLD-WETCHEM(),PH-<br>9045(1),8270TCL-SIM(14),REACTCN(14),PCB-<br>8082(365),TPH-DRO-D(14) |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

## GLOSSARY

### Acronyms

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DL       | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                |
| EDL      | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).                                                                                         |
| EMPC     | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.                                                                                                                                                                                                                               |
| EPA      | - Environmental Protection Agency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LCS      | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                          |
| LCSD     | - Laboratory Control Sample Duplicate: Refer to LCS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LFB      | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                         |
| LOD      | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                                                               |
| LOQ      | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)<br><br>Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL      | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                          |
| MS       | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.                                                                                                                                                                                                    |
| MSD      | - Matrix Spike Sample Duplicate: Refer to MS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NA       | - Not Applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NC       | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.                                                                                                                                                                                                                                                                                                                                                                           |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NI       | - Not Ignitable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NP       | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NR       | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.                                                                                                                                                                                                                                                                                                                                                                    |
| RL       | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                                                                                                                                   |
| RPD      | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.                                                                  |
| SRM      | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.                                                                                                                                                                                                                                                                                                                                                                     |
| STLP     | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TEF      | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.                                                                                                                                                                                                                                                                                                                                                                                             |
| TEQ      | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.                                                                                                                                                                                                                                                                                                                                                        |
| TIC      | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.                                                                                                                                                                                                                                                                      |

Report Format: Data Usability Report





**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

## Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

## Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Chlordane:** The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Gasoline Range Organics (GRO):** Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

## Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**Report Format:** Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

#### **Data Qualifiers**

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2431573  
**Report Date:** 06/13/24

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 125 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates IIIA, April 1998.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**Alpha Analytical, Inc.**

ID No.:17873

Facility: **Company-wide**

Revision 21

Department: **Quality Assurance**

Published Date: 04/17/2024

Title: **Certificate/Approval Program Summary**

Page 1 of 1

**Certification Information**

The following analytes are not included in our Primary NELAP Scope of Accreditation:

**Westborough Facility****EPA 624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625.1:** alpha-Terpineol**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.**Mansfield Facility****SM 2540D:** TSS.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Nonpotable Water:** **EPA RSK-175 Dissolved Gases****Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

**Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables).**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.**EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1** Hg.**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

[illegible]

## HA24-13 and HA24-18 Test Results



## ANALYTICAL REPORT

|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Lab Number:     | L2432275                                                      |
| Client:         | Haley & Aldrich<br>3 Bedford Farms Drive<br>Bedford, NH 03110 |
| ATTN:           | Erin Force                                                    |
| Phone:          | (603) 391-3332                                                |
| Project Name:   | STEEPLEGATE MALL FORCE MAIN                                   |
| Project Number: | 0208898-001                                                   |
| Report Date:    | 06/17/24                                                      |

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| <b>Alpha<br/>Sample ID</b> | <b>Client ID</b> | <b>Matrix</b> | <b>Sample<br/>Location</b> | <b>Collection<br/>Date/Time</b> | <b>Receive Date</b> |
|----------------------------|------------------|---------------|----------------------------|---------------------------------|---------------------|
| L2432275-01                | HA24-13_0.5-2.5  | SOIL          | CONCORD, NH                | 06/10/24 08:45                  | 06/10/24            |
| L2432275-02                | HA24-13_2.5-4.5  | SOIL          | CONCORD, NH                | 06/10/24 09:00                  | 06/10/24            |
| L2432275-03                | HA24-18_0.5-2.5  | SOIL          | CONCORD, NH                | 06/10/24 12:00                  | 06/10/24            |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

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**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Case Narrative (continued)

#### Volatile Organics

The WG1935174-5 Method Blank, associated with L2432275-01 through -03, has a concentration above the reporting limit for bromomethane. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

#### Semivolatile Organics

L2432275-01D and -03D: The sample has elevated detection limits due to the dilution required by the sample matrix.

#### Semivolatile Organics by SIM

L2432275-01D and -03D: The sample has elevated detection limits due to the dilution required by the sample matrix.

L2432275-01D: The surrogate recoveries are below the acceptance criteria for 2-fluorophenol (0%), phenol-d6 (0%), nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%), 2,4,6-tribromophenol (0%) and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

#### Total Metals

L2432275-01 through -03: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Caitlin Walukevich

Title: Technical Director/Representative

Date: 06/17/24

# ORGANICS

# VOLATILES

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/14/24 15:53  
**Analyst:** RAW  
**Percent Solids:** 94%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.6  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.56 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.56 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.4  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.56 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.4  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.4  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-01  
 Client ID: HA24-13\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/10/24 08:45  
 Date Received: 06/10/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 28   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.4  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.3  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.4  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.4  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 89  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 111        |           | 70-130              |
| Toluene-d8            | 102        |           | 70-130              |
| 4-Bromofluorobenzene  | 112        |           | 70-130              |
| Dibromofluoromethane  | 96         |           | 70-130              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/14/24 16:21  
**Analyst:** RAW  
**Percent Solids:** 96%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.2  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.0  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.6  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.0  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.0  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.0  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.0  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.52 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.52 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.2  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.0  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.52 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.52 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.0  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.52 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.52 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.52 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.2  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.52 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.52 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.0  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.0  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.2  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.1  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.0  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.0  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.6  | --  | 1               |



**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-02  
 Client ID: HA24-13\_2.5-4.5  
 Sample Location: CONCORD, NH

Date Collected: 06/10/24 09:00  
 Date Received: 06/10/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.52 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.1  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.1  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.0  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.0  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.0  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.0  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.1  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.0  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 10   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 26   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 10   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 10   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 10   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 10   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.1  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.2  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.0  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.52 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.1  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.0  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.0  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.1  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.1  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.1  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.1  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.2  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.0  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.0  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.2  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.0  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.1 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.1 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 21  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.1 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.1 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 83  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 110        |           | 70-130              |
| Toluene-d8            | 100        |           | 70-130              |
| 4-Bromofluorobenzene  | 116        |           | 70-130              |
| Dibromofluoromethane  | 96         |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-03  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/14/24 16:49  
**Analyst:** RAW  
**Percent Solids:** 93%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.6  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.56 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.56 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.5  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.56 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.5  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.5  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-03  
 Client ID: HA24-18\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/10/24 12:00  
 Date Received: 06/10/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 28   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.5  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.4  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.5  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.5  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-03  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 90  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 110        |           | 70-130              |
| Toluene-d8            | 105        |           | 70-130              |
| 4-Bromofluorobenzene  | 116        |           | 70-130              |
| Dibromofluoromethane  | 94         |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/14/24 11:15  
 Analyst: AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1935174-5 |        |           |       |      |     |
| Methylene chloride                                                                          | ND     |           | ug/kg | 5.0  | --  |
| 1,1-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| Chloroform                                                                                  | ND     |           | ug/kg | 1.5  | --  |
| Carbon tetrachloride                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloropropane                                                                         | ND     |           | ug/kg | 1.0  | --  |
| Dibromochloromethane                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,1,2-Trichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| Tetrachloroethene                                                                           | ND     |           | ug/kg | 0.50 | --  |
| Chlorobenzene                                                                               | ND     |           | ug/kg | 0.50 | --  |
| Trichlorofluoromethane                                                                      | ND     |           | ug/kg | 4.0  | --  |
| 1,2-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1-Trichloroethane                                                                       | ND     |           | ug/kg | 0.50 | --  |
| Bromodichloromethane                                                                        | ND     |           | ug/kg | 0.50 | --  |
| trans-1,3-Dichloropropene                                                                   | ND     |           | ug/kg | 1.0  | --  |
| cis-1,3-Dichloropropene                                                                     | ND     |           | ug/kg | 0.50 | --  |
| 1,3-Dichloropropene, Total                                                                  | ND     |           | ug/kg | 0.50 | --  |
| 1,1-Dichloropropene                                                                         | ND     |           | ug/kg | 0.50 | --  |
| Bromoform                                                                                   | ND     |           | ug/kg | 4.0  | --  |
| 1,1,2,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Benzene                                                                                     | ND     |           | ug/kg | 0.50 | --  |
| Toluene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Ethylbenzene                                                                                | ND     |           | ug/kg | 1.0  | --  |
| Chloromethane                                                                               | ND     |           | ug/kg | 4.0  | --  |
| Bromomethane                                                                                | 3.1    |           | ug/kg | 2.0  | --  |
| Vinyl chloride                                                                              | ND     |           | ug/kg | 1.0  | --  |
| Chloroethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| 1,1-Dichloroethene                                                                          | ND     |           | ug/kg | 1.0  | --  |
| trans-1,2-Dichloroethene                                                                    | ND     |           | ug/kg | 1.5  | --  |
| Trichloroethene                                                                             | ND     |           | ug/kg | 0.50 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/14/24 11:15  
 Analyst: AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1935174-5 |        |           |       |      |     |
| 1,2-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,3-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,4-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| Methyl tert butyl ether                                                                     | ND     |           | ug/kg | 2.0  | --  |
| p/m-Xylene                                                                                  | ND     |           | ug/kg | 2.0  | --  |
| o-Xylene                                                                                    | ND     |           | ug/kg | 1.0  | --  |
| Xylenes, Total                                                                              | ND     |           | ug/kg | 1.0  | --  |
| cis-1,2-Dichloroethene                                                                      | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloroethene, Total                                                                   | ND     |           | ug/kg | 1.0  | --  |
| Dibromomethane                                                                              | ND     |           | ug/kg | 2.0  | --  |
| 1,2,3-Trichloropropane                                                                      | ND     |           | ug/kg | 2.0  | --  |
| Styrene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Dichlorodifluoromethane                                                                     | ND     |           | ug/kg | 10   | --  |
| Acetone                                                                                     | ND     |           | ug/kg | 25   | --  |
| Carbon disulfide                                                                            | ND     |           | ug/kg | 10   | --  |
| 2-Butanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| 4-Methyl-2-pentanone                                                                        | ND     |           | ug/kg | 10   | --  |
| 2-Hexanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| Bromochloromethane                                                                          | ND     |           | ug/kg | 2.0  | --  |
| Tetrahydrofuran                                                                             | ND     |           | ug/kg | 4.0  | --  |
| 2,2-Dichloropropane                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,2-Dibromoethane                                                                           | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Bromobenzene                                                                                | ND     |           | ug/kg | 2.0  | --  |
| n-Butylbenzene                                                                              | ND     |           | ug/kg | 1.0  | --  |
| sec-Butylbenzene                                                                            | ND     |           | ug/kg | 1.0  | --  |
| tert-Butylbenzene                                                                           | ND     |           | ug/kg | 2.0  | --  |
| 1,3,5-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| o-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0  | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8260D  
**Analytical Date:** 06/14/24 11:15  
**Analyst:** AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL  | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1935174-5 |        |           |       |     |     |
| p-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0 | --  |
| 1,2-Dibromo-3-chloropropane                                                                 | ND     |           | ug/kg | 3.0 | --  |
| Hexachlorobutadiene                                                                         | ND     |           | ug/kg | 4.0 | --  |
| Isopropylbenzene                                                                            | ND     |           | ug/kg | 1.0 | --  |
| p-Isopropyltoluene                                                                          | ND     |           | ug/kg | 1.0 | --  |
| Naphthalene                                                                                 | ND     |           | ug/kg | 4.0 | --  |
| n-Propylbenzene                                                                             | ND     |           | ug/kg | 1.0 | --  |
| 1,2,3-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,3,5-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Ethyl ether                                                                                 | ND     |           | ug/kg | 2.0 | --  |
| Isopropyl Ether                                                                             | ND     |           | ug/kg | 2.0 | --  |
| Tert-Butyl Alcohol                                                                          | ND     |           | ug/kg | 20  | --  |
| Ethyl-Tert-Butyl-Ether                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Tertiary-Amyl Methyl Ether                                                                  | ND     |           | ug/kg | 2.0 | --  |
| 1,4-Dioxane                                                                                 | ND     |           | ug/kg | 80  | --  |

| Surrogate             | %Recovery | Qualifier | Acceptance Criteria |
|-----------------------|-----------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 105       |           | 70-130              |
| Toluene-d8            | 101       |           | 70-130              |
| 4-Bromofluorobenzene  | 115       |           | 70-130              |
| Dibromofluoromethane  | 92        |           | 70-130              |



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432275

**Report Date:** 06/17/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935174-3 WG1935174-4 |                  |      |                   |      |                     |     |      |               |
| Methylene chloride                                                                                             | 95               |      | 92                |      | 70-130              | 3   |      | 30            |
| 1,1-Dichloroethane                                                                                             | 91               |      | 138               | Q    | 70-130              | 41  | Q    | 30            |
| Chloroform                                                                                                     | 92               |      | 91                |      | 70-130              | 1   |      | 30            |
| Carbon tetrachloride                                                                                           | 84               |      | 83                |      | 70-130              | 1   |      | 30            |
| 1,2-Dichloropropane                                                                                            | 96               |      | 96                |      | 70-130              | 0   |      | 30            |
| Dibromochloromethane                                                                                           | 89               |      | 86                |      | 70-130              | 3   |      | 30            |
| 1,1,2-Trichloroethane                                                                                          | 99               |      | 96                |      | 70-130              | 3   |      | 30            |
| Tetrachloroethene                                                                                              | 85               |      | 84                |      | 70-130              | 1   |      | 30            |
| Chlorobenzene                                                                                                  | 94               |      | 90                |      | 70-130              | 4   |      | 30            |
| Trichlorofluoromethane                                                                                         | 97               |      | 92                |      | 70-139              | 5   |      | 30            |
| 1,2-Dichloroethane                                                                                             | 92               |      | 94                |      | 70-130              | 2   |      | 30            |
| 1,1,1-Trichloroethane                                                                                          | 91               |      | 92                |      | 70-130              | 1   |      | 30            |
| Bromodichloromethane                                                                                           | 90               |      | 92                |      | 70-130              | 2   |      | 30            |
| trans-1,3-Dichloropropene                                                                                      | 104              |      | 101               |      | 70-130              | 3   |      | 30            |
| cis-1,3-Dichloropropene                                                                                        | 98               |      | 96                |      | 70-130              | 2   |      | 30            |
| 1,1-Dichloropropene                                                                                            | 90               |      | 91                |      | 70-130              | 1   |      | 30            |
| Bromoform                                                                                                      | 83               |      | 82                |      | 70-130              | 1   |      | 30            |
| 1,1,2,2-Tetrachloroethane                                                                                      | 95               |      | 98                |      | 70-130              | 3   |      | 30            |
| Benzene                                                                                                        | 94               |      | 95                |      | 70-130              | 1   |      | 30            |
| Toluene                                                                                                        | 92               |      | 91                |      | 70-130              | 1   |      | 30            |
| Ethylbenzene                                                                                                   | 97               |      | 96                |      | 70-130              | 1   |      | 30            |
| Chloromethane                                                                                                  | 82               |      | 79                |      | 52-130              | 4   |      | 30            |
| Bromomethane                                                                                                   | 92               |      | 88                |      | 57-147              | 4   |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432275

**Report Date:** 06/17/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935174-3 WG1935174-4 |                  |      |                   |      |                     |     |      |               |
| Vinyl chloride                                                                                                 | 90               |      | 87                |      | 67-130              | 3   |      | 30            |
| Chloroethane                                                                                                   | 111              |      | 105               |      | 50-151              | 6   |      | 30            |
| 1,1-Dichloroethene                                                                                             | 93               |      | 90                |      | 65-135              | 3   |      | 30            |
| trans-1,2-Dichloroethene                                                                                       | 112              |      | 106               |      | 70-130              | 6   |      | 30            |
| Trichloroethene                                                                                                | 98               |      | 98                |      | 70-130              | 0   |      | 30            |
| 1,2-Dichlorobenzene                                                                                            | 92               |      | 93                |      | 70-130              | 1   |      | 30            |
| 1,3-Dichlorobenzene                                                                                            | 94               |      | 95                |      | 70-130              | 1   |      | 30            |
| 1,4-Dichlorobenzene                                                                                            | 94               |      | 93                |      | 70-130              | 1   |      | 30            |
| Methyl tert butyl ether                                                                                        | 137              | Q    | 131               | Q    | 66-130              | 4   |      | 30            |
| p/m-Xylene                                                                                                     | 94               |      | 93                |      | 70-130              | 1   |      | 30            |
| o-Xylene                                                                                                       | 92               |      | 90                |      | 70-130              | 2   |      | 30            |
| cis-1,2-Dichloroethene                                                                                         | 89               |      | 88                |      | 70-130              | 1   |      | 30            |
| Dibromomethane                                                                                                 | 93               |      | 93                |      | 70-130              | 0   |      | 30            |
| 1,2,3-Trichloropropane                                                                                         | 102              |      | 103               |      | 68-130              | 1   |      | 30            |
| Styrene                                                                                                        | 96               |      | 95                |      | 70-130              | 1   |      | 30            |
| Dichlorodifluoromethane                                                                                        | 62               |      | 60                |      | 30-146              | 3   |      | 30            |
| Acetone                                                                                                        | 110              |      | 108               |      | 54-140              | 2   |      | 30            |
| Carbon disulfide                                                                                               | 92               |      | 87                |      | 59-130              | 6   |      | 30            |
| 2-Butanone                                                                                                     | 94               |      | 94                |      | 70-130              | 0   |      | 30            |
| 4-Methyl-2-pentanone                                                                                           | 103              |      | 104               |      | 70-130              | 1   |      | 30            |
| 2-Hexanone                                                                                                     | 109              |      | 106               |      | 70-130              | 3   |      | 30            |
| Bromochloromethane                                                                                             | 85               |      | 81                |      | 70-130              | 5   |      | 30            |
| Tetrahydrofuran                                                                                                | 91               |      | 91                |      | 66-130              | 0   |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432275

**Report Date:** 06/17/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935174-3 WG1935174-4 |                  |      |                   |      |                     |     |      |               |
| 2,2-Dichloropropane                                                                                            | 93               |      | 94                |      | 70-130              | 1   |      | 30            |
| 1,2-Dibromoethane                                                                                              | 96               |      | 93                |      | 70-130              | 3   |      | 30            |
| 1,1,1,2-Tetrachloroethane                                                                                      | 90               |      | 90                |      | 70-130              | 0   |      | 30            |
| Bromobenzene                                                                                                   | 92               |      | 91                |      | 70-130              | 1   |      | 30            |
| n-Butylbenzene                                                                                                 | 104              |      | 104               |      | 70-130              | 0   |      | 30            |
| sec-Butylbenzene                                                                                               | 96               |      | 98                |      | 70-130              | 2   |      | 30            |
| tert-Butylbenzene                                                                                              | 93               |      | 95                |      | 70-130              | 2   |      | 30            |
| 1,3,5-Trichlorobenzene                                                                                         | 90               |      | 88                |      | 70-139              | 2   |      | 30            |
| o-Chlorotoluene                                                                                                | 102              |      | 104               |      | 70-130              | 2   |      | 30            |
| p-Chlorotoluene                                                                                                | 100              |      | 104               |      | 70-130              | 4   |      | 30            |
| 1,2-Dibromo-3-chloropropane                                                                                    | 86               |      | 90                |      | 68-130              | 5   |      | 30            |
| Hexachlorobutadiene                                                                                            | 74               |      | 76                |      | 67-130              | 3   |      | 30            |
| Isopropylbenzene                                                                                               | 98               |      | 100               |      | 70-130              | 2   |      | 30            |
| p-Isopropyltoluene                                                                                             | 95               |      | 97                |      | 70-130              | 2   |      | 30            |
| Naphthalene                                                                                                    | 96               |      | 96                |      | 70-130              | 0   |      | 30            |
| n-Propylbenzene                                                                                                | 103              |      | 104               |      | 70-130              | 1   |      | 30            |
| 1,2,3-Trichlorobenzene                                                                                         | 87               |      | 86                |      | 70-130              | 1   |      | 30            |
| 1,2,4-Trichlorobenzene                                                                                         | 90               |      | 88                |      | 70-130              | 2   |      | 30            |
| 1,3,5-Trimethylbenzene                                                                                         | 98               |      | 98                |      | 70-130              | 0   |      | 30            |
| 1,2,4-Trimethylbenzene                                                                                         | 99               |      | 100               |      | 70-130              | 1   |      | 30            |
| Ethyl ether                                                                                                    | 103              |      | 96                |      | 67-130              | 7   |      | 30            |
| Isopropyl Ether                                                                                                | 98               |      | 167               | Q    | 66-130              | 52  | Q    | 30            |
| Tert-Butyl Alcohol                                                                                             | 159              | Q    | 167               | Q    | 70-130              | 5   |      | 30            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24

| <b>Parameter</b>                                                                                               | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|----------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935174-3 WG1935174-4 |                          |             |                           |             |                             |            |             |                       |
| Ethyl-Tert-Butyl-Ether                                                                                         | 96                       |             | 94                        |             | 70-130                      | 2          |             | 30                    |
| Tertiary-Amyl Methyl Ether                                                                                     | 96                       |             | 96                        |             | 70-130                      | 0          |             | 30                    |
| 1,4-Dioxane                                                                                                    | 96                       |             | 98                        |             | 65-136                      | 2          |             | 30                    |

| <b>Surrogate</b>      | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|-----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 1,2-Dichloroethane-d4 | 100                      |             | 103                       |             | 70-130                         |
| Toluene-d8            | 103                      |             | 100                       |             | 70-130                         |
| 4-Bromofluorobenzene  | 108                      |             | 107                       |             | 70-130                         |
| Dibromofluoromethane  | 90                       |             | 93                        |             | 70-130                         |

# SEMIVOLATILES

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-01 D

Date Collected: 06/10/24 08:45

Client ID: HA24-13\_0.5-2.5

Date Received: 06/10/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Extraction Method: EPA 3546

Analytical Method: 1,8270E

Extraction Date: 06/15/24 10:51

Analytical Date: 06/17/24 00:25

Analyst: ALS

Percent Solids: 94%

| Parameter                                        | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |      |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 2900 | --  | 5               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 880  | --  | 5               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 790  | --  | 5               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 880  | --  | 5               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 880  | --  | 5               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 880  | --  | 5               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 880  | --  | 5               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 880  | --  | 5               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 880  | --  | 5               |
| Azobenzene                                       | ND     |           | ug/kg | 880  | --  | 5               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 880  | --  | 5               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 880  | --  | 5               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 1000 | --  | 5               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 950  | --  | 5               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 2500 | --  | 5               |
| Isophorone                                       | ND     |           | ug/kg | 790  | --  | 5               |
| Nitrobenzene                                     | ND     |           | ug/kg | 790  | --  | 5               |
| NDPA/DPA                                         | ND     |           | ug/kg | 700  | --  | 5               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 880  | --  | 5               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 880  | --  | 5               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 880  | --  | 5               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 880  | --  | 5               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 880  | --  | 5               |
| Diethyl phthalate                                | ND     |           | ug/kg | 880  | --  | 5               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 880  | --  | 5               |
| Biphenyl                                         | ND     |           | ug/kg | 2000 | --  | 5               |
| Aniline                                          | ND     |           | ug/kg | 1000 | --  | 5               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 880  | --  | 5               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01 D  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |      |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 880  | --  | 5               |
| Dibenzofuran                                     | ND     |           | ug/kg | 880  | --  | 5               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 1800 | --  | 5               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 530  | --  | 5               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 880  | --  | 5               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 790  | --  | 5               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 880  | --  | 5               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 1900 | --  | 5               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 1200 | --  | 5               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 4200 | --  | 5               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 2300 | --  | 5               |
| Phenol                                           | ND     |           | ug/kg | 880  | --  | 5               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 1300 | --  | 5               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 880  | --  | 5               |
| Benzoic Acid                                     | ND     |           | ug/kg | 2800 | --  | 5               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 880  | --  | 5               |
| Carbazole                                        | ND     |           | ug/kg | 880  | --  | 5               |
| Pyridine                                         | ND     |           | ug/kg | 950  | --  | 5               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 69         |           | 25-120              |
| Phenol-d6            | 63         |           | 10-120              |
| Nitrobenzene-d5      | 72         |           | 23-120              |
| 2-Fluorobiphenyl     | 72         |           | 30-120              |
| 2,4,6-Tribromophenol | 83         |           | 10-136              |
| 4-Terphenyl-d14      | 66         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01      D  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/17/24 13:08  
**Analyst:** DV  
**Percent Solids:** 94%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:59

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 180 | --  | 25              |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 180 | --  | 25              |
| Fluoranthene                                         | 8400   |           | ug/kg | 180 | --  | 25              |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 180 | --  | 25              |
| Naphthalene                                          | ND     |           | ug/kg | 180 | --  | 25              |
| Benzo(a)anthracene                                   | 5700   |           | ug/kg | 180 | --  | 25              |
| Benzo(a)pyrene                                       | 5900   |           | ug/kg | 180 | --  | 25              |
| Benzo(b)fluoranthene                                 | 7600   |           | ug/kg | 180 | --  | 25              |
| Benzo(k)fluoranthene                                 | 2600   |           | ug/kg | 180 | --  | 25              |
| Chrysene                                             | 5000   |           | ug/kg | 180 | --  | 25              |
| Acenaphthylene                                       | 3000   |           | ug/kg | 180 | --  | 25              |
| Anthracene                                           | 930    |           | ug/kg | 180 | --  | 25              |
| Benzo(ghi)perylene                                   | 2900   |           | ug/kg | 180 | --  | 25              |
| Fluorene                                             | ND     |           | ug/kg | 180 | --  | 25              |
| Phenanthrene                                         | 810    |           | ug/kg | 180 | --  | 25              |
| Dibenzo(a,h)anthracene                               | 760    |           | ug/kg | 180 | --  | 25              |
| Indeno(1,2,3-cd)Pyrene                               | 3800   |           | ug/kg | 180 | --  | 25              |
| Pyrene                                               | 7500   |           | ug/kg | 180 | --  | 25              |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 180 | --  | 25              |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 180 | --  | 25              |
| Pentachlorophenol                                    | ND     |           | ug/kg | 700 | --  | 25              |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 180 | --  | 25              |
| Hexachloroethane                                     | ND     |           | ug/kg | 180 | --  | 25              |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01 D  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 0          | Q         | 25-120              |
| Phenol-d6            | 0          | Q         | 10-120              |
| Nitrobenzene-d5      | 0          | Q         | 23-120              |
| 2-Fluorobiphenyl     | 0          | Q         | 30-120              |
| 2,4,6-Tribromophenol | 0          | Q         | 10-136              |
| 4-Terphenyl-d14      | 0          | Q         | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 00:49  
**Analyst:** ALS  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:51

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 570 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 160 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 210 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 190 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 490 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 160 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 160 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 390 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 210 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 160 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 370 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 830 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 450 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 250 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 560 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 190 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 77         |           | 25-120              |
| Phenol-d6            | 76         |           | 10-120              |
| Nitrobenzene-d5      | 80         |           | 23-120              |
| 2-Fluorobiphenyl     | 80         |           | 30-120              |
| 2,4,6-Tribromophenol | 97         |           | 10-136              |
| 4-Terphenyl-d14      | 76         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/17/24 13:25  
**Analyst:** DV  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:59

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 6.9 | --  | 1               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 6.9 | --  | 1               |
| Fluoranthene                                         | 170    |           | ug/kg | 6.9 | --  | 1               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 6.9 | --  | 1               |
| Naphthalene                                          | ND     |           | ug/kg | 6.9 | --  | 1               |
| Benzo(a)anthracene                                   | 140    |           | ug/kg | 6.9 | --  | 1               |
| Benzo(a)pyrene                                       | 230    |           | ug/kg | 6.9 | --  | 1               |
| Benzo(b)fluoranthene                                 | 300    |           | ug/kg | 6.9 | --  | 1               |
| Benzo(k)fluoranthene                                 | 100    |           | ug/kg | 6.9 | --  | 1               |
| Chrysene                                             | 140    |           | ug/kg | 6.9 | --  | 1               |
| Acenaphthylene                                       | 120    |           | ug/kg | 6.9 | --  | 1               |
| Anthracene                                           | 35     |           | ug/kg | 6.9 | --  | 1               |
| Benzo(ghi)perylene                                   | 140    |           | ug/kg | 6.9 | --  | 1               |
| Fluorene                                             | 7.1    |           | ug/kg | 6.9 | --  | 1               |
| Phenanthrene                                         | 39     |           | ug/kg | 6.9 | --  | 1               |
| Dibenzo(a,h)anthracene                               | 32     |           | ug/kg | 6.9 | --  | 1               |
| Indeno(1,2,3-cd)Pyrene                               | 180    |           | ug/kg | 6.9 | --  | 1               |
| Pyrene                                               | 180    |           | ug/kg | 6.9 | --  | 1               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 6.9 | --  | 1               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 6.9 | --  | 1               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 28  | --  | 1               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 6.9 | --  | 1               |
| Hexachloroethane                                     | ND     |           | ug/kg | 6.9 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 72         |           | 25-120              |
| Phenol-d6            | 86         |           | 10-120              |
| Nitrobenzene-d5      | 102        |           | 23-120              |
| 2-Fluorobiphenyl     | 69         |           | 30-120              |
| 2,4,6-Tribromophenol | 111        |           | 10-136              |
| 4-Terphenyl-d14      | 58         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-03 D

Date Collected: 06/10/24 12:00

Client ID: HA24-18\_0.5-2.5

Date Received: 06/10/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Extraction Method: EPA 3546

Analytical Method: 1,8270E

Extraction Date: 06/15/24 10:51

Analytical Date: 06/17/24 01:13

Analyst: ALS

Percent Solids: 93%

| Parameter                                        | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |      |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 2900 | --  | 5               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 880  | --  | 5               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 790  | --  | 5               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 880  | --  | 5               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 880  | --  | 5               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 880  | --  | 5               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 880  | --  | 5               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 880  | --  | 5               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 880  | --  | 5               |
| Azobenzene                                       | ND     |           | ug/kg | 880  | --  | 5               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 880  | --  | 5               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 880  | --  | 5               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 1000 | --  | 5               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 950  | --  | 5               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 2500 | --  | 5               |
| Isophorone                                       | ND     |           | ug/kg | 790  | --  | 5               |
| Nitrobenzene                                     | ND     |           | ug/kg | 790  | --  | 5               |
| NDPA/DPA                                         | ND     |           | ug/kg | 700  | --  | 5               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 880  | --  | 5               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 880  | --  | 5               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 880  | --  | 5               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 880  | --  | 5               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 880  | --  | 5               |
| Diethyl phthalate                                | ND     |           | ug/kg | 880  | --  | 5               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 880  | --  | 5               |
| Biphenyl                                         | ND     |           | ug/kg | 2000 | --  | 5               |
| Aniline                                          | ND     |           | ug/kg | 1000 | --  | 5               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 880  | --  | 5               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-03 D

Date Collected: 06/10/24 12:00

Client ID: HA24-18\_0.5-2.5

Date Received: 06/10/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |      |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 880  | --  | 5               |
| Dibenzofuran                                     | ND     |           | ug/kg | 880  | --  | 5               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 1800 | --  | 5               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 530  | --  | 5               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 880  | --  | 5               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 790  | --  | 5               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 880  | --  | 5               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 1900 | --  | 5               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 1200 | --  | 5               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 4200 | --  | 5               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 2300 | --  | 5               |
| Phenol                                           | ND     |           | ug/kg | 880  | --  | 5               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 880  | --  | 5               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 1300 | --  | 5               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 880  | --  | 5               |
| Benzoic Acid                                     | ND     |           | ug/kg | 2800 | --  | 5               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 880  | --  | 5               |
| Carbazole                                        | ND     |           | ug/kg | 880  | --  | 5               |
| Pyridine                                         | ND     |           | ug/kg | 950  | --  | 5               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 73         |           | 25-120              |
| Phenol-d6            | 71         |           | 10-120              |
| Nitrobenzene-d5      | 74         |           | 23-120              |
| 2-Fluorobiphenyl     | 77         |           | 30-120              |
| 2,4,6-Tribromophenol | 90         |           | 10-136              |
| 4-Terphenyl-d14      | 70         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-03      D  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/17/24 09:20  
**Analyst:** DV  
**Percent Solids:** 93%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:59

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 35  | --  | 5               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 35  | --  | 5               |
| Fluoranthene                                         | 720    |           | ug/kg | 35  | --  | 5               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 35  | --  | 5               |
| Naphthalene                                          | ND     |           | ug/kg | 35  | --  | 5               |
| Benzo(a)anthracene                                   | 370    |           | ug/kg | 35  | --  | 5               |
| Benzo(a)pyrene                                       | 520    |           | ug/kg | 35  | --  | 5               |
| Benzo(b)fluoranthene                                 | 700    |           | ug/kg | 35  | --  | 5               |
| Benzo(k)fluoranthene                                 | 240    |           | ug/kg | 35  | --  | 5               |
| Chrysene                                             | 340    |           | ug/kg | 35  | --  | 5               |
| Acenaphthylene                                       | 270    |           | ug/kg | 35  | --  | 5               |
| Anthracene                                           | 130    |           | ug/kg | 35  | --  | 5               |
| Benzo(ghi)perylene                                   | 300    |           | ug/kg | 35  | --  | 5               |
| Fluorene                                             | ND     |           | ug/kg | 35  | --  | 5               |
| Phenanthrene                                         | 170    |           | ug/kg | 35  | --  | 5               |
| Dibenzo(a,h)anthracene                               | 64     |           | ug/kg | 35  | --  | 5               |
| Indeno(1,2,3-cd)Pyrene                               | 360    |           | ug/kg | 35  | --  | 5               |
| Pyrene                                               | 730    |           | ug/kg | 35  | --  | 5               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 35  | --  | 5               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 35  | --  | 5               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 140 | --  | 5               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 35  | --  | 5               |
| Hexachloroethane                                     | ND     |           | ug/kg | 35  | --  | 5               |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-03      D  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 69         |           | 25-120              |
| Phenol-d6            | 80         |           | 10-120              |
| Nitrobenzene-d5      | 94         |           | 23-120              |
| 2-Fluorobiphenyl     | 70         |           | 30-120              |
| 2,4,6-Tribromophenol | 109        |           | 10-136              |
| 4-Terphenyl-d14      | 59         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/16/24 19:36  
**Analyst:** ALS

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:51

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1934810-1 |        |           |       |     |     |
| Acenaphthene                                                                             | ND     |           | ug/kg | 130 | --  |
| Benzidine                                                                                | ND     |           | ug/kg | 540 | --  |
| 1,2,4-Trichlorobenzene                                                                   | ND     |           | ug/kg | 160 | --  |
| Hexachlorobenzene                                                                        | ND     |           | ug/kg | 98  | --  |
| Bis(2-chloroethyl)ether                                                                  | ND     |           | ug/kg | 150 | --  |
| 2-Chloronaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,2-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,3-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,4-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 3,3'-Dichlorobenzidine                                                                   | ND     |           | ug/kg | 160 | --  |
| 2,4-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| 2,6-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| Azobenzene                                                                               | ND     |           | ug/kg | 160 | --  |
| Fluoranthene                                                                             | ND     |           | ug/kg | 98  | --  |
| 4-Chlorophenyl phenyl ether                                                              | ND     |           | ug/kg | 160 | --  |
| 4-Bromophenyl phenyl ether                                                               | ND     |           | ug/kg | 160 | --  |
| Bis(2-chloroisopropyl)ether                                                              | ND     |           | ug/kg | 200 | --  |
| Bis(2-chloroethoxy)methane                                                               | ND     |           | ug/kg | 180 | --  |
| Hexachlorobutadiene                                                                      | ND     |           | ug/kg | 160 | --  |
| Hexachlorocyclopentadiene                                                                | ND     |           | ug/kg | 470 | --  |
| Hexachloroethane                                                                         | ND     |           | ug/kg | 130 | --  |
| Isophorone                                                                               | ND     |           | ug/kg | 150 | --  |
| Naphthalene                                                                              | ND     |           | ug/kg | 160 | --  |
| Nitrobenzene                                                                             | ND     |           | ug/kg | 150 | --  |
| NDPA/DPA                                                                                 | ND     |           | ug/kg | 130 | --  |
| n-Nitrosodi-n-propylamine                                                                | ND     |           | ug/kg | 160 | --  |
| Bis(2-ethylhexyl)phthalate                                                               | ND     |           | ug/kg | 160 | --  |
| Butyl benzyl phthalate                                                                   | ND     |           | ug/kg | 160 | --  |
| Di-n-butylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/16/24 19:36  
**Analyst:** ALS

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:51

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1934810-1 |        |           |       |     |     |
| Di-n-octylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |
| Diethyl phthalate                                                                        | ND     |           | ug/kg | 160 | --  |
| Dimethyl phthalate                                                                       | ND     |           | ug/kg | 160 | --  |
| Benzo(a)anthracene                                                                       | ND     |           | ug/kg | 98  | --  |
| Benzo(a)pyrene                                                                           | ND     |           | ug/kg | 130 | --  |
| Benzo(b)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Benzo(k)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Chrysene                                                                                 | ND     |           | ug/kg | 98  | --  |
| Acenaphthylene                                                                           | ND     |           | ug/kg | 130 | --  |
| Anthracene                                                                               | ND     |           | ug/kg | 98  | --  |
| Benzo(ghi)perylene                                                                       | ND     |           | ug/kg | 130 | --  |
| Fluorene                                                                                 | ND     |           | ug/kg | 160 | --  |
| Phenanthrene                                                                             | ND     |           | ug/kg | 98  | --  |
| Dibenzo(a,h)anthracene                                                                   | ND     |           | ug/kg | 98  | --  |
| Indeno(1,2,3-cd)pyrene                                                                   | ND     |           | ug/kg | 130 | --  |
| Pyrene                                                                                   | ND     |           | ug/kg | 98  | --  |
| Biphenyl                                                                                 | ND     |           | ug/kg | 370 | --  |
| Aniline                                                                                  | ND     |           | ug/kg | 200 | --  |
| 4-Chloroaniline                                                                          | ND     |           | ug/kg | 160 | --  |
| 1-Methylnaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 2-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 4-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| Dibenzofuran                                                                             | ND     |           | ug/kg | 160 | --  |
| 2-Methylnaphthalene                                                                      | ND     |           | ug/kg | 200 | --  |
| n-Nitrosodimethylamine                                                                   | ND     |           | ug/kg | 330 | --  |
| 2,4,6-Trichlorophenol                                                                    | ND     |           | ug/kg | 98  | --  |
| p-Chloro-m-cresol                                                                        | ND     |           | ug/kg | 160 | --  |
| 2-Chlorophenol                                                                           | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/16/24 19:36  
**Analyst:** ALS

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:51

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1934810-1 |        |           |       |     |     |
| 2,4-Dichlorophenol                                                                       | ND     |           | ug/kg | 150 | --  |
| 2,4-Dimethylphenol                                                                       | ND     |           | ug/kg | 160 | --  |
| 2-Nitrophenol                                                                            | ND     |           | ug/kg | 350 | --  |
| 4-Nitrophenol                                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4-Dinitrophenol                                                                        | ND     |           | ug/kg | 780 | --  |
| 4,6-Dinitro-o-cresol                                                                     | ND     |           | ug/kg | 420 | --  |
| Pentachlorophenol                                                                        | ND     |           | ug/kg | 130 | --  |
| Phenol                                                                                   | ND     |           | ug/kg | 160 | --  |
| 2-Methylphenol                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Methylphenol/4-Methylphenol                                                            | ND     |           | ug/kg | 240 | --  |
| 2,4,5-Trichlorophenol                                                                    | ND     |           | ug/kg | 160 | --  |
| Benzoic Acid                                                                             | ND     |           | ug/kg | 530 | --  |
| Benzyl Alcohol                                                                           | ND     |           | ug/kg | 160 | --  |
| Carbazole                                                                                | ND     |           | ug/kg | 160 | --  |
| Pyridine                                                                                 | ND     |           | ug/kg | 180 | --  |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 84        |           | 25-120              |
| Phenol-d6            | 82        |           | 10-120              |
| Nitrobenzene-d5      | 86        |           | 23-120              |
| 2-Fluorobiphenyl     | 87        |           | 30-120              |
| 2,4,6-Tribromophenol | 107       |           | 10-136              |
| 4-Terphenyl-d14      | 94        |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/17/24 07:59  
**Analyst:** DV

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 10:51

| Parameter                                                                                    | Result | Qualifier | Units | RL  | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1934811-1 |        |           |       |     |     |
| Acenaphthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| 2-Chloronaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Fluoranthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Hexachlorobutadiene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Naphthalene                                                                                  | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)anthracene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)pyrene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Benzo(b)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Benzo(k)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Chrysene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Acenaphthylene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Anthracene                                                                                   | ND     |           | ug/kg | 6.5 | --  |
| Benzo(ghi)perylene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Fluorene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Phenanthrene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Dibenzo(a,h)anthracene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Indeno(1,2,3-cd)Pyrene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Pyrene                                                                                       | ND     |           | ug/kg | 6.5 | --  |
| 1-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| 2-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Pentachlorophenol                                                                            | ND     |           | ug/kg | 26  | --  |
| Hexachlorobenzene                                                                            | ND     |           | ug/kg | 6.5 | --  |
| Hexachloroethane                                                                             | ND     |           | ug/kg | 6.5 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8270E-SIM  
Analytical Date: 06/17/24 07:59  
Analyst: DV

Extraction Method: EPA 3546  
Extraction Date: 06/15/24 10:51

| Parameter                                                                                    | Result | Qualifier | Units | RL | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1934811-1 |        |           |       |    |     |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 75        |           | 25-120              |
| Phenol-d6            | 83        |           | 10-120              |
| Nitrobenzene-d5      | 94        |           | 23-120              |
| 2-Fluorobiphenyl     | 72        |           | 30-120              |
| 2,4,6-Tribromophenol | 112       |           | 10-136              |
| 4-Terphenyl-d14      | 74        |           | 18-120              |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432275

**Report Date:** 06/17/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934810-2 WG1934810-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                | 86               |      | 70                |      | 31-137              | 21  |      | 50            |
| Benzidine                                                                                                   | 49               |      | 37                |      | 10-66               | 28  |      | 50            |
| 1,2,4-Trichlorobenzene                                                                                      | 91               |      | 72                |      | 38-107              | 23  |      | 50            |
| Hexachlorobenzene                                                                                           | 97               |      | 79                |      | 40-140              | 20  |      | 50            |
| Bis(2-chloroethyl)ether                                                                                     | 80               |      | 63                |      | 40-140              | 24  |      | 50            |
| 2-Chloronaphthalene                                                                                         | 95               |      | 74                |      | 40-140              | 25  |      | 50            |
| 1,2-Dichlorobenzene                                                                                         | 84               |      | 68                |      | 40-140              | 21  |      | 50            |
| 1,3-Dichlorobenzene                                                                                         | 82               |      | 65                |      | 40-140              | 23  |      | 50            |
| 1,4-Dichlorobenzene                                                                                         | 81               |      | 65                |      | 28-104              | 22  |      | 50            |
| 3,3'-Dichlorobenzidine                                                                                      | 78               |      | 64                |      | 40-140              | 20  |      | 50            |
| 2,4-Dinitrotoluene                                                                                          | 105              |      | 82                |      | 40-132              | 25  |      | 50            |
| 2,6-Dinitrotoluene                                                                                          | 117              |      | 92                |      | 40-140              | 24  |      | 50            |
| Azobenzene                                                                                                  | 88               |      | 72                |      | 40-140              | 20  |      | 50            |
| Fluoranthene                                                                                                | 90               |      | 72                |      | 40-140              | 22  |      | 50            |
| 4-Chlorophenyl phenyl ether                                                                                 | 88               |      | 71                |      | 40-140              | 21  |      | 50            |
| 4-Bromophenyl phenyl ether                                                                                  | 92               |      | 74                |      | 40-140              | 22  |      | 50            |
| Bis(2-chloroisopropyl)ether                                                                                 | 56               |      | 46                |      | 40-140              | 20  |      | 50            |
| Bis(2-chloroethoxy)methane                                                                                  | 87               |      | 70                |      | 40-117              | 22  |      | 50            |
| Hexachlorobutadiene                                                                                         | 92               |      | 72                |      | 40-140              | 24  |      | 50            |
| Hexachlorocyclopentadiene                                                                                   | 104              |      | 79                |      | 40-140              | 27  |      | 50            |
| Hexachloroethane                                                                                            | 87               |      | 68                |      | 40-140              | 25  |      | 50            |
| Isophorone                                                                                                  | 90               |      | 72                |      | 40-140              | 22  |      | 50            |
| Naphthalene                                                                                                 | 82               |      | 65                |      | 40-140              | 23  |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432275

**Report Date:** 06/17/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934810-2 WG1934810-3 |                  |      |                   |      |                     |     |      |               |
| Nitrobenzene                                                                                                | 93               |      | 74                |      | 40-140              | 23  |      | 50            |
| NDPA/DPA                                                                                                    | 89               |      | 71                |      | 36-157              | 23  |      | 50            |
| n-Nitrosodi-n-propylamine                                                                                   | 92               |      | 74                |      | 32-121              | 22  |      | 50            |
| Bis(2-ethylhexyl)phthalate                                                                                  | 100              |      | 83                |      | 40-140              | 19  |      | 50            |
| Butyl benzyl phthalate                                                                                      | 106              |      | 85                |      | 40-140              | 22  |      | 50            |
| Di-n-butylphthalate                                                                                         | 94               |      | 77                |      | 40-140              | 20  |      | 50            |
| Di-n-octylphthalate                                                                                         | 108              |      | 93                |      | 40-140              | 15  |      | 50            |
| Diethyl phthalate                                                                                           | 92               |      | 75                |      | 40-140              | 20  |      | 50            |
| Dimethyl phthalate                                                                                          | 101              |      | 80                |      | 40-140              | 23  |      | 50            |
| Benzo(a)anthracene                                                                                          | 87               |      | 71                |      | 40-140              | 20  |      | 50            |
| Benzo(a)pyrene                                                                                              | 94               |      | 78                |      | 40-140              | 19  |      | 50            |
| Benzo(b)fluoranthene                                                                                        | 92               |      | 78                |      | 40-140              | 16  |      | 50            |
| Benzo(k)fluoranthene                                                                                        | 92               |      | 73                |      | 40-140              | 23  |      | 50            |
| Chrysene                                                                                                    | 86               |      | 70                |      | 40-140              | 21  |      | 50            |
| Acenaphthylene                                                                                              | 94               |      | 74                |      | 40-140              | 24  |      | 50            |
| Anthracene                                                                                                  | 85               |      | 69                |      | 40-140              | 21  |      | 50            |
| Benzo(ghi)perylene                                                                                          | 90               |      | 73                |      | 40-140              | 21  |      | 50            |
| Fluorene                                                                                                    | 87               |      | 70                |      | 40-140              | 22  |      | 50            |
| Phenanthrene                                                                                                | 82               |      | 66                |      | 40-140              | 22  |      | 50            |
| Dibenzo(a,h)anthracene                                                                                      | 90               |      | 77                |      | 40-140              | 16  |      | 50            |
| Indeno(1,2,3-cd)pyrene                                                                                      | 89               |      | 77                |      | 40-140              | 14  |      | 50            |
| Pyrene                                                                                                      | 88               |      | 71                |      | 35-142              | 21  |      | 50            |
| Biphenyl                                                                                                    | 85               |      | 67                |      | 37-127              | 24  |      | 50            |



# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432275

**Report Date:** 06/17/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934810-2 WG1934810-3 |                  |      |                   |      |                     |     |      |               |
| Aniline                                                                                                     | 70               |      | 56                |      | 40-140              | 22  |      | 50            |
| 4-Chloroaniline                                                                                             | 77               |      | 60                |      | 40-140              | 25  |      | 50            |
| 1-Methylnaphthalene                                                                                         | 96               |      | 75                |      | 26-130              | 25  |      | 50            |
| 2-Nitroaniline                                                                                              | 113              |      | 89                |      | 47-134              | 24  |      | 50            |
| 3-Nitroaniline                                                                                              | 78               |      | 63                |      | 26-129              | 21  |      | 50            |
| 4-Nitroaniline                                                                                              | 85               |      | 69                |      | 41-125              | 21  |      | 50            |
| Dibenzofuran                                                                                                | 86               |      | 70                |      | 40-140              | 21  |      | 50            |
| 2-Methylnaphthalene                                                                                         | 92               |      | 73                |      | 40-140              | 23  |      | 50            |
| n-Nitrosodimethylamine                                                                                      | 83               |      | 66                |      | 22-100              | 23  |      | 50            |
| 2,4,6-Trichlorophenol                                                                                       | 106              |      | 85                |      | 30-130              | 22  |      | 50            |
| p-Chloro-m-cresol                                                                                           | 101              |      | 82                |      | 26-103              | 21  |      | 50            |
| 2-Chlorophenol                                                                                              | 92               |      | 73                |      | 25-102              | 23  |      | 50            |
| 2,4-Dichlorophenol                                                                                          | 103              |      | 82                |      | 30-130              | 23  |      | 50            |
| 2,4-Dimethylphenol                                                                                          | 115              |      | 92                |      | 30-130              | 22  |      | 50            |
| 2-Nitrophenol                                                                                               | 114              |      | 91                |      | 30-130              | 22  |      | 50            |
| 4-Nitrophenol                                                                                               | 101              |      | 80                |      | 11-114              | 23  |      | 50            |
| 2,4-Dinitrophenol                                                                                           | 97               |      | 82                |      | 4-130               | 17  |      | 50            |
| 4,6-Dinitro-o-cresol                                                                                        | 106              |      | 86                |      | 10-130              | 21  |      | 50            |
| Pentachlorophenol                                                                                           | 88               |      | 70                |      | 17-109              | 23  |      | 50            |
| Phenol                                                                                                      | 83               |      | 66                |      | 26-90               | 23  |      | 50            |
| 2-Methylphenol                                                                                              | 96               |      | 75                |      | 30-130              | 25  |      | 50            |
| 3-Methylphenol/4-Methylphenol                                                                               | 104              |      | 82                |      | 30-130              | 24  |      | 50            |
| 2,4,5-Trichlorophenol                                                                                       | 109              |      | 87                |      | 30-130              | 22  |      | 50            |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432275

**Project Number:** 0208898-001

**Report Date:** 06/17/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934810-2 WG1934810-3 |                  |      |                   |      |                     |     |      |               |
| Benzoic Acid                                                                                                | 87               |      | 73                |      | 10-110              | 18  |      | 50            |
| Benzyl Alcohol                                                                                              | 98               |      | 78                |      | 40-140              | 23  |      | 50            |
| Carbazole                                                                                                   | 85               |      | 69                |      | 54-128              | 21  |      | 50            |
| Pyridine                                                                                                    | 63               |      | 45                |      | 10-93               | 33  |      | 50            |

| Surrogate            | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria |
|----------------------|------------------|------|-------------------|------|------------------------|
| 2-Fluorophenol       | 92               |      | 73                |      | 25-120                 |
| Phenol-d6            | 88               |      | 70                |      | 10-120                 |
| Nitrobenzene-d5      | 92               |      | 73                |      | 23-120                 |
| 2-Fluorobiphenyl     | 93               |      | 72                |      | 30-120                 |
| 2,4,6-Tribromophenol | 108              |      | 86                |      | 10-136                 |
| 4-Terphenyl-d14      | 88               |      | 70                |      | 18-120                 |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                                                       | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1934811-2 WG1934811-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                    | 68               |      | 64                |      | 40-140              | 6   |      | 50            |
| 2-Chloronaphthalene                                                                                             | 86               |      | 80                |      | 40-140              | 7   |      | 50            |
| Fluoranthene                                                                                                    | 70               |      | 67                |      | 40-140              | 4   |      | 50            |
| Hexachlorobutadiene                                                                                             | 80               |      | 74                |      | 34-107              | 8   |      | 50            |
| Naphthalene                                                                                                     | 71               |      | 67                |      | 40-140              | 6   |      | 50            |
| Benzo(a)anthracene                                                                                              | 88               |      | 83                |      | 40-140              | 6   |      | 50            |
| Benzo(a)pyrene                                                                                                  | 89               |      | 83                |      | 40-140              | 7   |      | 50            |
| Benzo(b)fluoranthene                                                                                            | 81               |      | 76                |      | 40-140              | 6   |      | 50            |
| Benzo(k)fluoranthene                                                                                            | 71               |      | 65                |      | 40-140              | 9   |      | 50            |
| Chrysene                                                                                                        | 73               |      | 69                |      | 40-140              | 6   |      | 50            |
| Acenaphthylene                                                                                                  | 85               |      | 80                |      | 40-140              | 6   |      | 50            |
| Anthracene                                                                                                      | 74               |      | 70                |      | 40-140              | 6   |      | 50            |
| Benzo(ghi)perylene                                                                                              | 84               |      | 79                |      | 40-140              | 6   |      | 50            |
| Fluorene                                                                                                        | 78               |      | 74                |      | 40-140              | 5   |      | 50            |
| Phenanthrene                                                                                                    | 69               |      | 64                |      | 40-140              | 8   |      | 50            |
| Dibenzo(a,h)anthracene                                                                                          | 96               |      | 92                |      | 40-140              | 4   |      | 50            |
| Indeno(1,2,3-cd)Pyrene                                                                                          | 123              |      | 116               |      | 40-140              | 6   |      | 50            |
| Pyrene                                                                                                          | 67               |      | 64                |      | 35-142              | 5   |      | 50            |
| 1-Methylnaphthalene                                                                                             | 77               |      | 72                |      | 40-140              | 7   |      | 50            |
| 2-Methylnaphthalene                                                                                             | 81               |      | 76                |      | 40-140              | 6   |      | 50            |
| Pentachlorophenol                                                                                               | 76               |      | 73                |      | 17-109              | 4   |      | 50            |
| Hexachlorobenzene                                                                                               | 59               |      | 55                |      | 40-140              | 7   |      | 50            |
| Hexachloroethane                                                                                                | 72               |      | 68                |      | 29-106              | 6   |      | 50            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24

| <b>Parameter</b> | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
|------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1934811-2 WG1934811-3

| <b>Surrogate</b>     | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 2-Fluorophenol       | 61                       |             | 58                        |             | 25-120                         |
| Phenol-d6            | 69                       |             | 66                        |             | 10-120                         |
| Nitrobenzene-d5      | 86                       |             | 83                        |             | 23-120                         |
| 2-Fluorobiphenyl     | 72                       |             | 68                        |             | 30-120                         |
| 2,4,6-Tribromophenol | 68                       |             | 65                        |             | 10-136                         |
| 4-Terphenyl-d14      | 55                       |             | 53                        |             | 18-120                         |

# **PETROLEUM HYDROCARBONS**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/16/24 09:53  
**Analyst:** SBC  
**Percent Solids:** 94%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 12:51

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 397000     |           | ug/kg     | 34200               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 79         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/16/24 09:28  
**Analyst:** SBC  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 12:51

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 34500      |           | ug/kg     | 33800               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 70         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

Lab ID: L2432275-03  
 Client ID: HA24-18\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/10/24 12:00  
 Date Received: 06/10/24  
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil  
 Analytical Method: 1,8015D(M)  
 Analytical Date: 06/16/24 10:18  
 Analyst: SBC  
 Percent Solids: 93%

Extraction Method: EPA 3546  
 Extraction Date: 06/15/24 12:51

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 88800      |           | ug/kg     | 34700               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 86         |           |           | 40-140              |     |                 |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/16/24 09:03  
**Analyst:** SBC

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 12:49

| Parameter                                                                                    | Result | Qualifier | Units | RL    | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-------|-----|
| Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01-03 Batch: WG1934822-1 |        |           |       |       |     |
| TPH (C10-C36)                                                                                | ND     |           | ug/kg | 31500 | --  |

| Surrogate   | %Recovery | Qualifier | Acceptance<br>Criteria |
|-------------|-----------|-----------|------------------------|
| o-Terphenyl | 73        |           | 40-140                 |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                                           | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 Batch: WG1934822-2 |                  |      |                   |      |                     |     |      |               |
| TPH (C10-C36)                                                                                       | 72               |      | -                 |      | 40-140              | -   |      | 40            |

| Surrogate   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria |
|-------------|------------------|------|-------------------|------|------------------------|
| o-Terphenyl | 76               |      |                   |      | 40-140                 |

# PCBS

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/16/24 15:39  
**Analyst:** MEO  
**Percent Solids:** 94%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 15:50  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/15/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/16/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 50.5 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 50.5 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 92         |           | 30-150              | A      |
| Decachlorobiphenyl           | 104        |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 93         |           | 30-150              | B      |
| Decachlorobiphenyl           | 115        |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/16/24 15:50  
**Analyst:** MEO  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 15:50  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/15/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/16/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 51.0 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 51.0 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 97         |           | 30-150              | A      |
| Decachlorobiphenyl           | 110        |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 101        |           | 30-150              | B      |
| Decachlorobiphenyl           | 114        |           | 30-150              | B      |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-03  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/16/24 16:02  
**Analyst:** MEO  
**Percent Solids:** 93%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 15:50  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/15/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/16/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 52.7 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 52.7 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 96         |           | 30-150              | A      |
| Decachlorobiphenyl           | 108        |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 100        |           | 30-150              | B      |
| Decachlorobiphenyl           | 118        |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8082A  
**Analytical Date:** 06/16/24 15:05  
**Analyst:** MEO

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/15/24 15:50  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/15/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/16/24

| Parameter                                                                                 | Result | Qualifier | Units | RL   | MDL | Column |
|-------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-03 Batch: WG1934856-1 |        |           |       |      |     |        |
| Aroclor 1016                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1221                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1232                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1242                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1248                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1254                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1260                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1262                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| Aroclor 1268                                                                              | ND     |           | ug/kg | 47.8 | --  | A      |
| PCBs, Total                                                                               | ND     |           | ug/kg | 47.8 | --  | A      |

| Surrogate                    | %Recovery | Qualifier | Acceptance<br>Criteria | Column |
|------------------------------|-----------|-----------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 85        |           | 30-150                 | A      |
| Decachlorobiphenyl           | 93        |           | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 89        |           | 30-150                 | B      |
| Decachlorobiphenyl           | 96        |           | 30-150                 | B      |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432275

**Project Number:** 0208898-001

**Report Date:** 06/17/24

| Parameter                                                                                                    | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits | Column |
|--------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-03 Batch: WG1934856-2 WG1934856-3 |                  |      |                   |      |                     |     |      |               |        |
| Aroclor 1016                                                                                                 | 89               |      | 88                |      | 40-140              | 1   |      | 50            | A      |
| Aroclor 1260                                                                                                 | 80               |      | 81                |      | 40-140              | 1   |      | 50            | A      |

| Surrogate                    | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria | Column |
|------------------------------|------------------|------|-------------------|------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 98               |      | 96                |      | 30-150                 | A      |
| Decachlorobiphenyl           | 106              |      | 108               |      | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 101              |      | 100               |      | 30-150                 | B      |
| Decachlorobiphenyl           | 112              |      | 114               |      | 30-150                 | B      |



## METALS

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-01

Date Collected: 06/10/24 08:45

Client ID: HA24-13\_0.5-2.5

Date Received: 06/10/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 94%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.68   |           | mg/kg | 0.804 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |
| Barium, Total                | 14.9   |           | mg/kg | 0.804 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |
| Cadmium, Total               | ND     |           | mg/kg | 0.804 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |
| Chromium, Total              | 5.48   |           | mg/kg | 0.804 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |
| Lead, Total                  | 5.43   |           | mg/kg | 4.02  | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |
| Mercury, Total               | ND     |           | mg/kg | 0.067 | --  | 1                  | 06/14/24 09:25   | 06/17/24 10:01   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.61  | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |
| Silver, Total                | ND     |           | mg/kg | 0.402 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:54   | EPA 3050B      | 1,6010D              | JMF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-02

Date Collected: 06/10/24 09:00

Client ID: HA24-13\_2.5-4.5

Date Received: 06/10/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 96%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.08   |           | mg/kg | 0.802 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |
| Barium, Total                | 14.3   |           | mg/kg | 0.802 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |
| Cadmium, Total               | ND     |           | mg/kg | 0.802 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |
| Chromium, Total              | 7.10   |           | mg/kg | 0.802 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |
| Lead, Total                  | ND     |           | mg/kg | 4.01  | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |
| Mercury, Total               | ND     |           | mg/kg | 0.066 | --  | 1                  | 06/14/24 09:25   | 06/17/24 10:04   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.60  | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |
| Silver, Total                | ND     |           | mg/kg | 0.401 | --  | 2                  | 06/14/24 10:30   | 06/14/24 19:58   | EPA 3050B      | 1,6010D              | JMF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**SAMPLE RESULTS**

Lab ID: L2432275-03

Date Collected: 06/10/24 12:00

Client ID: HA24-18\_0.5-2.5

Date Received: 06/10/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 93%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 3.96   |           | mg/kg | 0.815 | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |
| Barium, Total                | 19.0   |           | mg/kg | 0.815 | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |
| Cadmium, Total               | ND     |           | mg/kg | 0.815 | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |
| Chromium, Total              | 7.81   |           | mg/kg | 0.815 | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |
| Lead, Total                  | 7.26   |           | mg/kg | 4.07  | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |
| Mercury, Total               | ND     |           | mg/kg | 0.069 | --  | 1                  | 06/14/24 09:25   | 06/17/24 10:08   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.63  | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |
| Silver, Total                | ND     |           | mg/kg | 0.407 | --  | 2                  | 06/14/24 10:30   | 06/14/24 20:02   | EPA 3050B      | 1,6010D              | JMF     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2432275

Project Number: 0208898-001

Report Date: 06/17/24

## Method Blank Analysis Batch Quality Control

| Parameter                                                            | Result Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|----------------------------------------------------------------------|------------------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1934051-1 |                  |       |       |     |                 |                |                |                   |         |
| Arsenic, Total                                                       | ND               | mg/kg | 0.400 | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |
| Barium, Total                                                        | ND               | mg/kg | 0.400 | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |
| Cadmium, Total                                                       | ND               | mg/kg | 0.400 | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |
| Chromium, Total                                                      | ND               | mg/kg | 0.400 | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |
| Lead, Total                                                          | ND               | mg/kg | 2.00  | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |
| Selenium, Total                                                      | ND               | mg/kg | 0.800 | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |
| Silver, Total                                                        | ND               | mg/kg | 0.200 | --  | 1               | 06/14/24 10:30 | 06/14/24 18:58 | 1,6010D           | JMF     |

### Prep Information

Digestion Method: EPA 3050B

| Parameter                                                            | Result Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|----------------------------------------------------------------------|------------------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1934053-1 |                  |       |       |     |                 |                |                |                   |         |
| Mercury, Total                                                       | ND               | mg/kg | 0.083 | --  | 1               | 06/14/24 09:25 | 06/14/24 11:19 | 1,7471B           | JWN     |

### Prep Information

Digestion Method: EPA 7471B



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|-----------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1934051-2 |                  |      |                   |      |                     |     |      |            |
| Arsenic, Total                                                              | 98               |      | -                 |      | 80-120              | -   |      |            |
| Barium, Total                                                               | 100              |      | -                 |      | 80-120              | -   |      |            |
| Cadmium, Total                                                              | 98               |      | -                 |      | 80-120              | -   |      |            |
| Chromium, Total                                                             | 97               |      | -                 |      | 80-120              | -   |      |            |
| Lead, Total                                                                 | 101              |      | -                 |      | 80-120              | -   |      |            |
| Selenium, Total                                                             | 98               |      | -                 |      | 80-120              | -   |      |            |
| Silver, Total                                                               | 98               |      | -                 |      | 80-120              | -   |      |            |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1934053-2 |                  |      |                   |      |                     |     |      |            |
| Mercury, Total                                                              | 97               |      | -                 |      | 80-120              | -   |      |            |

# Matrix Spike Analysis

## Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                                                                              | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03    QC Batch ID: WG1934051-3    QC Sample: L2432281-01    Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Arsenic, Total                                                                                                                         | 5.35          | 11.9     | 16.5     | 93           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Barium, Total                                                                                                                          | 62.2          | 199      | 201      | 70           | Q    | -         | -             |      | 75-125          | -   |      | 20         |
| Cadmium, Total                                                                                                                         | ND            | 5.27     | 3.92     | 74           | Q    | -         | -             |      | 75-125          | -   |      | 20         |
| Chromium, Total                                                                                                                        | 34.2          | 19.9     | 47.2     | 65           | Q    | -         | -             |      | 75-125          | -   |      | 20         |
| Lead, Total                                                                                                                            | 15.7          | 52.7     | 58.1     | 80           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Selenium, Total                                                                                                                        | ND            | 11.9     | 8.10     | 68           | Q    | -         | -             |      | 75-125          | -   |      | 20         |
| Silver, Total                                                                                                                          | ND            | 4.97     | 3.78     | 76           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03    QC Batch ID: WG1934053-3    QC Sample: L2433405-01    Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Mercury, Total                                                                                                                         | ND            | 1.28     | 1.25     | 98           |      | -         | -             |      | 80-120          | -   |      | 20         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                                                                      | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|--------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1934051-4 QC Sample: L2432281-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Arsenic, Total                                                                                                                 | 5.35          | 6.41             | mg/kg | 18  |      | 20         |
| Barium, Total                                                                                                                  | 62.2          | 57.8             | mg/kg | 7   |      | 20         |
| Cadmium, Total                                                                                                                 | ND            | ND               | mg/kg | NC  |      | 20         |
| Chromium, Total                                                                                                                | 34.2          | 36.1             | mg/kg | 5   |      | 20         |
| Lead, Total                                                                                                                    | 15.7          | 14.7             | mg/kg | 7   |      | 20         |
| Selenium, Total                                                                                                                | ND            | ND               | mg/kg | NC  |      | 20         |
| Silver, Total                                                                                                                  | ND            | ND               | mg/kg | NC  |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1934053-4 QC Sample: L2433405-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Mercury, Total                                                                                                                 | ND            | ND               | mg/kg | NC  |      | 20         |



# **INORGANICS & MISCELLANEOUS**

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### SAMPLE RESULTS

**Lab ID:** L2432275-01  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/14/24 15:32 | 1,1030            | GEF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### SAMPLE RESULTS

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/14/24 15:32 | 1,1030            | GEF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### SAMPLE RESULTS

**Lab ID:** L2432275-03  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/14/24 15:32 | 1,1030            | GEF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

**SAMPLE RESULTS**

**Lab ID:** L2432275-01  
**Client ID:** HA24-13\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 08:45  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 94.3   |           | %     | 0.100 | NA  | 1               | -              | 06/11/24 09:58 | 121,2540G         | ROI     |
| pH (H)                              | 7.68   |           | SU    | -     | NA  | 1               | -              | 06/11/24 21:28 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/14/24 20:35 | 06/14/24 22:09 | 125,7.3           | DWH     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/14/24 20:35 | 06/14/24 22:37 | 125,7.3           | DWH     |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### SAMPLE RESULTS

**Lab ID:** L2432275-02  
**Client ID:** HA24-13\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 09:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 95.8   |           | %     | 0.100 | NA  | 1               | -              | 06/11/24 09:58 | 121,2540G         | ROI     |
| pH (H)                              | 7.48   |           | SU    | -     | NA  | 1               | -              | 06/11/24 21:28 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/14/24 20:35 | 06/14/24 22:09 | 125,7.3           | DWH     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/14/24 20:35 | 06/14/24 22:37 | 125,7.3           | DWH     |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

### SAMPLE RESULTS

**Lab ID:** L2432275-03  
**Client ID:** HA24-18\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/10/24 12:00  
**Date Received:** 06/10/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 93.2   |           | %     | 0.100 | NA  | 1               | -              | 06/11/24 09:58 | 121,2540G         | ROI     |
| pH (H)                              | 6.84   |           | SU    | -     | NA  | 1               | -              | 06/11/24 21:28 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/14/24 20:35 | 06/14/24 22:09 | 125,7.3           | DWH     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/14/24 20:35 | 06/14/24 22:38 | 125,7.3           | DWH     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2432275

Project Number: 0208898-001

Report Date: 06/17/24

### Method Blank Analysis Batch Quality Control

| Parameter                                                                   | Result | Qualifier | Units | RL | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|-----------------------------------------------------------------------------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------------|---------|
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1934624-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Sulfide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/14/24 20:35   | 06/14/24 22:34   | 125,7.3              | DWH     |
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1934626-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Cyanide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/14/24 20:35   | 06/14/24 22:06   | 125,7.3              | DWH     |



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                          | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1932897-1 |                  |      |                   |      |                     |     |      |            |
| pH                                                                                 | 100              |      | -                 |      | 99-101              | -   |      |            |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1934624-2 |                  |      |                   |      |                     |     |      |            |
| Sulfide, Reactive                                                                  | 114              |      | -                 |      | 60-125              | -   |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1934626-2 |                  |      |                   |      |                     |     |      |            |
| Cyanide, Reactive                                                                  | 109              |      | -                 |      | 30-125              | -   |      | 40         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2432275  
**Report Date:** 06/17/24

| Parameter                                                                                                                             | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1932495-1 QC Sample: L2431846-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Solids, Total                                                                                                                         | 93.2          | 92.4             | %     | 1   |      | 20         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1932897-2 QC Sample: L2430706-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| pH                                                                                                                                    | 6.92          | 7.00             | SU    | 1   |      | 5          |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1934624-3 QC Sample: L2432274-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Sulfide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1934626-3 QC Sample: L2432274-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Cyanide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432275**Project Number:** 0208898-001**Report Date:** 06/17/24**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information**

|               |                     |
|---------------|---------------------|
| <b>Cooler</b> | <b>Custody Seal</b> |
| A             | Absent              |

**Container Information**

| Container ID | Container Type                 | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal   | Frozen Date/Time | Analysis(*)                                                                                                             |
|--------------|--------------------------------|--------|------------|----------|------------|------|--------|------------------|-------------------------------------------------------------------------------------------------------------------------|
| L2432275-01A | Vial MeOH preserved            | A      | NA         |          | 5.5        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                                          |
| L2432275-01B | Vial water preserved           | A      | NA         |          | 5.5        | Y    | Absent | 10-JUN-24 19:46  | 8260HLW-NH(14)                                                                                                          |
| L2432275-01C | Vial water preserved           | A      | NA         |          | 5.5        | Y    | Absent | 10-JUN-24 19:46  | 8260HLW-NH(14)                                                                                                          |
| L2432275-01D | Glass 60mL/2oz unpreserved     | A      | NA         |          | 5.5        | Y    | Absent |                  | HEXCR-RELOG()                                                                                                           |
| L2432275-01F | Plastic 2oz unpreserved for TS | A      | NA         |          | 5.5        | Y    | Absent |                  | TS(7)                                                                                                                   |
| L2432275-01G | Glass 500ml/16oz unpreserved   | A      | NA         |          | 5.5        | Y    | Absent |                  | IGNIT-1030(14),8270TCL(14),REACTS(14),HOLD-WETCHEM(),PH-9045(1),8270TCL-SIM(14),REACTCN(14),PCB-8082(365),TPH-DRO-D(14) |
| L2432275-01H | Glass 60ml unpreserved split   | A      | NA         |          | 5.5        | Y    | Absent |                  | AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),SE-TI(180),PB-TI(180),HG-T(28),CD-TI(180)                                   |
| L2432275-02A | Vial MeOH preserved            | A      | NA         |          | 5.5        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                                          |
| L2432275-02B | Vial water preserved           | A      | NA         |          | 5.5        | Y    | Absent | 10-JUN-24 19:46  | 8260HLW-NH(14)                                                                                                          |
| L2432275-02C | Vial water preserved           | A      | NA         |          | 5.5        | Y    | Absent | 10-JUN-24 19:46  | 8260HLW-NH(14)                                                                                                          |
| L2432275-02D | Glass 60mL/2oz unpreserved     | A      | NA         |          | 5.5        | Y    | Absent |                  | HEXCR-RELOG()                                                                                                           |
| L2432275-02F | Plastic 2oz unpreserved for TS | A      | NA         |          | 5.5        | Y    | Absent |                  | TS(7)                                                                                                                   |
| L2432275-02G | Glass 500ml/16oz unpreserved   | A      | NA         |          | 5.5        | Y    | Absent |                  | REACTS(14),IGNIT-1030(14),8270TCL(14),HOLD-WETCHEM(),PH-9045(1),8270TCL-SIM(14),REACTCN(14),PCB-8082(365),TPH-DRO-D(14) |
| L2432275-02H | Glass 60ml unpreserved split   | A      | NA         |          | 5.5        | Y    | Absent |                  | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),SE-TI(180),PB-TI(180),HG-T(28),CD-TI(180)                                   |
| L2432275-03A | Vial MeOH preserved            | A      | NA         |          | 5.5        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                                          |
| L2432275-03B | Vial water preserved           | A      | NA         |          | 5.5        | Y    | Absent | 10-JUN-24 19:46  | 8260HLW-NH(14)                                                                                                          |
| L2432275-03C | Vial water preserved           | A      | NA         |          | 5.5        | Y    | Absent | 10-JUN-24 19:46  | 8260HLW-NH(14)                                                                                                          |
| L2432275-03D | Glass 60mL/2oz unpreserved     | A      | NA         |          | 5.5        | Y    | Absent |                  | HEXCR-RELOG()                                                                                                           |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
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**Serial\_No:** 06172416:16  
**Lab Number:** L2432275  
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**Container Information**

| <b>Container ID</b> | <b>Container Type</b>          | <b>Cooler</b> | <b>Initial pH</b> | <b>Final pH</b> | <b>Temp deg C</b> | <b>Pres</b> | <b>Seal</b> | <b>Frozen Date/Time</b> | <b>Analysis(*)</b>                                                                                                      |
|---------------------|--------------------------------|---------------|-------------------|-----------------|-------------------|-------------|-------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------|
| L2432275-03F        | Plastic 2oz unpreserved for TS | A             | NA                |                 | 5.5               | Y           | Absent      |                         | TS(7)                                                                                                                   |
| L2432275-03G        | Glass 500ml/16oz unpreserved   | A             | NA                |                 | 5.5               | Y           | Absent      |                         | IGNIT-1030(14),REACTS(14),8270TCL(14),HOLD-WETCHEM(),PH-9045(1),8270TCL-SIM(14),PCB-8082(365),REACTCN(14),TPH-DRO-D(14) |
| L2432275-03H        | Glass 60ml unpreserved split   | A             | NA                |                 | 5.5               | Y           | Absent      |                         | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),SE-TI(180),PB-TI(180),HG-T(28),CD-TI(180)                                   |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

## GLOSSARY

### Acronyms

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DL       | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                |
| EDL      | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).                                                                                         |
| EMPC     | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.                                                                                                                                                                                                                               |
| EPA      | - Environmental Protection Agency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LCS      | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                          |
| LCSD     | - Laboratory Control Sample Duplicate: Refer to LCS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LFB      | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                         |
| LOD      | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                                                               |
| LOQ      | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)<br><br>Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL      | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                          |
| MS       | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.                                                                                                                                                                                                    |
| MSD      | - Matrix Spike Sample Duplicate: Refer to MS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NA       | - Not Applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NC       | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.                                                                                                                                                                                                                                                                                                                                                                           |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NI       | - Not Ignitable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NP       | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NR       | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.                                                                                                                                                                                                                                                                                                                                                                    |
| RL       | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                                                                                                                                   |
| RPD      | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.                                                                  |
| SRM      | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.                                                                                                                                                                                                                                                                                                                                                                     |
| STLP     | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TEF      | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.                                                                                                                                                                                                                                                                                                                                                                                             |
| TEQ      | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.                                                                                                                                                                                                                                                                                                                                                        |
| TIC      | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.                                                                                                                                                                                                                                                                      |

Report Format: Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
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## Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

## Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Chlordane:** The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Gasoline Range Organics (GRO):** Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

## Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**Report Format:** Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
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#### **Data Qualifiers**

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432275  
**Report Date:** 06/17/24

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 125 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates IIIA, April 1998.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.





## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

**EPA 624.1:** m/p-xylene, o-xylene, Naphthalene

**EPA 625.1:** alpha-Terpineol

**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

**EPA 8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

**SM 2540D:** TSS.

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Nonpotable Water:** **EPA RSK-175 Dissolved Gases**

**Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

**EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

**EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**

**EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

#### Non-Potable Water

**SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

**SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

**EPA 624.1:** Volatile Halocarbons & Aromatics,

**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables).

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.**

### Mansfield Facility:

#### Drinking Water

**EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.

**EPA 522, EPA 537.1.**

#### Non-Potable Water

**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

**EPA 245.1** Hg.

**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                     |  |                                                                         |             |                                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------|
|  <b>CHAIN OF CUSTODY</b><br>Westborough, MA 01581    Mansfield, MA 02048<br>8 Walkup Dr.    320 Forbes Blvd.<br>TEL: 508-898-9220    TEL: 508-822-9300<br>FAX: 508-898-9193    FAX: 508-822-3288 |  | <b>Service Centers</b><br>Brewer, ME 04412    Portsmouth, NH 03801 Melrose, NJ<br>07430    Albany, NY 12205<br>Tonawanda, NY 14150    Holmes, PA 19043                                                                                              |  | Page 1<br>of                                                            |             | Date Rec'd in Lab: <b>6/10/24</b>                                                                                                                                                                                              |                  | ALPHA Job #: <b>L2432275</b> |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
|                                                                                                                                                                                                                                                                                  |  | <b>Project Information</b><br>Project Name: <b>Steeplegate Mail Force Main/Gravity Sewer</b><br>Project Location: <b>Concord, NH</b><br>Project #: <b>0208898-001</b><br>(Use Project name as Project #) <input type="checkbox"/>                   |  |                                                                         |             | <b>Deliverables</b><br><input checked="" type="checkbox"/> Email <input type="checkbox"/> Fax<br><input checked="" type="checkbox"/> EQulS (1 File) <input type="checkbox"/> EQulS (4 File)<br><input type="checkbox"/> Other: |                  |                              |                                     | <b>Billing Information</b><br><input checked="" type="checkbox"/> Same as Client Info<br>PO #:                                                                                                                                                                                                                                                                                                                                    |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
|                                                                                                                                                                                                                                                                                  |  | <b>H&amp;A Information</b><br>H&A Client: <b>Erin Force</b><br>H&A Address: <b>75 Washington Ave, Suite 1A</b><br><b>Portland, ME 04101</b><br>H&A Phone: <b>(207) 482-4626</b><br>H&A Fax: <b>n/a</b><br>H&A Email: <b>Eforce@haleyaldrich.com</b> |  |                                                                         |             | <b>Regulatory Requirements (Program/Criteria)</b><br>Note: Select State from menu & identify criteria.                                                                                                                         |                  |                              |                                     | <b>Disposal Site Information</b><br>Please identify below location of applicable disposal facilities.<br>Disposal Facility:<br><input type="checkbox"/> NJ <input type="checkbox"/> NY<br><input type="checkbox"/> Other:                                                                                                                                                                                                         |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| These samples have been previously analyzed by Alpha <input type="checkbox"/><br>Other project specific requirements/comments:                                                                                                                                                   |  |                                                                                                                                                                                                                                                     |  |                                                                         |             | <b>ANALYSIS</b>                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     | <b>Sample Filtration</b><br><input type="checkbox"/> Done<br><input type="checkbox"/> Lab to do<br><input checked="" type="checkbox"/> Lab to do<br>(Please Specify below) |                                     | Total Bottles |                                     |                                     |                                     |                                     |          |
| Please specify Metals or TAL.                                                                                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                     |  |                                                                         |             | VOCs 8260D/5035 H&L<br>PAHs 8270E<br>TPH DRO<br>Total Solids SM 2540<br>pH 9045<br>PCBs 8082A<br>RCRA 8 Metals 6010D/74<br>Haz. Waste Characterization                                                                         |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     | <b>Sample Specific Comments</b>                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| ALPHA Lab ID (Lab Use Only)                                                                                                                                                                                                                                                      |  | Sample ID                                                                                                                                                                                                                                           |  | Collection                                                              |             | Sample Matrix                                                                                                                                                                                                                  | Sampler Initials | Depth                        |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                     |  | Date                                                                    | Time        |                                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| <b>32275 -01</b>                                                                                                                                                                                                                                                                 |  | <b>HA24-13-0.5-25</b>                                                                                                                                                                                                                               |  | <b>6/10/24</b>                                                          | <b>0845</b> | <b>So/Full</b>                                                                                                                                                                                                                 | <b>SGS</b>       | <b>0.5-25</b>                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                                                                                                                                        | <input checked="" type="checkbox"/> |               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <b>6</b> |
| <b>-02</b>                                                                                                                                                                                                                                                                       |  | <b>HA24-13-25-4.5</b>                                                                                                                                                                                                                               |  | <b>6/10/24</b>                                                          | <b>0900</b> | <b>So/Full</b>                                                                                                                                                                                                                 | <b>SGS</b>       | <b>25-4.5</b>                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                                                                                                                                        | <input checked="" type="checkbox"/> |               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <b>6</b> |
| <b>-03</b>                                                                                                                                                                                                                                                                       |  | <b>HA24-18-0.5-25</b>                                                                                                                                                                                                                               |  | <b>6/10/24</b>                                                          | <b>1200</b> | <b>So/SAND</b>                                                                                                                                                                                                                 | <b>SGS</b>       | <b>0.5-25</b>                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                                                                                                                                        | <input checked="" type="checkbox"/> |               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <b>6</b> |
|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                     |  |                                                                         |             |                                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                     |  |                                                                         |             |                                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                     |  |                                                                         |             |                                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| Preservative Code:<br>A = None<br>B = HCl<br>C = HNO <sub>3</sub><br>D = H <sub>2</sub> SO <sub>4</sub><br>E = NaOH<br>F = MeOH<br>G = NaHSO <sub>4</sub><br>H = Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub><br>K/E = Zn Ac/NaOH<br>O = Other                                  |  | Container Code:<br>P = Plastic<br>A = Amber Glass<br>V = Vial<br>G = Glass<br>B = Bacteria Cup<br>C = Cube<br>O = Other<br>E = Encore<br>D = BOD Bottle                                                                                             |  | Westboro: Certification No: MA935<br>Mansfield: Certification No: MA015 |             | Container Type                                                                                                                                                                                                                 |                  | Preservative                 |                                     | Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2022-24-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical. |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| Relinquished By: <i>[Signature]</i>                                                                                                                                                                                                                                              |  |                                                                                                                                                                                                                                                     |  | Date/Time: <b>6/10/24 1315</b>                                          |             | Received By: <i>[Signature]</i>                                                                                                                                                                                                |                  |                              |                                     | Date/Time: <b>6/10/24 1315</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| <i>[Signature]</i>                                                                                                                                                                                                                                                               |  |                                                                                                                                                                                                                                                     |  | Date/Time: <b>6/10/24 1825</b>                                          |             | <i>[Signature]</i>                                                                                                                                                                                                             |                  |                              |                                     | Date/Time: <b>6/10/24 1825</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |
| Document ID: 20455 Rev 4 (11/22/2021)                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                     |  |                                                                         |             |                                                                                                                                                                                                                                |                  |                              |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                            |                                     |               |                                     |                                     |                                     |                                     |          |

## HA24-23 and HA24-28 Test Results



## ANALYTICAL REPORT

|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Lab Number:     | L2432632                                                      |
| Client:         | Haley & Aldrich<br>3 Bedford Farms Drive<br>Bedford, NH 03110 |
| ATTN:           | Erin Force                                                    |
| Phone:          | (603) 391-3332                                                |
| Project Name:   | STEEPLEGATE MALL FORCE MAIN                                   |
| Project Number: | 0208898-001                                                   |
| Report Date:    | 06/18/24                                                      |

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

| <b>Alpha<br/>Sample ID</b> | <b>Client ID</b> | <b>Matrix</b> | <b>Sample<br/>Location</b> | <b>Collection<br/>Date/Time</b> | <b>Receive Date</b> |
|----------------------------|------------------|---------------|----------------------------|---------------------------------|---------------------|
| L2432632-01                | HA24-23_0.5-2.5  | SOIL          | CONCORD, NH                | 06/11/24 09:40                  | 06/11/24            |
| L2432632-02                | HA24-23_2.5-4.5  | SOIL          | CONCORD, NH                | 06/11/24 09:55                  | 06/11/24            |
| L2432632-03                | HA24-28_0.5-2.5  | SOIL          | CONCORD, NH                | 06/11/24 11:50                  | 06/11/24            |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

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**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Case Narrative (continued)

#### Sample Receipt

The analyses performed were specified by the client.

#### Total Metals

L2432632-01 through -03: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

The WG1934595-4 Laboratory Duplicate RPD for lead (27%), performed on L2432632-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Kelly O'Neill

Title: Technical Director/Representative

Date: 06/18/24

# ORGANICS



# VOLATILES

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/16/24 23:11  
**Analyst:** AJK  
**Percent Solids:** 91%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.9  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.8  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.2  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.59 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.59 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.7  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.59 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.59 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.2  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.59 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.59 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.59 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.7  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.59 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.59 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.2  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.7  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.8  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-01  
 Client ID: HA24-23\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/11/24 09:40  
 Date Received: 06/11/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.59 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.3  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.3  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.2  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.3  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 12   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 29   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 12   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 12   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 12   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 12   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.3  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.7  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.59 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.2  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.3  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.3  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.5  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.7  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.2  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.7  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.2  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.3 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.3 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 23  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 94  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 99         |           | 70-130              |
| Toluene-d8            | 97         |           | 70-130              |
| 4-Bromofluorobenzene  | 107        |           | 70-130              |
| Dibromofluoromethane  | 99         |           | 70-130              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/17/24 21:50  
**Analyst:** JIC  
**Percent Solids:** 98%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.7  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.57 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.57 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.6  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.57 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.57 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.57 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.57 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.57 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.6  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.57 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.57 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.6  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-02  
 Client ID: HA24-23\_2.5-4.5  
 Sample Location: CONCORD, NH

Date Collected: 06/11/24 09:55  
 Date Received: 06/11/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.57 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.3  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.3  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.3  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 29   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.3  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.6  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.57 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.3  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.3  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.4  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.6  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.6  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.3 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.3 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 23  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 92  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 100        |           | 70-130              |
| Toluene-d8            | 98         |           | 70-130              |
| 4-Bromofluorobenzene  | 92         |           | 70-130              |
| Dibromofluoromethane  | 102        |           | 70-130              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/17/24 22:16  
**Analyst:** JIC  
**Percent Solids:** 86%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.6  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.56 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.56 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.4  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.56 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.4  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.4  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-03  
 Client ID: HA24-28\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/11/24 11:50  
 Date Received: 06/11/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 28   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.4  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.3  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.4  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.4  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 89  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 102        |           | 70-130              |
| Toluene-d8            | 98         |           | 70-130              |
| 4-Bromofluorobenzene  | 95         |           | 70-130              |
| Dibromofluoromethane  | 103        |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260D  
Analytical Date: 06/16/24 19:59  
Analyst: AJK

| Parameter                                                                                | Result | Qualifier | Units | RL   | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1935795-5 |        |           |       |      |     |
| Methylene chloride                                                                       | ND     |           | ug/kg | 5.0  | --  |
| 1,1-Dichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| Chloroform                                                                               | ND     |           | ug/kg | 1.5  | --  |
| Carbon tetrachloride                                                                     | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloropropane                                                                      | ND     |           | ug/kg | 1.0  | --  |
| Dibromochloromethane                                                                     | ND     |           | ug/kg | 1.0  | --  |
| 1,1,2-Trichloroethane                                                                    | ND     |           | ug/kg | 1.0  | --  |
| Tetrachloroethene                                                                        | ND     |           | ug/kg | 0.50 | --  |
| Chlorobenzene                                                                            | ND     |           | ug/kg | 0.50 | --  |
| Trichlorofluoromethane                                                                   | ND     |           | ug/kg | 4.0  | --  |
| 1,2-Dichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1-Trichloroethane                                                                    | ND     |           | ug/kg | 0.50 | --  |
| Bromodichloromethane                                                                     | ND     |           | ug/kg | 0.50 | --  |
| trans-1,3-Dichloropropene                                                                | ND     |           | ug/kg | 1.0  | --  |
| cis-1,3-Dichloropropene                                                                  | ND     |           | ug/kg | 0.50 | --  |
| 1,3-Dichloropropene, Total                                                               | ND     |           | ug/kg | 0.50 | --  |
| 1,1-Dichloropropene                                                                      | ND     |           | ug/kg | 0.50 | --  |
| Bromoform                                                                                | ND     |           | ug/kg | 4.0  | --  |
| 1,1,2,2-Tetrachloroethane                                                                | ND     |           | ug/kg | 0.50 | --  |
| Benzene                                                                                  | ND     |           | ug/kg | 0.50 | --  |
| Toluene                                                                                  | ND     |           | ug/kg | 1.0  | --  |
| Ethylbenzene                                                                             | ND     |           | ug/kg | 1.0  | --  |
| Chloromethane                                                                            | ND     |           | ug/kg | 4.0  | --  |
| Bromomethane                                                                             | ND     |           | ug/kg | 2.0  | --  |
| Vinyl chloride                                                                           | ND     |           | ug/kg | 1.0  | --  |
| Chloroethane                                                                             | ND     |           | ug/kg | 2.0  | --  |
| 1,1-Dichloroethene                                                                       | ND     |           | ug/kg | 1.0  | --  |
| trans-1,2-Dichloroethene                                                                 | ND     |           | ug/kg | 1.5  | --  |
| Trichloroethene                                                                          | ND     |           | ug/kg | 0.50 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260D  
Analytical Date: 06/16/24 19:59  
Analyst: AJK

| Parameter                                                                                | Result | Qualifier | Units | RL   | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1935795-5 |        |           |       |      |     |
| 1,2-Dichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| 1,3-Dichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| 1,4-Dichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| Methyl tert butyl ether                                                                  | ND     |           | ug/kg | 2.0  | --  |
| p/m-Xylene                                                                               | ND     |           | ug/kg | 2.0  | --  |
| o-Xylene                                                                                 | ND     |           | ug/kg | 1.0  | --  |
| Xylenes, Total                                                                           | ND     |           | ug/kg | 1.0  | --  |
| cis-1,2-Dichloroethene                                                                   | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloroethene, Total                                                                | ND     |           | ug/kg | 1.0  | --  |
| Dibromomethane                                                                           | ND     |           | ug/kg | 2.0  | --  |
| 1,2,3-Trichloropropane                                                                   | ND     |           | ug/kg | 2.0  | --  |
| Styrene                                                                                  | ND     |           | ug/kg | 1.0  | --  |
| Dichlorodifluoromethane                                                                  | ND     |           | ug/kg | 10   | --  |
| Acetone                                                                                  | ND     |           | ug/kg | 25   | --  |
| Carbon disulfide                                                                         | ND     |           | ug/kg | 10   | --  |
| 2-Butanone                                                                               | ND     |           | ug/kg | 10   | --  |
| 4-Methyl-2-pentanone                                                                     | ND     |           | ug/kg | 10   | --  |
| 2-Hexanone                                                                               | ND     |           | ug/kg | 10   | --  |
| Bromochloromethane                                                                       | ND     |           | ug/kg | 2.0  | --  |
| Tetrahydrofuran                                                                          | ND     |           | ug/kg | 4.0  | --  |
| 2,2-Dichloropropane                                                                      | ND     |           | ug/kg | 2.0  | --  |
| 1,2-Dibromoethane                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1,2-Tetrachloroethane                                                                | ND     |           | ug/kg | 0.50 | --  |
| Bromobenzene                                                                             | ND     |           | ug/kg | 2.0  | --  |
| n-Butylbenzene                                                                           | ND     |           | ug/kg | 1.0  | --  |
| sec-Butylbenzene                                                                         | ND     |           | ug/kg | 1.0  | --  |
| tert-Butylbenzene                                                                        | ND     |           | ug/kg | 2.0  | --  |
| 1,3,5-Trichlorobenzene                                                                   | ND     |           | ug/kg | 2.0  | --  |
| o-Chlorotoluene                                                                          | ND     |           | ug/kg | 2.0  | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8260D  
**Analytical Date:** 06/16/24 19:59  
**Analyst:** AJK

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1935795-5 |        |           |       |     |     |
| p-Chlorotoluene                                                                          | ND     |           | ug/kg | 2.0 | --  |
| 1,2-Dibromo-3-chloropropane                                                              | ND     |           | ug/kg | 3.0 | --  |
| Hexachlorobutadiene                                                                      | ND     |           | ug/kg | 4.0 | --  |
| Isopropylbenzene                                                                         | ND     |           | ug/kg | 1.0 | --  |
| p-Isopropyltoluene                                                                       | ND     |           | ug/kg | 1.0 | --  |
| Naphthalene                                                                              | ND     |           | ug/kg | 4.0 | --  |
| n-Propylbenzene                                                                          | ND     |           | ug/kg | 1.0 | --  |
| 1,2,3-Trichlorobenzene                                                                   | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trichlorobenzene                                                                   | ND     |           | ug/kg | 2.0 | --  |
| 1,3,5-Trimethylbenzene                                                                   | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trimethylbenzene                                                                   | ND     |           | ug/kg | 2.0 | --  |
| Ethyl ether                                                                              | ND     |           | ug/kg | 2.0 | --  |
| Isopropyl Ether                                                                          | ND     |           | ug/kg | 2.0 | --  |
| Tert-Butyl Alcohol                                                                       | ND     |           | ug/kg | 20  | --  |
| Ethyl-Tert-Butyl-Ether                                                                   | ND     |           | ug/kg | 2.0 | --  |
| Tertiary-Amyl Methyl Ether                                                               | ND     |           | ug/kg | 2.0 | --  |
| 1,4-Dioxane                                                                              | ND     |           | ug/kg | 80  | --  |

| Surrogate             | %Recovery | Qualifier | Acceptance Criteria |
|-----------------------|-----------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 94        |           | 70-130              |
| Toluene-d8            | 99        |           | 70-130              |
| 4-Bromofluorobenzene  | 78        |           | 70-130              |
| Dibromofluoromethane  | 96        |           | 70-130              |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/17/24 21:24  
 Analyst: MAG

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02-03 Batch: WG1935830-5 |        |           |       |      |     |
| Methylene chloride                                                                          | ND     |           | ug/kg | 5.0  | --  |
| 1,1-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| Chloroform                                                                                  | ND     |           | ug/kg | 1.5  | --  |
| Carbon tetrachloride                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloropropane                                                                         | ND     |           | ug/kg | 1.0  | --  |
| Dibromochloromethane                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,1,2-Trichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| Tetrachloroethene                                                                           | ND     |           | ug/kg | 0.50 | --  |
| Chlorobenzene                                                                               | ND     |           | ug/kg | 0.50 | --  |
| Trichlorofluoromethane                                                                      | ND     |           | ug/kg | 4.0  | --  |
| 1,2-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1-Trichloroethane                                                                       | ND     |           | ug/kg | 0.50 | --  |
| Bromodichloromethane                                                                        | ND     |           | ug/kg | 0.50 | --  |
| trans-1,3-Dichloropropene                                                                   | ND     |           | ug/kg | 1.0  | --  |
| cis-1,3-Dichloropropene                                                                     | ND     |           | ug/kg | 0.50 | --  |
| 1,3-Dichloropropene, Total                                                                  | ND     |           | ug/kg | 0.50 | --  |
| 1,1-Dichloropropene                                                                         | ND     |           | ug/kg | 0.50 | --  |
| Bromoform                                                                                   | ND     |           | ug/kg | 4.0  | --  |
| 1,1,2,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Benzene                                                                                     | ND     |           | ug/kg | 0.50 | --  |
| Toluene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Ethylbenzene                                                                                | ND     |           | ug/kg | 1.0  | --  |
| Chloromethane                                                                               | ND     |           | ug/kg | 4.0  | --  |
| Bromomethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| Vinyl chloride                                                                              | ND     |           | ug/kg | 1.0  | --  |
| Chloroethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| 1,1-Dichloroethene                                                                          | ND     |           | ug/kg | 1.0  | --  |
| trans-1,2-Dichloroethene                                                                    | ND     |           | ug/kg | 1.5  | --  |
| Trichloroethene                                                                             | ND     |           | ug/kg | 0.50 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/17/24 21:24  
 Analyst: MAG

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02-03 Batch: WG1935830-5 |        |           |       |      |     |
| 1,2-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,3-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,4-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| Methyl tert butyl ether                                                                     | ND     |           | ug/kg | 2.0  | --  |
| p/m-Xylene                                                                                  | ND     |           | ug/kg | 2.0  | --  |
| o-Xylene                                                                                    | ND     |           | ug/kg | 1.0  | --  |
| Xylenes, Total                                                                              | ND     |           | ug/kg | 1.0  | --  |
| cis-1,2-Dichloroethene                                                                      | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloroethene, Total                                                                   | ND     |           | ug/kg | 1.0  | --  |
| Dibromomethane                                                                              | ND     |           | ug/kg | 2.0  | --  |
| 1,2,3-Trichloropropane                                                                      | ND     |           | ug/kg | 2.0  | --  |
| Styrene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Dichlorodifluoromethane                                                                     | ND     |           | ug/kg | 10   | --  |
| Acetone                                                                                     | ND     |           | ug/kg | 25   | --  |
| Carbon disulfide                                                                            | ND     |           | ug/kg | 10   | --  |
| 2-Butanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| 4-Methyl-2-pentanone                                                                        | ND     |           | ug/kg | 10   | --  |
| 2-Hexanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| Bromochloromethane                                                                          | ND     |           | ug/kg | 2.0  | --  |
| Tetrahydrofuran                                                                             | ND     |           | ug/kg | 4.0  | --  |
| 2,2-Dichloropropane                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,2-Dibromoethane                                                                           | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Bromobenzene                                                                                | ND     |           | ug/kg | 2.0  | --  |
| n-Butylbenzene                                                                              | ND     |           | ug/kg | 1.0  | --  |
| sec-Butylbenzene                                                                            | ND     |           | ug/kg | 1.0  | --  |
| tert-Butylbenzene                                                                           | ND     |           | ug/kg | 2.0  | --  |
| 1,3,5-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| o-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0  | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8260D  
**Analytical Date:** 06/17/24 21:24  
**Analyst:** MAG

| Parameter                                                                                   | Result | Qualifier | Units | RL  | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02-03 Batch: WG1935830-5 |        |           |       |     |     |
| p-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0 | --  |
| 1,2-Dibromo-3-chloropropane                                                                 | ND     |           | ug/kg | 3.0 | --  |
| Hexachlorobutadiene                                                                         | ND     |           | ug/kg | 4.0 | --  |
| Isopropylbenzene                                                                            | ND     |           | ug/kg | 1.0 | --  |
| p-Isopropyltoluene                                                                          | ND     |           | ug/kg | 1.0 | --  |
| Naphthalene                                                                                 | ND     |           | ug/kg | 4.0 | --  |
| n-Propylbenzene                                                                             | ND     |           | ug/kg | 1.0 | --  |
| 1,2,3-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,3,5-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Ethyl ether                                                                                 | ND     |           | ug/kg | 2.0 | --  |
| Isopropyl Ether                                                                             | ND     |           | ug/kg | 2.0 | --  |
| Tert-Butyl Alcohol                                                                          | ND     |           | ug/kg | 20  | --  |
| Ethyl-Tert-Butyl-Ether                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Tertiary-Amyl Methyl Ether                                                                  | ND     |           | ug/kg | 2.0 | --  |
| 1,4-Dioxane                                                                                 | ND     |           | ug/kg | 80  | --  |

| Surrogate             | %Recovery | Qualifier | Acceptance Criteria |
|-----------------------|-----------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 96        |           | 70-130              |
| Toluene-d8            | 96        |           | 70-130              |
| 4-Bromofluorobenzene  | 93        |           | 70-130              |
| Dibromofluoromethane  | 98        |           | 70-130              |





# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1935795-3 WG1935795-4 |                  |      |                   |      |                     |     |      |               |
| Methylene chloride                                                                                          | 93               |      | 101               |      | 70-130              | 8   |      | 30            |
| 1,1-Dichloroethane                                                                                          | 96               |      | 105               |      | 70-130              | 9   |      | 30            |
| Chloroform                                                                                                  | 99               |      | 104               |      | 70-130              | 5   |      | 30            |
| Carbon tetrachloride                                                                                        | 108              |      | 106               |      | 70-130              | 2   |      | 30            |
| 1,2-Dichloropropane                                                                                         | 115              |      | 107               |      | 70-130              | 7   |      | 30            |
| Dibromochloromethane                                                                                        | 111              |      | 106               |      | 70-130              | 5   |      | 30            |
| 1,1,2-Trichloroethane                                                                                       | 105              |      | 99                |      | 70-130              | 6   |      | 30            |
| Tetrachloroethene                                                                                           | 93               |      | 93                |      | 70-130              | 0   |      | 30            |
| Chlorobenzene                                                                                               | 104              |      | 101               |      | 70-130              | 3   |      | 30            |
| Trichlorofluoromethane                                                                                      | 93               |      | 74                |      | 70-139              | 23  |      | 30            |
| 1,2-Dichloroethane                                                                                          | 97               |      | 96                |      | 70-130              | 1   |      | 30            |
| 1,1,1-Trichloroethane                                                                                       | 105              |      | 105               |      | 70-130              | 0   |      | 30            |
| Bromodichloromethane                                                                                        | 117              |      | 105               |      | 70-130              | 11  |      | 30            |
| trans-1,3-Dichloropropene                                                                                   | 107              |      | 102               |      | 70-130              | 5   |      | 30            |
| cis-1,3-Dichloropropene                                                                                     | 125              |      | 96                |      | 70-130              | 26  |      | 30            |
| 1,1-Dichloropropene                                                                                         | 90               |      | 96                |      | 70-130              | 6   |      | 30            |
| Bromoform                                                                                                   | 103              |      | 86                |      | 70-130              | 18  |      | 30            |
| 1,1,2,2-Tetrachloroethane                                                                                   | 105              |      | 103               |      | 70-130              | 2   |      | 30            |
| Benzene                                                                                                     | 103              |      | 109               |      | 70-130              | 6   |      | 30            |
| Toluene                                                                                                     | 104              |      | 101               |      | 70-130              | 3   |      | 30            |
| Ethylbenzene                                                                                                | 104              |      | 102               |      | 70-130              | 2   |      | 30            |
| Chloromethane                                                                                               | 92               |      | 83                |      | 52-130              | 10  |      | 30            |
| Bromomethane                                                                                                | 51               | Q    | 38                | Q    | 57-147              | 29  |      | 30            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1935795-3 WG1935795-4 |                  |      |                   |      |                     |     |      |               |
| Vinyl chloride                                                                                              | 67               |      | 60                | Q    | 67-130              | 11  |      | 30            |
| Chloroethane                                                                                                | 64               |      | 52                |      | 50-151              | 21  |      | 30            |
| 1,1-Dichloroethene                                                                                          | 86               |      | 80                |      | 65-135              | 7   |      | 30            |
| trans-1,2-Dichloroethene                                                                                    | 97               |      | 104               |      | 70-130              | 7   |      | 30            |
| Trichloroethene                                                                                             | 104              |      | 103               |      | 70-130              | 1   |      | 30            |
| 1,2-Dichlorobenzene                                                                                         | 105              |      | 86                |      | 70-130              | 20  |      | 30            |
| 1,3-Dichlorobenzene                                                                                         | 104              |      | 103               |      | 70-130              | 1   |      | 30            |
| 1,4-Dichlorobenzene                                                                                         | 103              |      | 97                |      | 70-130              | 6   |      | 30            |
| Methyl tert butyl ether                                                                                     | 98               |      | 102               |      | 66-130              | 4   |      | 30            |
| p/m-Xylene                                                                                                  | 96               |      | 94                |      | 70-130              | 2   |      | 30            |
| o-Xylene                                                                                                    | 93               |      | 90                |      | 70-130              | 3   |      | 30            |
| cis-1,2-Dichloroethene                                                                                      | 99               |      | 103               |      | 70-130              | 4   |      | 30            |
| Dibromomethane                                                                                              | 110              |      | 101               |      | 70-130              | 9   |      | 30            |
| 1,2,3-Trichloropropane                                                                                      | 102              |      | 96                |      | 68-130              | 6   |      | 30            |
| Styrene                                                                                                     | 95               |      | 87                |      | 70-130              | 9   |      | 30            |
| Dichlorodifluoromethane                                                                                     | 106              |      | 81                |      | 30-146              | 27  |      | 30            |
| Acetone                                                                                                     | 105              |      | 97                |      | 54-140              | 8   |      | 30            |
| Carbon disulfide                                                                                            | 84               |      | 79                |      | 59-130              | 6   |      | 30            |
| 2-Butanone                                                                                                  | 104              |      | 103               |      | 70-130              | 1   |      | 30            |
| 4-Methyl-2-pentanone                                                                                        | 102              |      | 94                |      | 70-130              | 8   |      | 30            |
| 2-Hexanone                                                                                                  | 108              |      | 100               |      | 70-130              | 8   |      | 30            |
| Bromochloromethane                                                                                          | 112              |      | 104               |      | 70-130              | 7   |      | 30            |
| Tetrahydrofuran                                                                                             | 121              |      | 97                |      | 66-130              | 22  |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432632

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1935795-3 WG1935795-4 |                  |      |                   |      |                     |     |      |               |
| 2,2-Dichloropropane                                                                                         | 101              |      | 105               |      | 70-130              | 4   |      | 30            |
| 1,2-Dibromoethane                                                                                           | 109              |      | 103               |      | 70-130              | 6   |      | 30            |
| 1,1,1,2-Tetrachloroethane                                                                                   | 104              |      | 100               |      | 70-130              | 4   |      | 30            |
| Bromobenzene                                                                                                | 101              |      | 102               |      | 70-130              | 1   |      | 30            |
| n-Butylbenzene                                                                                              | 110              |      | 76                |      | 70-130              | 37  | Q    | 30            |
| sec-Butylbenzene                                                                                            | 107              |      | 108               |      | 70-130              | 1   |      | 30            |
| tert-Butylbenzene                                                                                           | 106              |      | 108               |      | 70-130              | 2   |      | 30            |
| 1,3,5-Trichlorobenzene                                                                                      | 103              |      | 101               |      | 70-139              | 2   |      | 30            |
| o-Chlorotoluene                                                                                             | 107              |      | 106               |      | 70-130              | 1   |      | 30            |
| p-Chlorotoluene                                                                                             | 106              |      | 106               |      | 70-130              | 0   |      | 30            |
| 1,2-Dibromo-3-chloropropane                                                                                 | 106              |      | 102               |      | 68-130              | 4   |      | 30            |
| Hexachlorobutadiene                                                                                         | 99               |      | 100               |      | 67-130              | 1   |      | 30            |
| Isopropylbenzene                                                                                            | 99               |      | 99                |      | 70-130              | 0   |      | 30            |
| p-Isopropyltoluene                                                                                          | 99               |      | 98                |      | 70-130              | 1   |      | 30            |
| Naphthalene                                                                                                 | 116              |      | 112               |      | 70-130              | 4   |      | 30            |
| n-Propylbenzene                                                                                             | 106              |      | 109               |      | 70-130              | 3   |      | 30            |
| 1,2,3-Trichlorobenzene                                                                                      | 105              |      | 103               |      | 70-130              | 2   |      | 30            |
| 1,2,4-Trichlorobenzene                                                                                      | 108              |      | 106               |      | 70-130              | 2   |      | 30            |
| 1,3,5-Trimethylbenzene                                                                                      | 105              |      | 106               |      | 70-130              | 1   |      | 30            |
| 1,2,4-Trimethylbenzene                                                                                      | 104              |      | 103               |      | 70-130              | 1   |      | 30            |
| Ethyl ether                                                                                                 | 91               |      | 74                |      | 67-130              | 21  |      | 30            |
| Isopropyl Ether                                                                                             | 106              |      | 114               |      | 66-130              | 7   |      | 30            |
| Tert-Butyl Alcohol                                                                                          | 106              |      | 106               |      | 70-130              | 0   |      | 30            |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1935795-3 WG1935795-4 |                  |      |                   |      |                     |     |      |               |
| Ethyl-Tert-Butyl-Ether                                                                                      | 104              |      | 108               |      | 70-130              | 4   |      | 30            |
| Tertiary-Amyl Methyl Ether                                                                                  | 102              |      | 105               |      | 70-130              | 3   |      | 30            |
| 1,4-Dioxane                                                                                                 | 124              |      | 96                |      | 65-136              | 25  |      | 30            |

| Surrogate             | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria |
|-----------------------|------------------|------|-------------------|------|------------------------|
| 1,2-Dichloroethane-d4 | 91               |      | 93                |      | 70-130                 |
| Toluene-d8            | 99               |      | 100               |      | 70-130                 |
| 4-Bromofluorobenzene  | 101              |      | 106               |      | 70-130                 |
| Dibromofluoromethane  | 101              |      | 100               |      | 70-130                 |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02-03 Batch: WG1935830-3 WG1935830-4 |                  |      |                   |      |                     |     |      |               |
| Methylene chloride                                                                                             | 87               |      | 85                |      | 70-130              | 2   |      | 30            |
| 1,1-Dichloroethane                                                                                             | 83               |      | 80                |      | 70-130              | 4   |      | 30            |
| Chloroform                                                                                                     | 82               |      | 80                |      | 70-130              | 2   |      | 30            |
| Carbon tetrachloride                                                                                           | 83               |      | 80                |      | 70-130              | 4   |      | 30            |
| 1,2-Dichloropropane                                                                                            | 83               |      | 81                |      | 70-130              | 2   |      | 30            |
| Dibromochloromethane                                                                                           | 83               |      | 84                |      | 70-130              | 1   |      | 30            |
| 1,1,2-Trichloroethane                                                                                          | 83               |      | 83                |      | 70-130              | 0   |      | 30            |
| Tetrachloroethene                                                                                              | 89               |      | 85                |      | 70-130              | 5   |      | 30            |
| Chlorobenzene                                                                                                  | 84               |      | 82                |      | 70-130              | 2   |      | 30            |
| Trichlorofluoromethane                                                                                         | 86               |      | 80                |      | 70-139              | 7   |      | 30            |
| 1,2-Dichloroethane                                                                                             | 80               |      | 80                |      | 70-130              | 0   |      | 30            |
| 1,1,1-Trichloroethane                                                                                          | 86               |      | 82                |      | 70-130              | 5   |      | 30            |
| Bromodichloromethane                                                                                           | 82               |      | 82                |      | 70-130              | 0   |      | 30            |
| trans-1,3-Dichloropropene                                                                                      | 82               |      | 82                |      | 70-130              | 0   |      | 30            |
| cis-1,3-Dichloropropene                                                                                        | 84               |      | 84                |      | 70-130              | 0   |      | 30            |
| 1,1-Dichloropropene                                                                                            | 88               |      | 85                |      | 70-130              | 3   |      | 30            |
| Bromoform                                                                                                      | 81               |      | 84                |      | 70-130              | 4   |      | 30            |
| 1,1,2,2-Tetrachloroethane                                                                                      | 83               |      | 86                |      | 70-130              | 4   |      | 30            |
| Benzene                                                                                                        | 84               |      | 82                |      | 70-130              | 2   |      | 30            |
| Toluene                                                                                                        | 87               |      | 83                |      | 70-130              | 5   |      | 30            |
| Ethylbenzene                                                                                                   | 82               |      | 78                |      | 70-130              | 5   |      | 30            |
| Chloromethane                                                                                                  | 68               |      | 64                |      | 52-130              | 6   |      | 30            |
| Bromomethane                                                                                                   | 101              |      | 95                |      | 57-147              | 6   |      | 30            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432632

**Report Date:** 06/18/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02-03 Batch: WG1935830-3 WG1935830-4 |                  |      |                   |      |                     |     |      |               |
| Vinyl chloride                                                                                                 | 78               |      | 75                |      | 67-130              | 4   |      | 30            |
| Chloroethane                                                                                                   | 80               |      | 76                |      | 50-151              | 5   |      | 30            |
| 1,1-Dichloroethene                                                                                             | 85               |      | 82                |      | 65-135              | 4   |      | 30            |
| trans-1,2-Dichloroethene                                                                                       | 84               |      | 82                |      | 70-130              | 2   |      | 30            |
| Trichloroethene                                                                                                | 83               |      | 82                |      | 70-130              | 1   |      | 30            |
| 1,2-Dichlorobenzene                                                                                            | 83               |      | 83                |      | 70-130              | 0   |      | 30            |
| 1,3-Dichlorobenzene                                                                                            | 84               |      | 83                |      | 70-130              | 1   |      | 30            |
| 1,4-Dichlorobenzene                                                                                            | 83               |      | 82                |      | 70-130              | 1   |      | 30            |
| Methyl tert butyl ether                                                                                        | 82               |      | 82                |      | 66-130              | 0   |      | 30            |
| p/m-Xylene                                                                                                     | 84               |      | 81                |      | 70-130              | 4   |      | 30            |
| o-Xylene                                                                                                       | 83               |      | 81                |      | 70-130              | 2   |      | 30            |
| cis-1,2-Dichloroethene                                                                                         | 84               |      | 82                |      | 70-130              | 2   |      | 30            |
| Dibromomethane                                                                                                 | 82               |      | 83                |      | 70-130              | 1   |      | 30            |
| 1,2,3-Trichloropropane                                                                                         | 80               |      | 81                |      | 68-130              | 1   |      | 30            |
| Styrene                                                                                                        | 88               |      | 86                |      | 70-130              | 2   |      | 30            |
| Dichlorodifluoromethane                                                                                        | 62               |      | 60                |      | 30-146              | 3   |      | 30            |
| Acetone                                                                                                        | 77               |      | 71                |      | 54-140              | 8   |      | 30            |
| Carbon disulfide                                                                                               | 78               |      | 76                |      | 59-130              | 3   |      | 30            |
| 2-Butanone                                                                                                     | 81               |      | 84                |      | 70-130              | 4   |      | 30            |
| 4-Methyl-2-pentanone                                                                                           | 84               |      | 86                |      | 70-130              | 2   |      | 30            |
| 2-Hexanone                                                                                                     | 84               |      | 84                |      | 70-130              | 0   |      | 30            |
| Bromochloromethane                                                                                             | 84               |      | 84                |      | 70-130              | 0   |      | 30            |
| Tetrahydrofuran                                                                                                | 84               |      | 80                |      | 66-130              | 5   |      | 30            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02-03 Batch: WG1935830-3 WG1935830-4 |                  |      |                   |      |                     |     |      |               |
| 2,2-Dichloropropane                                                                                            | 80               |      | 77                |      | 70-130              | 4   |      | 30            |
| 1,2-Dibromoethane                                                                                              | 85               |      | 86                |      | 70-130              | 1   |      | 30            |
| 1,1,1,2-Tetrachloroethane                                                                                      | 83               |      | 83                |      | 70-130              | 0   |      | 30            |
| Bromobenzene                                                                                                   | 81               |      | 80                |      | 70-130              | 1   |      | 30            |
| n-Butylbenzene                                                                                                 | 86               |      | 82                |      | 70-130              | 5   |      | 30            |
| sec-Butylbenzene                                                                                               | 84               |      | 80                |      | 70-130              | 5   |      | 30            |
| tert-Butylbenzene                                                                                              | 82               |      | 80                |      | 70-130              | 2   |      | 30            |
| 1,3,5-Trichlorobenzene                                                                                         | 88               |      | 87                |      | 70-139              | 1   |      | 30            |
| o-Chlorotoluene                                                                                                | 79               |      | 80                |      | 70-130              | 1   |      | 30            |
| p-Chlorotoluene                                                                                                | 82               |      | 81                |      | 70-130              | 1   |      | 30            |
| 1,2-Dibromo-3-chloropropane                                                                                    | 82               |      | 86                |      | 68-130              | 5   |      | 30            |
| Hexachlorobutadiene                                                                                            | 85               |      | 82                |      | 67-130              | 4   |      | 30            |
| Isopropylbenzene                                                                                               | 82               |      | 80                |      | 70-130              | 2   |      | 30            |
| p-Isopropyltoluene                                                                                             | 84               |      | 81                |      | 70-130              | 4   |      | 30            |
| Naphthalene                                                                                                    | 82               |      | 85                |      | 70-130              | 4   |      | 30            |
| n-Propylbenzene                                                                                                | 82               |      | 80                |      | 70-130              | 2   |      | 30            |
| 1,2,3-Trichlorobenzene                                                                                         | 87               |      | 88                |      | 70-130              | 1   |      | 30            |
| 1,2,4-Trichlorobenzene                                                                                         | 89               |      | 88                |      | 70-130              | 1   |      | 30            |
| 1,3,5-Trimethylbenzene                                                                                         | 81               |      | 80                |      | 70-130              | 1   |      | 30            |
| 1,2,4-Trimethylbenzene                                                                                         | 82               |      | 79                |      | 70-130              | 4   |      | 30            |
| Ethyl ether                                                                                                    | 84               |      | 84                |      | 67-130              | 0   |      | 30            |
| Isopropyl Ether                                                                                                | 81               |      | 79                |      | 66-130              | 3   |      | 30            |
| Tert-Butyl Alcohol                                                                                             | 78               |      | 83                |      | 70-130              | 6   |      | 30            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24

| <b>Parameter</b>                                                                                               | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|----------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02-03 Batch: WG1935830-3 WG1935830-4 |                          |             |                           |             |                             |            |             |                       |
| Ethyl-Tert-Butyl-Ether                                                                                         | 82                       |             | 81                        |             | 70-130                      | 1          |             | 30                    |
| Tertiary-Amyl Methyl Ether                                                                                     | 82                       |             | 81                        |             | 70-130                      | 1          |             | 30                    |
| 1,4-Dioxane                                                                                                    | 96                       |             | 95                        |             | 65-136                      | 1          |             | 30                    |

| <b>Surrogate</b>      | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|-----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 1,2-Dichloroethane-d4 | 95                       |             | 96                        |             | 70-130                         |
| Toluene-d8            | 99                       |             | 98                        |             | 70-130                         |
| 4-Bromofluorobenzene  | 96                       |             | 96                        |             | 70-130                         |
| Dibromofluoromethane  | 101                      |             | 100                       |             | 70-130                         |



# SEMIVOLATILES

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 16:08  
**Analyst:** IM  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:20

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 600 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 180 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 160 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 180 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 180 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 180 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 180 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 180 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 180 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 180 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 180 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 180 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 220 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 200 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 520 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 160 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 160 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 180 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 180 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 180 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 180 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 180 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 180 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 180 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 410 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 220 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 180 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-01  
 Client ID: HA24-23\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/11/24 09:40  
 Date Received: 06/11/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 180 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 180 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 360 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 110 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 180 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 160 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 180 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 390 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 250 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 870 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 470 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 180 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 260 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 180 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 590 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 180 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 180 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 200 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 75         |           | 25-120              |
| Phenol-d6            | 79         |           | 10-120              |
| Nitrobenzene-d5      | 83         |           | 23-120              |
| 2-Fluorobiphenyl     | 91         |           | 30-120              |
| 2,4,6-Tribromophenol | 83         |           | 10-136              |
| 4-Terphenyl-d14      | 88         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 11:52  
**Analyst:** JJW  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:21

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 7.2 | --  | 1               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 7.2 | --  | 1               |
| Fluoranthene                                         | 200    |           | ug/kg | 7.2 | --  | 1               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 7.2 | --  | 1               |
| Naphthalene                                          | ND     |           | ug/kg | 7.2 | --  | 1               |
| Benzo(a)anthracene                                   | 97     |           | ug/kg | 7.2 | --  | 1               |
| Benzo(a)pyrene                                       | 120    |           | ug/kg | 7.2 | --  | 1               |
| Benzo(b)fluoranthene                                 | 150    |           | ug/kg | 7.2 | --  | 1               |
| Benzo(k)fluoranthene                                 | 46     |           | ug/kg | 7.2 | --  | 1               |
| Chrysene                                             | 94     |           | ug/kg | 7.2 | --  | 1               |
| Acenaphthylene                                       | 96     |           | ug/kg | 7.2 | --  | 1               |
| Anthracene                                           | 26     |           | ug/kg | 7.2 | --  | 1               |
| Benzo(ghi)perylene                                   | 67     |           | ug/kg | 7.2 | --  | 1               |
| Fluorene                                             | ND     |           | ug/kg | 7.2 | --  | 1               |
| Phenanthrene                                         | 48     |           | ug/kg | 7.2 | --  | 1               |
| Dibenzo(a,h)anthracene                               | 16     |           | ug/kg | 7.2 | --  | 1               |
| Indeno(1,2,3-cd)Pyrene                               | 81     |           | ug/kg | 7.2 | --  | 1               |
| Pyrene                                               | 180    |           | ug/kg | 7.2 | --  | 1               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 7.2 | --  | 1               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 7.2 | --  | 1               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 29  | --  | 1               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 7.2 | --  | 1               |
| Hexachloroethane                                     | ND     |           | ug/kg | 7.2 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 70         |           | 25-120              |
| Phenol-d6            | 86         |           | 10-120              |
| Nitrobenzene-d5      | 96         |           | 23-120              |
| 2-Fluorobiphenyl     | 66         |           | 30-120              |
| 2,4,6-Tribromophenol | 122        |           | 10-136              |
| 4-Terphenyl-d14      | 60         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 16:31  
**Analyst:** IM  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:20

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 550 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 130 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 380 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 360 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 800 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 540 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 79         |           | 25-120              |
| Phenol-d6            | 83         |           | 10-120              |
| Nitrobenzene-d5      | 88         |           | 23-120              |
| 2-Fluorobiphenyl     | 97         |           | 30-120              |
| 2,4,6-Tribromophenol | 85         |           | 10-136              |
| 4-Terphenyl-d14      | 98         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 16:16  
**Analyst:** JJW  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:21

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 6.7 | --  | 1               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 6.7 | --  | 1               |
| Fluoranthene                                         | ND     |           | ug/kg | 6.7 | --  | 1               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 6.7 | --  | 1               |
| Naphthalene                                          | ND     |           | ug/kg | 6.7 | --  | 1               |
| Benzo(a)anthracene                                   | ND     |           | ug/kg | 6.7 | --  | 1               |
| Benzo(a)pyrene                                       | ND     |           | ug/kg | 6.7 | --  | 1               |
| Benzo(b)fluoranthene                                 | ND     |           | ug/kg | 6.7 | --  | 1               |
| Benzo(k)fluoranthene                                 | ND     |           | ug/kg | 6.7 | --  | 1               |
| Chrysene                                             | ND     |           | ug/kg | 6.7 | --  | 1               |
| Acenaphthylene                                       | ND     |           | ug/kg | 6.7 | --  | 1               |
| Anthracene                                           | ND     |           | ug/kg | 6.7 | --  | 1               |
| Benzo(ghi)perylene                                   | ND     |           | ug/kg | 6.7 | --  | 1               |
| Fluorene                                             | ND     |           | ug/kg | 6.7 | --  | 1               |
| Phenanthrene                                         | ND     |           | ug/kg | 6.7 | --  | 1               |
| Dibenzo(a,h)anthracene                               | ND     |           | ug/kg | 6.7 | --  | 1               |
| Indeno(1,2,3-cd)Pyrene                               | ND     |           | ug/kg | 6.7 | --  | 1               |
| Pyrene                                               | ND     |           | ug/kg | 6.7 | --  | 1               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 6.7 | --  | 1               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 6.7 | --  | 1               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 27  | --  | 1               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 6.7 | --  | 1               |
| Hexachloroethane                                     | ND     |           | ug/kg | 6.7 | --  | 1               |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 62         |           | 25-120              |
| Phenol-d6            | 78         |           | 10-120              |
| Nitrobenzene-d5      | 92         |           | 23-120              |
| 2-Fluorobiphenyl     | 64         |           | 30-120              |
| 2,4,6-Tribromophenol | 92         |           | 10-136              |
| 4-Terphenyl-d14      | 50         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 16:55  
**Analyst:** IM  
**Percent Solids:** 86%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:20

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 630 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 190 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 170 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 190 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 190 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 190 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 190 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 190 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 190 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 190 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 190 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 190 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 230 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 210 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 550 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 170 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 170 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 150 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 190 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 190 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 190 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 190 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 190 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 190 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 190 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 440 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 230 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 190 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 190 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 190 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 190 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 190 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 380 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 120 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 190 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 190 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 190 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 410 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 270 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 920 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 500 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 190 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 190 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 280 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 190 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 620 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 190 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 190 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 210 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 77         |           | 25-120              |
| Phenol-d6            | 76         |           | 10-120              |
| Nitrobenzene-d5      | 88         |           | 23-120              |
| 2-Fluorobiphenyl     | 92         |           | 30-120              |
| 2,4,6-Tribromophenol | 81         |           | 10-136              |
| 4-Terphenyl-d14      | 87         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03 D  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 16:33  
**Analyst:** JJW  
**Percent Solids:** 86%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:21

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 38  | --  | 5               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 38  | --  | 5               |
| Fluoranthene                                         | 2000   |           | ug/kg | 38  | --  | 5               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 38  | --  | 5               |
| Naphthalene                                          | 81     |           | ug/kg | 38  | --  | 5               |
| Benzo(a)anthracene                                   | 1400   |           | ug/kg | 38  | --  | 5               |
| Benzo(a)pyrene                                       | 1500   |           | ug/kg | 38  | --  | 5               |
| Benzo(b)fluoranthene                                 | 1900   |           | ug/kg | 38  | --  | 5               |
| Benzo(k)fluoranthene                                 | 470    |           | ug/kg | 38  | --  | 5               |
| Chrysene                                             | 1300   |           | ug/kg | 38  | --  | 5               |
| Acenaphthylene                                       | 600    |           | ug/kg | 38  | --  | 5               |
| Anthracene                                           | 260    |           | ug/kg | 38  | --  | 5               |
| Benzo(ghi)perylene                                   | 760    |           | ug/kg | 38  | --  | 5               |
| Fluorene                                             | 49     |           | ug/kg | 38  | --  | 5               |
| Phenanthrene                                         | 630    |           | ug/kg | 38  | --  | 5               |
| Dibenzo(a,h)anthracene                               | 190    |           | ug/kg | 38  | --  | 5               |
| Indeno(1,2,3-cd)Pyrene                               | 980    |           | ug/kg | 38  | --  | 5               |
| Pyrene                                               | 1800   |           | ug/kg | 38  | --  | 5               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 38  | --  | 5               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 38  | --  | 5               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 150 | --  | 5               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 38  | --  | 5               |
| Hexachloroethane                                     | ND     |           | ug/kg | 38  | --  | 5               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03      D  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 75         |           | 25-120              |
| Phenol-d6            | 90         |           | 10-120              |
| Nitrobenzene-d5      | 109        |           | 23-120              |
| 2-Fluorobiphenyl     | 80         |           | 30-120              |
| 2,4,6-Tribromophenol | 126        |           | 10-136              |
| 4-Terphenyl-d14      | 61         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 12:18  
**Analyst:** IM

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:20

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1934982-1 |        |           |       |     |     |
| Acenaphthene                                                                             | ND     |           | ug/kg | 130 | --  |
| Benzidine                                                                                | ND     |           | ug/kg | 540 | --  |
| 1,2,4-Trichlorobenzene                                                                   | ND     |           | ug/kg | 160 | --  |
| Hexachlorobenzene                                                                        | ND     |           | ug/kg | 99  | --  |
| Bis(2-chloroethyl)ether                                                                  | ND     |           | ug/kg | 150 | --  |
| 2-Chloronaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,2-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,3-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,4-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 3,3'-Dichlorobenzidine                                                                   | ND     |           | ug/kg | 160 | --  |
| 2,4-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| 2,6-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| Azobenzene                                                                               | ND     |           | ug/kg | 160 | --  |
| Fluoranthene                                                                             | ND     |           | ug/kg | 99  | --  |
| 4-Chlorophenyl phenyl ether                                                              | ND     |           | ug/kg | 160 | --  |
| 4-Bromophenyl phenyl ether                                                               | ND     |           | ug/kg | 160 | --  |
| Bis(2-chloroisopropyl)ether                                                              | ND     |           | ug/kg | 200 | --  |
| Bis(2-chloroethoxy)methane                                                               | ND     |           | ug/kg | 180 | --  |
| Hexachlorobutadiene                                                                      | ND     |           | ug/kg | 160 | --  |
| Hexachlorocyclopentadiene                                                                | ND     |           | ug/kg | 470 | --  |
| Hexachloroethane                                                                         | ND     |           | ug/kg | 130 | --  |
| Isophorone                                                                               | ND     |           | ug/kg | 150 | --  |
| Naphthalene                                                                              | ND     |           | ug/kg | 160 | --  |
| Nitrobenzene                                                                             | ND     |           | ug/kg | 150 | --  |
| NDPA/DPA                                                                                 | ND     |           | ug/kg | 130 | --  |
| n-Nitrosodi-n-propylamine                                                                | ND     |           | ug/kg | 160 | --  |
| Bis(2-ethylhexyl)phthalate                                                               | ND     |           | ug/kg | 160 | --  |
| Butyl benzyl phthalate                                                                   | ND     |           | ug/kg | 160 | --  |
| Di-n-butylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 12:18  
**Analyst:** IM

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:20

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1934982-1 |        |           |       |     |     |
| Di-n-octylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |
| Diethyl phthalate                                                                        | ND     |           | ug/kg | 160 | --  |
| Dimethyl phthalate                                                                       | ND     |           | ug/kg | 160 | --  |
| Benzo(a)anthracene                                                                       | ND     |           | ug/kg | 99  | --  |
| Benzo(a)pyrene                                                                           | ND     |           | ug/kg | 130 | --  |
| Benzo(b)fluoranthene                                                                     | ND     |           | ug/kg | 99  | --  |
| Benzo(k)fluoranthene                                                                     | ND     |           | ug/kg | 99  | --  |
| Chrysene                                                                                 | ND     |           | ug/kg | 99  | --  |
| Acenaphthylene                                                                           | ND     |           | ug/kg | 130 | --  |
| Anthracene                                                                               | ND     |           | ug/kg | 99  | --  |
| Benzo(ghi)perylene                                                                       | ND     |           | ug/kg | 130 | --  |
| Fluorene                                                                                 | ND     |           | ug/kg | 160 | --  |
| Phenanthrene                                                                             | ND     |           | ug/kg | 99  | --  |
| Dibenzo(a,h)anthracene                                                                   | ND     |           | ug/kg | 99  | --  |
| Indeno(1,2,3-cd)pyrene                                                                   | ND     |           | ug/kg | 130 | --  |
| Pyrene                                                                                   | ND     |           | ug/kg | 99  | --  |
| Biphenyl                                                                                 | ND     |           | ug/kg | 380 | --  |
| Aniline                                                                                  | ND     |           | ug/kg | 200 | --  |
| 4-Chloroaniline                                                                          | ND     |           | ug/kg | 160 | --  |
| 1-Methylnaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 2-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 4-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| Dibenzofuran                                                                             | ND     |           | ug/kg | 160 | --  |
| 2-Methylnaphthalene                                                                      | ND     |           | ug/kg | 200 | --  |
| n-Nitrosodimethylamine                                                                   | ND     |           | ug/kg | 330 | --  |
| 2,4,6-Trichlorophenol                                                                    | ND     |           | ug/kg | 99  | --  |
| p-Chloro-m-cresol                                                                        | ND     |           | ug/kg | 160 | --  |
| 2-Chlorophenol                                                                           | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/17/24 12:18  
**Analyst:** IM

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:20

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1934982-1 |        |           |       |     |     |
| 2,4-Dichlorophenol                                                                       | ND     |           | ug/kg | 150 | --  |
| 2,4-Dimethylphenol                                                                       | ND     |           | ug/kg | 160 | --  |
| 2-Nitrophenol                                                                            | ND     |           | ug/kg | 360 | --  |
| 4-Nitrophenol                                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4-Dinitrophenol                                                                        | ND     |           | ug/kg | 790 | --  |
| 4,6-Dinitro-o-cresol                                                                     | ND     |           | ug/kg | 430 | --  |
| Pentachlorophenol                                                                        | ND     |           | ug/kg | 130 | --  |
| Phenol                                                                                   | ND     |           | ug/kg | 160 | --  |
| 2-Methylphenol                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Methylphenol/4-Methylphenol                                                            | ND     |           | ug/kg | 240 | --  |
| 2,4,5-Trichlorophenol                                                                    | ND     |           | ug/kg | 160 | --  |
| Benzoic Acid                                                                             | ND     |           | ug/kg | 530 | --  |
| Benzyl Alcohol                                                                           | ND     |           | ug/kg | 160 | --  |
| Carbazole                                                                                | ND     |           | ug/kg | 160 | --  |
| Pyridine                                                                                 | ND     |           | ug/kg | 180 | --  |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 67        |           | 25-120              |
| Phenol-d6            | 68        |           | 10-120              |
| Nitrobenzene-d5      | 73        |           | 23-120              |
| 2-Fluorobiphenyl     | 84        |           | 30-120              |
| 2,4,6-Tribromophenol | 74        |           | 10-136              |
| 4-Terphenyl-d14      | 86        |           | 18-120              |





**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 07:44  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:21

| Parameter                                                                                    | Result | Qualifier | Units | RL  | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1934983-1 |        |           |       |     |     |
| Acenaphthene                                                                                 | ND     |           | ug/kg | 6.6 | --  |
| 2-Chloronaphthalene                                                                          | ND     |           | ug/kg | 6.6 | --  |
| Fluoranthene                                                                                 | ND     |           | ug/kg | 6.6 | --  |
| Hexachlorobutadiene                                                                          | ND     |           | ug/kg | 6.6 | --  |
| Naphthalene                                                                                  | ND     |           | ug/kg | 6.6 | --  |
| Benzo(a)anthracene                                                                           | ND     |           | ug/kg | 6.6 | --  |
| Benzo(a)pyrene                                                                               | ND     |           | ug/kg | 6.6 | --  |
| Benzo(b)fluoranthene                                                                         | ND     |           | ug/kg | 6.6 | --  |
| Benzo(k)fluoranthene                                                                         | ND     |           | ug/kg | 6.6 | --  |
| Chrysene                                                                                     | ND     |           | ug/kg | 6.6 | --  |
| Acenaphthylene                                                                               | ND     |           | ug/kg | 6.6 | --  |
| Anthracene                                                                                   | ND     |           | ug/kg | 6.6 | --  |
| Benzo(ghi)perylene                                                                           | ND     |           | ug/kg | 6.6 | --  |
| Fluorene                                                                                     | ND     |           | ug/kg | 6.6 | --  |
| Phenanthrene                                                                                 | ND     |           | ug/kg | 6.6 | --  |
| Dibenzo(a,h)anthracene                                                                       | ND     |           | ug/kg | 6.6 | --  |
| Indeno(1,2,3-cd)Pyrene                                                                       | ND     |           | ug/kg | 6.6 | --  |
| Pyrene                                                                                       | ND     |           | ug/kg | 6.6 | --  |
| 1-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.6 | --  |
| 2-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.6 | --  |
| Pentachlorophenol                                                                            | ND     |           | ug/kg | 26  | --  |
| Hexachlorobenzene                                                                            | ND     |           | ug/kg | 6.6 | --  |
| Hexachloroethane                                                                             | ND     |           | ug/kg | 6.6 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 07:44  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 13:21

| Parameter                                                                                    | Result | Qualifier | Units | RL | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1934983-1 |        |           |       |    |     |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 45        |           | 25-120              |
| Phenol-d6            | 52        |           | 10-120              |
| Nitrobenzene-d5      | 70        |           | 23-120              |
| 2-Fluorobiphenyl     | 53        |           | 30-120              |
| 2,4,6-Tribromophenol | 50        |           | 10-136              |
| 4-Terphenyl-d14      | 44        |           | 18-120              |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934982-2 WG1934982-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                | 86               |      | 76                |      | 31-137              | 12  |      | 50            |
| Benzidine                                                                                                   | 30               |      | 33                |      | 10-66               | 10  |      | 50            |
| 1,2,4-Trichlorobenzene                                                                                      | 95               |      | 79                |      | 38-107              | 18  |      | 50            |
| Hexachlorobenzene                                                                                           | 91               |      | 80                |      | 40-140              | 13  |      | 50            |
| Bis(2-chloroethyl)ether                                                                                     | 79               |      | 66                |      | 40-140              | 18  |      | 50            |
| 2-Chloronaphthalene                                                                                         | 93               |      | 83                |      | 40-140              | 11  |      | 50            |
| 1,2-Dichlorobenzene                                                                                         | 86               |      | 70                |      | 40-140              | 21  |      | 50            |
| 1,3-Dichlorobenzene                                                                                         | 83               |      | 68                |      | 40-140              | 20  |      | 50            |
| 1,4-Dichlorobenzene                                                                                         | 86               |      | 69                |      | 28-104              | 22  |      | 50            |
| 3,3'-Dichlorobenzidine                                                                                      | 66               |      | 66                |      | 40-140              | 0   |      | 50            |
| 2,4-Dinitrotoluene                                                                                          | 100              |      | 92                |      | 40-132              | 8   |      | 50            |
| 2,6-Dinitrotoluene                                                                                          | 108              |      | 96                |      | 40-140              | 12  |      | 50            |
| Azobenzene                                                                                                  | 85               |      | 76                |      | 40-140              | 11  |      | 50            |
| Fluoranthene                                                                                                | 99               |      | 88                |      | 40-140              | 12  |      | 50            |
| 4-Chlorophenyl phenyl ether                                                                                 | 103              |      | 93                |      | 40-140              | 10  |      | 50            |
| 4-Bromophenyl phenyl ether                                                                                  | 98               |      | 88                |      | 40-140              | 11  |      | 50            |
| Bis(2-chloroisopropyl)ether                                                                                 | 85               |      | 69                |      | 40-140              | 21  |      | 50            |
| Bis(2-chloroethoxy)methane                                                                                  | 83               |      | 69                |      | 40-117              | 18  |      | 50            |
| Hexachlorobutadiene                                                                                         | 106              |      | 90                |      | 40-140              | 16  |      | 50            |
| Hexachlorocyclopentadiene                                                                                   | 90               |      | 74                |      | 40-140              | 20  |      | 50            |
| Hexachloroethane                                                                                            | 84               |      | 65                |      | 40-140              | 26  |      | 50            |
| Isophorone                                                                                                  | 86               |      | 73                |      | 40-140              | 16  |      | 50            |
| Naphthalene                                                                                                 | 88               |      | 74                |      | 40-140              | 17  |      | 50            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEELEGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432632

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934982-2 WG1934982-3 |                  |      |                   |      |                     |     |      |               |
| Nitrobenzene                                                                                                | 97               |      | 77                |      | 40-140              | 23  |      | 50            |
| NDPA/DPA                                                                                                    | 93               |      | 84                |      | 36-157              | 10  |      | 50            |
| n-Nitrosodi-n-propylamine                                                                                   | 87               |      | 72                |      | 32-121              | 19  |      | 50            |
| Bis(2-ethylhexyl)phthalate                                                                                  | 81               |      | 71                |      | 40-140              | 13  |      | 50            |
| Butyl benzyl phthalate                                                                                      | 87               |      | 77                |      | 40-140              | 12  |      | 50            |
| Di-n-butylphthalate                                                                                         | 88               |      | 78                |      | 40-140              | 12  |      | 50            |
| Di-n-octylphthalate                                                                                         | 77               |      | 67                |      | 40-140              | 14  |      | 50            |
| Diethyl phthalate                                                                                           | 88               |      | 78                |      | 40-140              | 12  |      | 50            |
| Dimethyl phthalate                                                                                          | 99               |      | 87                |      | 40-140              | 13  |      | 50            |
| Benzo(a)anthracene                                                                                          | 92               |      | 82                |      | 40-140              | 11  |      | 50            |
| Benzo(a)pyrene                                                                                              | 87               |      | 78                |      | 40-140              | 11  |      | 50            |
| Benzo(b)fluoranthene                                                                                        | 87               |      | 78                |      | 40-140              | 11  |      | 50            |
| Benzo(k)fluoranthene                                                                                        | 85               |      | 75                |      | 40-140              | 13  |      | 50            |
| Chrysene                                                                                                    | 90               |      | 81                |      | 40-140              | 11  |      | 50            |
| Acenaphthylene                                                                                              | 98               |      | 86                |      | 40-140              | 13  |      | 50            |
| Anthracene                                                                                                  | 92               |      | 84                |      | 40-140              | 9   |      | 50            |
| Benzo(ghi)perylene                                                                                          | 86               |      | 75                |      | 40-140              | 14  |      | 50            |
| Fluorene                                                                                                    | 91               |      | 81                |      | 40-140              | 12  |      | 50            |
| Phenanthrene                                                                                                | 90               |      | 80                |      | 40-140              | 12  |      | 50            |
| Dibenzo(a,h)anthracene                                                                                      | 88               |      | 77                |      | 40-140              | 13  |      | 50            |
| Indeno(1,2,3-cd)pyrene                                                                                      | 88               |      | 79                |      | 40-140              | 11  |      | 50            |
| Pyrene                                                                                                      | 99               |      | 88                |      | 35-142              | 12  |      | 50            |
| Biphenyl                                                                                                    | 84               |      | 75                |      | 37-127              | 11  |      | 50            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934982-2 WG1934982-3 |                  |      |                   |      |                     |     |      |               |
| Aniline                                                                                                     | 60               |      | 54                |      | 40-140              | 11  |      | 50            |
| 4-Chloroaniline                                                                                             | 74               |      | 73                |      | 40-140              | 1   |      | 50            |
| 1-Methylnaphthalene                                                                                         | 92               |      | 82                |      | 26-130              | 11  |      | 50            |
| 2-Nitroaniline                                                                                              | 99               |      | 87                |      | 47-134              | 13  |      | 50            |
| 3-Nitroaniline                                                                                              | 67               |      | 68                |      | 26-129              | 1   |      | 50            |
| 4-Nitroaniline                                                                                              | 86               |      | 75                |      | 41-125              | 14  |      | 50            |
| Dibenzofuran                                                                                                | 92               |      | 81                |      | 40-140              | 13  |      | 50            |
| 2-Methylnaphthalene                                                                                         | 92               |      | 81                |      | 40-140              | 13  |      | 50            |
| n-Nitrosodimethylamine                                                                                      | 76               |      | 63                |      | 22-100              | 19  |      | 50            |
| 2,4,6-Trichlorophenol                                                                                       | 112              |      | 97                |      | 30-130              | 14  |      | 50            |
| p-Chloro-m-cresol                                                                                           | 97               |      | 85                |      | 26-103              | 13  |      | 50            |
| 2-Chlorophenol                                                                                              | 87               |      | 73                |      | 25-102              | 18  |      | 50            |
| 2,4-Dichlorophenol                                                                                          | 101              |      | 85                |      | 30-130              | 17  |      | 50            |
| 2,4-Dimethylphenol                                                                                          | 83               |      | 72                |      | 30-130              | 14  |      | 50            |
| 2-Nitrophenol                                                                                               | 97               |      | 81                |      | 30-130              | 18  |      | 50            |
| 4-Nitrophenol                                                                                               | 104              |      | 90                |      | 11-114              | 14  |      | 50            |
| 2,4-Dinitrophenol                                                                                           | 103              |      | 91                |      | 4-130               | 12  |      | 50            |
| 4,6-Dinitro-o-cresol                                                                                        | 115              |      | 104               |      | 10-130              | 10  |      | 50            |
| Pentachlorophenol                                                                                           | 87               |      | 78                |      | 17-109              | 11  |      | 50            |
| Phenol                                                                                                      | 87               |      | 73                |      | 26-90               | 18  |      | 50            |
| 2-Methylphenol                                                                                              | 91               |      | 74                |      | 30-130              | 21  |      | 50            |
| 3-Methylphenol/4-Methylphenol                                                                               | 95               |      | 81                |      | 30-130              | 16  |      | 50            |
| 2,4,5-Trichlorophenol                                                                                       | 113              |      | 101               |      | 30-130              | 11  |      | 50            |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN

**Lab Number:** L2432632

**Project Number:** 0208898-001

**Report Date:** 06/18/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCS<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1934982-2 WG1934982-3 |                  |      |                  |      |                     |     |      |               |
| Benzoic Acid                                                                                                | 80               |      | 65               |      | 10-110              | 21  |      | 50            |
| Benzyl Alcohol                                                                                              | 97               |      | 80               |      | 40-140              | 19  |      | 50            |
| Carbazole                                                                                                   | 89               |      | 78               |      | 54-128              | 13  |      | 50            |
| Pyridine                                                                                                    | 53               |      | 42               |      | 10-93               | 23  |      | 50            |

| Surrogate            | LCS<br>%Recovery | Qual | LCS<br>%Recovery | Qual | Acceptance<br>Criteria |
|----------------------|------------------|------|------------------|------|------------------------|
| 2-Fluorophenol       | 81               |      | 65               |      | 25-120                 |
| Phenol-d6            | 79               |      | 67               |      | 10-120                 |
| Nitrobenzene-d5      | 87               |      | 71               |      | 23-120                 |
| 2-Fluorobiphenyl     | 91               |      | 77               |      | 30-120                 |
| 2,4,6-Tribromophenol | 79               |      | 70               |      | 10-136                 |
| 4-Terphenyl-d14      | 90               |      | 78               |      | 18-120                 |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

| Parameter                                                                                                       | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1934983-2 WG1934983-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                    | 53               |      | 57                |      | 40-140              | 7   |      | 50            |
| 2-Chloronaphthalene                                                                                             | 64               |      | 70                |      | 40-140              | 9   |      | 50            |
| Fluoranthene                                                                                                    | 57               |      | 57                |      | 40-140              | 0   |      | 50            |
| Hexachlorobutadiene                                                                                             | 59               |      | 65                |      | 34-107              | 10  |      | 50            |
| Naphthalene                                                                                                     | 55               |      | 61                |      | 40-140              | 10  |      | 50            |
| Benzo(a)anthracene                                                                                              | 69               |      | 74                |      | 40-140              | 7   |      | 50            |
| Benzo(a)pyrene                                                                                                  | 69               |      | 74                |      | 40-140              | 7   |      | 50            |
| Benzo(b)fluoranthene                                                                                            | 64               |      | 69                |      | 40-140              | 8   |      | 50            |
| Benzo(k)fluoranthene                                                                                            | 55               |      | 59                |      | 40-140              | 7   |      | 50            |
| Chrysene                                                                                                        | 56               |      | 59                |      | 40-140              | 5   |      | 50            |
| Acenaphthylene                                                                                                  | 66               |      | 71                |      | 40-140              | 7   |      | 50            |
| Anthracene                                                                                                      | 57               |      | 60                |      | 40-140              | 5   |      | 50            |
| Benzo(ghi)perylene                                                                                              | 61               |      | 66                |      | 40-140              | 8   |      | 50            |
| Fluorene                                                                                                        | 61               |      | 65                |      | 40-140              | 6   |      | 50            |
| Phenanthrene                                                                                                    | 52               |      | 56                |      | 40-140              | 7   |      | 50            |
| Dibenzo(a,h)anthracene                                                                                          | 73               |      | 80                |      | 40-140              | 9   |      | 50            |
| Indeno(1,2,3-cd)Pyrene                                                                                          | 91               |      | 99                |      | 40-140              | 8   |      | 50            |
| Pyrene                                                                                                          | 54               |      | 55                |      | 35-142              | 2   |      | 50            |
| 1-Methylnaphthalene                                                                                             | 59               |      | 65                |      | 40-140              | 10  |      | 50            |
| 2-Methylnaphthalene                                                                                             | 62               |      | 68                |      | 40-140              | 9   |      | 50            |
| Pentachlorophenol                                                                                               | 59               |      | 63                |      | 17-109              | 7   |      | 50            |
| Hexachlorobenzene                                                                                               | 44               |      | 47                |      | 40-140              | 7   |      | 50            |
| Hexachloroethane                                                                                                | 62               |      | 68                |      | 29-106              | 9   |      | 50            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEELEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24

| <b>Parameter</b> | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
|------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1934983-2 WG1934983-3

| <b>Surrogate</b>     | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 2-Fluorophenol       | 50                       |             | 55                        |             | 25-120                         |
| Phenol-d6            | 57                       |             | 63                        |             | 10-120                         |
| Nitrobenzene-d5      | 74                       |             | 82                        |             | 23-120                         |
| 2-Fluorobiphenyl     | 53                       |             | 58                        |             | 30-120                         |
| 2,4,6-Tribromophenol | 53                       |             | 57                        |             | 10-136                         |
| 4-Terphenyl-d14      | 45                       |             | 45                        |             | 18-120                         |



# **PETROLEUM HYDROCARBONS**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 12:59  
**Analyst:** LMR  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 15:56

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 35800               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 99         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 14:09  
**Analyst:** LMR  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 15:56

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 32500               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 68         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 14:44  
**Analyst:** LMR  
**Percent Solids:** 86%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 15:56

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | 97600      |           | ug/kg     | 36700               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 76         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 12:24  
**Analyst:** LMR

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 15:56

| Parameter                                                                                    | Result | Qualifier | Units | RL    | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-------|-----|
| Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01-03 Batch: WG1935008-1 |        |           |       |       |     |
| TPH (C10-C36)                                                                                | ND     |           | ug/kg | 32800 | --  |

| Surrogate   | %Recovery | Qualifier | Acceptance<br>Criteria |
|-------------|-----------|-----------|------------------------|
| o-Terphenyl | 68        |           | 40-140                 |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24

| <b>Parameter</b>                                                                                    | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|-----------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 Batch: WG1935008-2 |                          |             |                           |             |                             |            |             |                       |
| TPH (C10-C36)                                                                                       | 55                       |             | -                         |             | 40-140                      | -          |             | 40                    |

| <b>Surrogate</b> | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| o-Terphenyl      | 56                       |             |                           |             | 40-140                         |

Lab Duplicate Analysis  
Batch Quality Control

Project Name: STEEPLGATE MALL FORCE MAIN  
Project Number: 0208898-001

Lab Number: L2432632  
Report Date: 06/18/24

| Parameter                                                                                                                                                   | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1935008-3 QC Sample: L2432632-01 Client ID: HA24-23_0.5-2.5 |               |                  |       |     |      |            |
| TPH (C10-C36)                                                                                                                                               | ND            | ND               | ug/kg | NC  |      | 40         |

| Surrogate   | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|-------------|-----------|-----------|-----------|-----------|---------------------|
| o-Terphenyl | 99        |           | 69        |           | 40-140              |



# PCBS



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/17/24 12:37  
**Analyst:** MEO  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 16:28  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/17/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/17/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 50.8 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 50.8 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 81         |           | 30-150              | A      |
| Decachlorobiphenyl           | 84         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 74         |           | 30-150              | B      |
| Decachlorobiphenyl           | 77         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/17/24 12:47  
**Analyst:** MEO  
**Percent Solids:** 98%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 16:28  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/17/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/17/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 48.6 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 48.6 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 80         |           | 30-150              | A      |
| Decachlorobiphenyl           | 89         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 79         |           | 30-150              | B      |
| Decachlorobiphenyl           | 87         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

**SAMPLE RESULTS**

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/17/24 12:57  
**Analyst:** MEO  
**Percent Solids:** 86%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 16:28  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/17/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/17/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 54.9 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 54.9 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 75         |           | 30-150              | A      |
| Decachlorobiphenyl           | 71         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 72         |           | 30-150              | B      |
| Decachlorobiphenyl           | 70         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A  
 Analytical Date: 06/17/24 12:06  
 Analyst: MEO

Extraction Method: EPA 3546  
 Extraction Date: 06/16/24 16:28  
 Cleanup Method: EPA 3665A  
 Cleanup Date: 06/17/24  
 Cleanup Method: EPA 3660B  
 Cleanup Date: 06/17/24

| Parameter                                                                                 | Result | Qualifier | Units | RL   | MDL | Column |
|-------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-03 Batch: WG1935014-1 |        |           |       |      |     |        |
| Aroclor 1016                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1221                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1232                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1242                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1248                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1254                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1260                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1262                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| Aroclor 1268                                                                              | ND     |           | ug/kg | 47.2 | --  | A      |
| PCBs, Total                                                                               | ND     |           | ug/kg | 47.2 | --  | A      |

| Surrogate                    | %Recovery | Qualifier | Acceptance<br>Criteria | Column |
|------------------------------|-----------|-----------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 80        |           | 30-150                 | A      |
| Decachlorobiphenyl           | 88        |           | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 76        |           | 30-150                 | B      |
| Decachlorobiphenyl           | 86        |           | 30-150                 | B      |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24

| <b>Parameter</b>                                                                                             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> | <b>Column</b> |
|--------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|---------------|
| Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-03 Batch: WG1935014-2 WG1935014-3 |                          |             |                           |             |                             |            |             |                       |               |
| Aroclor 1016                                                                                                 | 94                       |             | 88                        |             | 40-140                      | 7          |             | 50                    | A             |
| Aroclor 1260                                                                                                 | 91                       |             | 86                        |             | 40-140                      | 6          |             | 50                    | A             |

| <b>Surrogate</b>             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> | <b>Column</b> |
|------------------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|---------------|
| 2,4,5,6-Tetrachloro-m-xylene | 81                       |             | 77                        |             | 30-150                         | A             |
| Decachlorobiphenyl           | 91                       |             | 88                        |             | 30-150                         | A             |
| 2,4,5,6-Tetrachloro-m-xylene | 78                       |             | 74                        |             | 30-150                         | B             |
| Decachlorobiphenyl           | 89                       |             | 83                        |             | 30-150                         | B             |

## METALS

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-01

Date Collected: 06/11/24 09:40

Client ID: HA24-23\_0.5-2.5

Date Received: 06/11/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 3.45   |           | mg/kg | 0.847 | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |
| Barium, Total                | 13.9   |           | mg/kg | 0.847 | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |
| Cadmium, Total               | ND     |           | mg/kg | 0.847 | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |
| Chromium, Total              | 6.52   |           | mg/kg | 0.847 | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |
| Lead, Total                  | 8.65   |           | mg/kg | 4.23  | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |
| Mercury, Total               | ND     |           | mg/kg | 0.070 | --  | 1                  | 06/15/24 13:30   | 06/18/24 00:16   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.69  | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |
| Silver, Total                | ND     |           | mg/kg | 0.423 | --  | 2                  | 06/15/24 12:10   | 06/17/24 13:07   | EPA 3050B      | 1,6010D              | DHL     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-02

Date Collected: 06/11/24 09:55

Client ID: HA24-23\_2.5-4.5

Date Received: 06/11/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 98%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.16   |           | mg/kg | 0.768 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |
| Barium, Total                | 12.7   |           | mg/kg | 0.768 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |
| Cadmium, Total               | ND     |           | mg/kg | 0.768 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |
| Chromium, Total              | 5.24   |           | mg/kg | 0.768 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |
| Lead, Total                  | ND     |           | mg/kg | 3.84  | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |
| Mercury, Total               | ND     |           | mg/kg | 0.064 | --  | 1                  | 06/15/24 13:30   | 06/18/24 00:50   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.54  | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |
| Silver, Total                | ND     |           | mg/kg | 0.384 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:55   | EPA 3050B      | 1,6010D              | DHL     |





**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432632**Project Number:** 0208898-001**Report Date:** 06/18/24**SAMPLE RESULTS**

Lab ID: L2432632-03

Date Collected: 06/11/24 11:50

Client ID: HA24-28\_0.5-2.5

Date Received: 06/11/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 86%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.13   |           | mg/kg | 0.886 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |
| Barium, Total                | 21.8   |           | mg/kg | 0.886 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |
| Cadmium, Total               | ND     |           | mg/kg | 0.886 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |
| Chromium, Total              | 6.90   |           | mg/kg | 0.886 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |
| Lead, Total                  | 17.5   |           | mg/kg | 4.43  | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |
| Mercury, Total               | ND     |           | mg/kg | 0.074 | --  | 1                  | 06/15/24 13:30   | 06/18/24 00:53   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.77  | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |
| Silver, Total                | ND     |           | mg/kg | 0.443 | --  | 2                  | 06/15/24 12:10   | 06/17/24 12:59   | EPA 3050B      | 1,6010D              | DHL     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2432632

Project Number: 0208898-001

Report Date: 06/18/24

## Method Blank Analysis Batch Quality Control

| Parameter                                                            | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|----------------------------------------------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1934595-1 |        |           |       |       |     |                    |                  |                  |                      |         |
| Arsenic, Total                                                       | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |
| Barium, Total                                                        | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |
| Cadmium, Total                                                       | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |
| Chromium, Total                                                      | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |
| Lead, Total                                                          | ND     |           | mg/kg | 2.00  | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |
| Selenium, Total                                                      | ND     |           | mg/kg | 0.800 | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |
| Silver, Total                                                        | ND     |           | mg/kg | 0.200 | --  | 1                  | 06/15/24 12:10   | 06/17/24 12:47   | 1,6010D              | DHL     |

### Prep Information

Digestion Method: EPA 3050B

| Parameter                                                            | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|----------------------------------------------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1934597-1 |        |           |       |       |     |                    |                  |                  |                      |         |
| Mercury, Total                                                       | ND     |           | mg/kg | 0.083 | --  | 1                  | 06/15/24 13:30   | 06/18/24 00:10   | 1,7471B              | MJR     |

### Prep Information

Digestion Method: EPA 7471B



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

| Parameter                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|-----------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1934595-2 |                  |      |                   |      |                     |     |      |            |
| Arsenic, Total                                                              | 100              |      | -                 |      | 80-120              | -   |      |            |
| Barium, Total                                                               | 99               |      | -                 |      | 80-120              | -   |      |            |
| Cadmium, Total                                                              | 100              |      | -                 |      | 80-120              | -   |      |            |
| Chromium, Total                                                             | 98               |      | -                 |      | 80-120              | -   |      |            |
| Lead, Total                                                                 | 102              |      | -                 |      | 80-120              | -   |      |            |
| Selenium, Total                                                             | 97               |      | -                 |      | 80-120              | -   |      |            |
| Silver, Total                                                               | 99               |      | -                 |      | 80-120              | -   |      |            |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1934597-2 |                  |      |                   |      |                     |     |      |            |
| Mercury, Total                                                              | 96               |      | -                 |      | 80-120              | -   |      |            |

# Matrix Spike Analysis

## Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

| Parameter                                                                                                                                    | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03    QC Batch ID: WG1934595-3    QC Sample: L2432632-01    Client ID: HA24-23_0.5-2.5 |               |          |          |              |      |           |               |      |                 |     |      |            |
| Arsenic, Total                                                                                                                               | 3.45          | 10.2     | 13.4     | 98           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Barium, Total                                                                                                                                | 13.9          | 170      | 177      | 96           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Cadmium, Total                                                                                                                               | ND            | 4.5      | 4.26     | 95           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Chromium, Total                                                                                                                              | 6.52          | 17       | 22.4     | 94           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Lead, Total                                                                                                                                  | 8.65          | 45       | 51.5     | 95           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Selenium, Total                                                                                                                              | ND            | 10.2     | 10.2     | 100          |      | -         | -             |      | 75-125          | -   |      | 20         |
| Silver, Total                                                                                                                                | ND            | 4.24     | 4.04     | 95           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03    QC Batch ID: WG1934597-3    QC Sample: L2432632-01    Client ID: HA24-23_0.5-2.5 |               |          |          |              |      |           |               |      |                 |     |      |            |
| Mercury, Total                                                                                                                               | ND            | 1.4      | 1.37     | 97           |      | -         | -             |      | 80-120          | -   |      | 20         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2432632  
**Report Date:** 06/18/24

| Parameter                                                                                                                           | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1934595-4 QC Sample: L2432632-01 Client ID: HA24-23_0.5-2.5 |               |                  |       |     |      |            |
| Arsenic, Total                                                                                                                      | 3.45          | 2.90             | mg/kg | 17  |      | 20         |
| Barium, Total                                                                                                                       | 13.9          | 13.6             | mg/kg | 2   |      | 20         |
| Cadmium, Total                                                                                                                      | ND            | ND               | mg/kg | NC  |      | 20         |
| Chromium, Total                                                                                                                     | 6.52          | 6.27             | mg/kg | 4   |      | 20         |
| Lead, Total                                                                                                                         | 8.65          | 6.58             | mg/kg | 27  | Q    | 20         |
| Selenium, Total                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 20         |
| Silver, Total                                                                                                                       | ND            | ND               | mg/kg | NC  |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1934597-4 QC Sample: L2432632-01 Client ID: HA24-23_0.5-2.5 |               |                  |       |     |      |            |
| Mercury, Total                                                                                                                      | ND            | ND               | mg/kg | NC  |      | 20         |

# **INORGANICS & MISCELLANEOUS**

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### SAMPLE RESULTS

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Fine  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/14/24 16:27 | 1,1030            | GEF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### SAMPLE RESULTS

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/14/24 16:27 | 1,1030            | GEF     |





**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### SAMPLE RESULTS

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/14/24 16:27 | 1,1030            | GEF     |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### SAMPLE RESULTS

**Lab ID:** L2432632-01  
**Client ID:** HA24-23\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:40  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 91.2   |           | %     | 0.100 | NA  | 1               | -              | 06/11/24 21:58 | 121,2540G         | SJB     |
| pH (H)                              | 6.15   |           | SU    | -     | NA  | 1               | -              | 06/14/24 21:02 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/18/24 15:03 | 06/18/24 16:59 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/18/24 15:03 | 06/18/24 17:18 | 125,7.3           | JLB     |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### SAMPLE RESULTS

**Lab ID:** L2432632-02  
**Client ID:** HA24-23\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 09:55  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 98.3   |           | %     | 0.100 | NA  | 1               | -              | 06/11/24 21:58 | 121,2540G         | SJB     |
| pH (H)                              | 6.18   |           | SU    | -     | NA  | 1               | -              | 06/14/24 21:02 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/18/24 15:03 | 06/18/24 17:00 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/18/24 15:03 | 06/18/24 17:18 | 125,7.3           | JLB     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

### SAMPLE RESULTS

**Lab ID:** L2432632-03  
**Client ID:** HA24-28\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/11/24 11:50  
**Date Received:** 06/11/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 85.9   |           | %     | 0.100 | NA  | 1               | -              | 06/11/24 21:58 | 121,2540G         | SJB     |
| pH (H)                              | 6.35   |           | SU    | -     | NA  | 1               | -              | 06/14/24 21:02 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/18/24 15:03 | 06/18/24 17:00 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/18/24 15:03 | 06/18/24 17:19 | 125,7.3           | JLB     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2432632

Project Number: 0208898-001

Report Date: 06/18/24

**Method Blank Analysis**  
**Batch Quality Control**

| Parameter                                                                   | Result | Qualifier | Units | RL | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|-----------------------------------------------------------------------------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------------|---------|
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1935946-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Cyanide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/18/24 15:03   | 06/18/24 16:57   | 125,7.3              | JLB     |
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1935947-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Sulfide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/18/24 15:03   | 06/18/24 17:15   | 125,7.3              | JLB     |



**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLEGATE MALL FORCE MAIN**Project Number:** 0208898-001**Lab Number:** L2432632**Report Date:** 06/18/24

| Parameter                                                                          | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1934629-1 |                  |      |                   |      |                     |     |      |            |
| pH                                                                                 | 100              |      | -                 |      | 99-101              | -   |      |            |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1935946-2 |                  |      |                   |      |                     |     |      |            |
| Cyanide, Reactive                                                                  | 95               |      | -                 |      | 30-125              | -   |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1935947-2 |                  |      |                   |      |                     |     |      |            |
| Sulfide, Reactive                                                                  | 115              |      | -                 |      | 60-125              | -   |      | 40         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2432632  
**Report Date:** 06/18/24

| Parameter                                                                                                                                  | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1932943-1 QC Sample: L2432632-01 Client ID: HA24-23_0.5-2.5 |               |                  |       |     |      |            |
| Solids, Total                                                                                                                              | 91.2          | 90.2             | %     | 1   |      | 20         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1934629-2 QC Sample: L2432563-03 Client ID: DUP Sample      |               |                  |       |     |      |            |
| pH                                                                                                                                         | 6.43          | 6.24             | SU    | 3   |      | 5          |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1935946-3 QC Sample: L2432786-04 Client ID: DUP Sample      |               |                  |       |     |      |            |
| Cyanide, Reactive                                                                                                                          | ND            | ND               | mg/kg | NC  |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1935947-3 QC Sample: L2432786-04 Client ID: DUP Sample      |               |                  |       |     |      |            |
| Sulfide, Reactive                                                                                                                          | ND            | ND               | mg/kg | NC  |      | 40         |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Serial\_No:** 06182418:36  
**Lab Number:** L2432632  
**Report Date:** 06/18/24

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

#### Cooler Information

**Cooler**                      **Custody Seal**  
A                                  Absent

#### Container Information

| Container ID | Container Type                          | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal   | Frozen Date/Time | Analysis(*)                                                                                              |
|--------------|-----------------------------------------|--------|------------|----------|------------|------|--------|------------------|----------------------------------------------------------------------------------------------------------|
| L2432632-01A | Vial MeOH preserved                     | A      | NA         |          | 4.6        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2432632-01B | Vial water preserved                    | A      | NA         |          | 4.6        | Y    | Absent | 11-JUN-24 21:43  | 8260HLW-NH(14)                                                                                           |
| L2432632-01C | Vial water preserved                    | A      | NA         |          | 4.6        | Y    | Absent | 11-JUN-24 21:43  | 8260HLW-NH(14)                                                                                           |
| L2432632-01D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 4.6        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2432632-01E | Glass 60ml unpreserved split            | A      | NA         |          | 4.6        | Y    | Absent |                  | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |
| L2432632-01F | Glass 60ml/2oz unpreserved/No Headspace | A      | NA         |          | 4.6        | Y    | Absent |                  | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2432632-01G | Glass 500ml/16oz unpreserved            | A      | NA         |          | 4.6        | Y    | Absent |                  | 8270TCL(14),IGNIT-1030(14),REACTS(14),PH-9045(1),8270TCL-SIM(14),PCB-8082(365),TPH-DRO-D(14),REACTCN(14) |
| L2432632-02A | Vial MeOH preserved                     | A      | NA         |          | 4.6        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2432632-02B | Vial water preserved                    | A      | NA         |          | 4.6        | Y    | Absent | 11-JUN-24 21:43  | 8260HLW-NH(14)                                                                                           |
| L2432632-02C | Vial water preserved                    | A      | NA         |          | 4.6        | Y    | Absent | 11-JUN-24 21:43  | 8260HLW-NH(14)                                                                                           |
| L2432632-02D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 4.6        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2432632-02E | Glass 60ml unpreserved split            | A      | NA         |          | 4.6        | Y    | Absent |                  | AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |
| L2432632-02F | Glass 60ml/2oz unpreserved/No Headspace | A      | NA         |          | 4.6        | Y    | Absent |                  | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2432632-02G | Glass 500ml/16oz unpreserved            | A      | NA         |          | 4.6        | Y    | Absent |                  | REACTS(14),8270TCL(14),IGNIT-1030(14),PH-9045(1),8270TCL-SIM(14),REACTCN(14),TPH-DRO-D(14),PCB-8082(365) |
| L2432632-03A | Vial MeOH preserved                     | A      | NA         |          | 4.6        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2432632-03B | Vial water preserved                    | A      | NA         |          | 4.6        | Y    | Absent | 11-JUN-24 21:43  | 8260HLW-NH(14)                                                                                           |
| L2432632-03C | Vial water preserved                    | A      | NA         |          | 4.6        | Y    | Absent | 11-JUN-24 21:43  | 8260HLW-NH(14)                                                                                           |
| L2432632-03D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 4.6        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2432632-03E | Glass 60ml unpreserved split            | A      | NA         |          | 4.6        | Y    | Absent |                  | AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

Serial\_No:06182418:36  
**Lab Number:** L2432632  
**Report Date:** 06/18/24

**Container Information**

| <b>Container ID</b> | <b>Container Type</b>                   | <b>Cooler</b> | <b>Initial<br/>pH</b> | <b>Final<br/>pH</b> | <b>Temp<br/>deg C</b> | <b>Pres</b> | <b>Seal</b> | <b>Frozen<br/>Date/Time</b> | <b>Analysis(*)</b>                                                                                       |
|---------------------|-----------------------------------------|---------------|-----------------------|---------------------|-----------------------|-------------|-------------|-----------------------------|----------------------------------------------------------------------------------------------------------|
| L2432632-03F        | Glass 60ml/2oz unpreserved/No Headspace | A             | NA                    |                     | 4.6                   | Y           | Absent      |                             | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2432632-03G        | Glass 500ml/16oz unpreserved            | A             | NA                    |                     | 4.6                   | Y           | Absent      |                             | 8270TCL(14),IGNIT-1030(14),REACTS(14),PH-9045(1),8270TCL-SIM(14),TPH-DRO-D(14),REACTCN(14),PCB-8082(365) |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

## GLOSSARY

### Acronyms

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DL       | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                |
| EDL      | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).                                                                                         |
| EMPC     | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.                                                                                                                                                                                                                               |
| EPA      | - Environmental Protection Agency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LCS      | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                          |
| LCSD     | - Laboratory Control Sample Duplicate: Refer to LCS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LFB      | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                         |
| LOD      | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                                                               |
| LOQ      | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)<br><br>Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL      | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                          |
| MS       | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.                                                                                                                                                                                                    |
| MSD      | - Matrix Spike Sample Duplicate: Refer to MS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NA       | - Not Applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NC       | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.                                                                                                                                                                                                                                                                                                                                                                           |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NI       | - Not Ignitable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NP       | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NR       | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.                                                                                                                                                                                                                                                                                                                                                                    |
| RL       | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                                                                                                                                   |
| RPD      | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.                                                                  |
| SRM      | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.                                                                                                                                                                                                                                                                                                                                                                     |
| STLP     | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TEF      | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.                                                                                                                                                                                                                                                                                                                                                                                             |
| TEQ      | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.                                                                                                                                                                                                                                                                                                                                                        |
| TIC      | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.                                                                                                                                                                                                                                                                      |

Report Format: Data Usability Report



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

## Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

## Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Chlordane:** The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Gasoline Range Organics (GRO):** Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

## Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**Report Format:** Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

#### **Data Qualifiers**

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432632  
**Report Date:** 06/18/24

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 125 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates IIIA, April 1998.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**Alpha Analytical, Inc.**Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 21

Published Date: 04/17/2024

Page 1 of 1

**Certification Information**

The following analytes are not included in our Primary NELAP Scope of Accreditation:

**Westborough Facility****EPA 624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625.1:** alpha-Terpineol**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.**Mansfield Facility****SM 2540D:** TSS.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Nonpotable Water:** **EPA RSK-175 Dissolved Gases****Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

**Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables).**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.**EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1** Hg.**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

[illegible]

## HA24-33 and HA24-38 Test Results





## ANALYTICAL REPORT

|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Lab Number:     | L2432925                                                      |
| Client:         | Haley & Aldrich<br>3 Bedford Farms Drive<br>Bedford, NH 03110 |
| ATTN:           | Erin Force                                                    |
| Phone:          | (603) 391-3332                                                |
| Project Name:   | STEEPLEGATE MALL FORCE MAIN                                   |
| Project Number: | 0208898-001                                                   |
| Report Date:    | 06/19/24                                                      |

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

| <b>Alpha<br/>Sample ID</b> | <b>Client ID</b> | <b>Matrix</b> | <b>Sample<br/>Location</b> | <b>Collection<br/>Date/Time</b> | <b>Receive Date</b> |
|----------------------------|------------------|---------------|----------------------------|---------------------------------|---------------------|
| L2432925-01                | HA24-33_0.5-2.5  | SOIL          | CONCORD, NH                | 06/12/24 08:40                  | 06/12/24            |
| L2432925-02                | HA24-33_2.5-4.5  | SOIL          | CONCORD, NH                | 06/12/24 08:55                  | 06/12/24            |
| L2432925-03                | HA24-38_0.5-2.5  | SOIL          | CONCORD, NH                | 06/12/24 10:30                  | 06/12/24            |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Case Narrative (continued)

#### Volatile Organics

The WG1935896-5 Method Blank, associated with L2432925-01 through -03, has a concentration above the reporting limit for bromomethane. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

#### Semivolatile Organics by SIM

L2432925-01D: The sample has elevated detection limits due to the dilution required by the sample matrix.

#### Total Metals

L2432925-01 through -03: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

*Tiffani Morrissey* - Tiffani Morrissey

Title: Technical Director/Representative

Date: 06/19/24

# ORGANICS

# VOLATILES

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-01  
 Client ID: HA24-33\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/12/24 08:40  
 Date Received: 06/12/24  
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil  
 Analytical Method: 1,8260D  
 Analytical Date: 06/18/24 02:14  
 Analyst: JIC  
 Percent Solids: 91%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.6  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.56 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.56 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.5  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.56 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.5  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.56 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.5  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-01  
 Client ID: HA24-33\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/12/24 08:40  
 Date Received: 06/12/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.56 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 28   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.5  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.56 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.3  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.5  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.5  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 89  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 125        |           | 70-130              |
| Toluene-d8            | 101        |           | 70-130              |
| 4-Bromofluorobenzene  | 106        |           | 70-130              |
| Dibromofluoromethane  | 106        |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/18/24 02:41  
**Analyst:** JIC  
**Percent Solids:** 97%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 6.1  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.8  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.2  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.61 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.61 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.8  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.61 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.61 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.2  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.61 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.61 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.61 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.8  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.61 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.61 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.2  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.8  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.4  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.8  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-02  
 Client ID: HA24-33\_2.5-4.5  
 Sample Location: CONCORD, NH

Date Collected: 06/12/24 08:55  
 Date Received: 06/12/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.61 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.4  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.4  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.4  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.2  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.4  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 12   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 30   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 12   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 12   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 12   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 12   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.4  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.8  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.61 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.4  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.2  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.4  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.4  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.4  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.6  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.8  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.2  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.8  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.2  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.4 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.4 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.4 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.4 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.4 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.4 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 24  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.4 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.4 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 97  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 125        |           | 70-130              |
| Toluene-d8            | 100        |           | 70-130              |
| 4-Bromofluorobenzene  | 105        |           | 70-130              |
| Dibromofluoromethane  | 105        |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/18/24 03:08  
**Analyst:** JIC  
**Percent Solids:** 97%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.8  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.7  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.2  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.58 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.58 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.6  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.58 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.58 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.2  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.58 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.58 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.58 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.6  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.58 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.58 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.2  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.6  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.7  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-03  
 Client ID: HA24-38\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/12/24 10:30  
 Date Received: 06/12/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.58 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.3  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.3  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.2  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.3  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.2  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 12   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 29   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 12   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 12   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 12   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 12   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.3  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.6  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.2  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.58 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.3  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.2  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.2  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.3  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.3  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.3  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.5  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.6  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.2  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.2  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.6  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.2  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.3 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.3 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 23  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.3 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.3 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 92  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 125        |           | 70-130              |
| Toluene-d8            | 102        |           | 70-130              |
| 4-Bromofluorobenzene  | 108        |           | 70-130              |
| Dibromofluoromethane  | 105        |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/17/24 22:10  
 Analyst: MAG

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1935896-5 |        |           |       |      |     |
| Methylene chloride                                                                          | ND     |           | ug/kg | 5.0  | --  |
| 1,1-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| Chloroform                                                                                  | ND     |           | ug/kg | 1.5  | --  |
| Carbon tetrachloride                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloropropane                                                                         | ND     |           | ug/kg | 1.0  | --  |
| Dibromochloromethane                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,1,2-Trichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| Tetrachloroethene                                                                           | ND     |           | ug/kg | 0.50 | --  |
| Chlorobenzene                                                                               | ND     |           | ug/kg | 0.50 | --  |
| Trichlorofluoromethane                                                                      | ND     |           | ug/kg | 4.0  | --  |
| 1,2-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1-Trichloroethane                                                                       | ND     |           | ug/kg | 0.50 | --  |
| Bromodichloromethane                                                                        | ND     |           | ug/kg | 0.50 | --  |
| trans-1,3-Dichloropropene                                                                   | ND     |           | ug/kg | 1.0  | --  |
| cis-1,3-Dichloropropene                                                                     | ND     |           | ug/kg | 0.50 | --  |
| 1,3-Dichloropropene, Total                                                                  | ND     |           | ug/kg | 0.50 | --  |
| 1,1-Dichloropropene                                                                         | ND     |           | ug/kg | 0.50 | --  |
| Bromoform                                                                                   | ND     |           | ug/kg | 4.0  | --  |
| 1,1,2,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Benzene                                                                                     | ND     |           | ug/kg | 0.50 | --  |
| Toluene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Ethylbenzene                                                                                | ND     |           | ug/kg | 1.0  | --  |
| Chloromethane                                                                               | ND     |           | ug/kg | 4.0  | --  |
| Bromomethane                                                                                | 2.2    |           | ug/kg | 2.0  | --  |
| Vinyl chloride                                                                              | ND     |           | ug/kg | 1.0  | --  |
| Chloroethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| 1,1-Dichloroethene                                                                          | ND     |           | ug/kg | 1.0  | --  |
| trans-1,2-Dichloroethene                                                                    | ND     |           | ug/kg | 1.5  | --  |
| Trichloroethene                                                                             | ND     |           | ug/kg | 0.50 | --  |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/17/24 22:10  
 Analyst: MAG

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1935896-5 |        |           |       |      |     |
| 1,2-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,3-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,4-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| Methyl tert butyl ether                                                                     | ND     |           | ug/kg | 2.0  | --  |
| p/m-Xylene                                                                                  | ND     |           | ug/kg | 2.0  | --  |
| o-Xylene                                                                                    | ND     |           | ug/kg | 1.0  | --  |
| Xylenes, Total                                                                              | ND     |           | ug/kg | 1.0  | --  |
| cis-1,2-Dichloroethene                                                                      | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloroethene, Total                                                                   | ND     |           | ug/kg | 1.0  | --  |
| Dibromomethane                                                                              | ND     |           | ug/kg | 2.0  | --  |
| 1,2,3-Trichloropropane                                                                      | ND     |           | ug/kg | 2.0  | --  |
| Styrene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Dichlorodifluoromethane                                                                     | ND     |           | ug/kg | 10   | --  |
| Acetone                                                                                     | ND     |           | ug/kg | 25   | --  |
| Carbon disulfide                                                                            | ND     |           | ug/kg | 10   | --  |
| 2-Butanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| 4-Methyl-2-pentanone                                                                        | ND     |           | ug/kg | 10   | --  |
| 2-Hexanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| Bromochloromethane                                                                          | ND     |           | ug/kg | 2.0  | --  |
| Tetrahydrofuran                                                                             | ND     |           | ug/kg | 4.0  | --  |
| 2,2-Dichloropropane                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,2-Dibromoethane                                                                           | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Bromobenzene                                                                                | ND     |           | ug/kg | 2.0  | --  |
| n-Butylbenzene                                                                              | ND     |           | ug/kg | 1.0  | --  |
| sec-Butylbenzene                                                                            | ND     |           | ug/kg | 1.0  | --  |
| tert-Butylbenzene                                                                           | ND     |           | ug/kg | 2.0  | --  |
| 1,3,5-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| o-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0  | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8260D  
**Analytical Date:** 06/17/24 22:10  
**Analyst:** MAG

| Parameter                                                                                   | Result | Qualifier | Units | RL  | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1935896-5 |        |           |       |     |     |
| p-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0 | --  |
| 1,2-Dibromo-3-chloropropane                                                                 | ND     |           | ug/kg | 3.0 | --  |
| Hexachlorobutadiene                                                                         | ND     |           | ug/kg | 4.0 | --  |
| Isopropylbenzene                                                                            | ND     |           | ug/kg | 1.0 | --  |
| p-Isopropyltoluene                                                                          | ND     |           | ug/kg | 1.0 | --  |
| Naphthalene                                                                                 | ND     |           | ug/kg | 4.0 | --  |
| n-Propylbenzene                                                                             | ND     |           | ug/kg | 1.0 | --  |
| 1,2,3-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,3,5-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Ethyl ether                                                                                 | ND     |           | ug/kg | 2.0 | --  |
| Isopropyl Ether                                                                             | ND     |           | ug/kg | 2.0 | --  |
| Tert-Butyl Alcohol                                                                          | ND     |           | ug/kg | 20  | --  |
| Ethyl-Tert-Butyl-Ether                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Tertiary-Amyl Methyl Ether                                                                  | ND     |           | ug/kg | 2.0 | --  |
| 1,4-Dioxane                                                                                 | ND     |           | ug/kg | 80  | --  |

| Surrogate             | %Recovery | Qualifier | Acceptance Criteria |
|-----------------------|-----------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 113       |           | 70-130              |
| Toluene-d8            | 101       |           | 70-130              |
| 4-Bromofluorobenzene  | 113       |           | 70-130              |
| Dibromofluoromethane  | 99        |           | 70-130              |



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432925

**Project Number:** 0208898-001

**Report Date:** 06/19/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935896-3 WG1935896-4 |                  |      |                   |      |                     |     |      |               |
| Methylene chloride                                                                                             | 109              |      | 106               |      | 70-130              | 3   |      | 30            |
| 1,1-Dichloroethane                                                                                             | 122              |      | 118               |      | 70-130              | 3   |      | 30            |
| Chloroform                                                                                                     | 119              |      | 117               |      | 70-130              | 2   |      | 30            |
| Carbon tetrachloride                                                                                           | 113              |      | 111               |      | 70-130              | 2   |      | 30            |
| 1,2-Dichloropropane                                                                                            | 118              |      | 117               |      | 70-130              | 1   |      | 30            |
| Dibromochloromethane                                                                                           | 98               |      | 97                |      | 70-130              | 1   |      | 30            |
| 1,1,2-Trichloroethane                                                                                          | 117              |      | 113               |      | 70-130              | 3   |      | 30            |
| Tetrachloroethene                                                                                              | 103              |      | 100               |      | 70-130              | 3   |      | 30            |
| Chlorobenzene                                                                                                  | 108              |      | 107               |      | 70-130              | 1   |      | 30            |
| Trichlorofluoromethane                                                                                         | 123              |      | 122               |      | 70-139              | 1   |      | 30            |
| 1,2-Dichloroethane                                                                                             | 119              |      | 116               |      | 70-130              | 3   |      | 30            |
| 1,1,1-Trichloroethane                                                                                          | 122              |      | 117               |      | 70-130              | 4   |      | 30            |
| Bromodichloromethane                                                                                           | 113              |      | 107               |      | 70-130              | 5   |      | 30            |
| trans-1,3-Dichloropropene                                                                                      | 122              |      | 120               |      | 70-130              | 2   |      | 30            |
| cis-1,3-Dichloropropene                                                                                        | 120              |      | 115               |      | 70-130              | 4   |      | 30            |
| 1,1-Dichloropropene                                                                                            | 120              |      | 118               |      | 70-130              | 2   |      | 30            |
| Bromoform                                                                                                      | 88               |      | 89                |      | 70-130              | 1   |      | 30            |
| 1,1,2,2-Tetrachloroethane                                                                                      | 108              |      | 110               |      | 70-130              | 2   |      | 30            |
| Benzene                                                                                                        | 120              |      | 117               |      | 70-130              | 3   |      | 30            |
| Toluene                                                                                                        | 110              |      | 110               |      | 70-130              | 0   |      | 30            |
| Ethylbenzene                                                                                                   | 117              |      | 116               |      | 70-130              | 1   |      | 30            |
| Chloromethane                                                                                                  | 114              |      | 109               |      | 52-130              | 4   |      | 30            |
| Bromomethane                                                                                                   | 110              |      | 109               |      | 57-147              | 1   |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432925

**Report Date:** 06/19/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935896-3 WG1935896-4 |                  |      |                   |      |                     |     |      |               |
| Vinyl chloride                                                                                                 | 127              |      | 127               |      | 67-130              | 0   |      | 30            |
| Chloroethane                                                                                                   | 125              |      | 124               |      | 50-151              | 1   |      | 30            |
| 1,1-Dichloroethene                                                                                             | 115              |      | 116               |      | 65-135              | 1   |      | 30            |
| trans-1,2-Dichloroethene                                                                                       | 131              | Q    | 82                |      | 70-130              | 46  | Q    | 30            |
| Trichloroethene                                                                                                | 121              |      | 119               |      | 70-130              | 2   |      | 30            |
| 1,2-Dichlorobenzene                                                                                            | 106              |      | 104               |      | 70-130              | 2   |      | 30            |
| 1,3-Dichlorobenzene                                                                                            | 109              |      | 110               |      | 70-130              | 1   |      | 30            |
| 1,4-Dichlorobenzene                                                                                            | 108              |      | 106               |      | 70-130              | 2   |      | 30            |
| Methyl tert butyl ether                                                                                        | 144              | Q    | 92                |      | 66-130              | 44  | Q    | 30            |
| p/m-Xylene                                                                                                     | 113              |      | 110               |      | 70-130              | 3   |      | 30            |
| o-Xylene                                                                                                       | 109              |      | 106               |      | 70-130              | 3   |      | 30            |
| cis-1,2-Dichloroethene                                                                                         | 110              |      | 108               |      | 70-130              | 2   |      | 30            |
| Dibromomethane                                                                                                 | 108              |      | 108               |      | 70-130              | 0   |      | 30            |
| 1,2,3-Trichloropropane                                                                                         | 110              |      | 113               |      | 68-130              | 3   |      | 30            |
| Styrene                                                                                                        | 115              |      | 113               |      | 70-130              | 2   |      | 30            |
| Dichlorodifluoromethane                                                                                        | 102              |      | 101               |      | 30-146              | 1   |      | 30            |
| Acetone                                                                                                        | 115              |      | 78                |      | 54-140              | 38  | Q    | 30            |
| Carbon disulfide                                                                                               | 118              |      | 118               |      | 59-130              | 0   |      | 30            |
| 2-Butanone                                                                                                     | 109              |      | 109               |      | 70-130              | 0   |      | 30            |
| 4-Methyl-2-pentanone                                                                                           | 106              |      | 107               |      | 70-130              | 1   |      | 30            |
| 2-Hexanone                                                                                                     | 110              |      | 110               |      | 70-130              | 0   |      | 30            |
| Bromochloromethane                                                                                             | 99               |      | 98                |      | 70-130              | 1   |      | 30            |
| Tetrahydrofuran                                                                                                | 104              |      | 110               |      | 66-130              | 6   |      | 30            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432925

**Report Date:** 06/19/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935896-3 WG1935896-4 |                  |      |                   |      |                     |     |      |               |
| 2,2-Dichloropropane                                                                                            | 130              |      | 124               |      | 70-130              | 5   |      | 30            |
| 1,2-Dibromoethane                                                                                              | 104              |      | 106               |      | 70-130              | 2   |      | 30            |
| 1,1,1,2-Tetrachloroethane                                                                                      | 104              |      | 103               |      | 70-130              | 1   |      | 30            |
| Bromobenzene                                                                                                   | 100              |      | 98                |      | 70-130              | 2   |      | 30            |
| n-Butylbenzene                                                                                                 | 128              |      | 124               |      | 70-130              | 3   |      | 30            |
| sec-Butylbenzene                                                                                               | 116              |      | 115               |      | 70-130              | 1   |      | 30            |
| tert-Butylbenzene                                                                                              | 109              |      | 108               |      | 70-130              | 1   |      | 30            |
| 1,3,5-Trichlorobenzene                                                                                         | 105              |      | 102               |      | 70-139              | 3   |      | 30            |
| o-Chlorotoluene                                                                                                | 118              |      | 116               |      | 70-130              | 2   |      | 30            |
| p-Chlorotoluene                                                                                                | 117              |      | 116               |      | 70-130              | 1   |      | 30            |
| 1,2-Dibromo-3-chloropropane                                                                                    | 87               |      | 89                |      | 68-130              | 2   |      | 30            |
| Hexachlorobutadiene                                                                                            | 90               |      | 87                |      | 67-130              | 3   |      | 30            |
| Isopropylbenzene                                                                                               | 114              |      | 112               |      | 70-130              | 2   |      | 30            |
| p-Isopropyltoluene                                                                                             | 114              |      | 111               |      | 70-130              | 3   |      | 30            |
| Naphthalene                                                                                                    | 100              |      | 100               |      | 70-130              | 0   |      | 30            |
| n-Propylbenzene                                                                                                | 121              |      | 119               |      | 70-130              | 2   |      | 30            |
| 1,2,3-Trichlorobenzene                                                                                         | 98               |      | 94                |      | 70-130              | 4   |      | 30            |
| 1,2,4-Trichlorobenzene                                                                                         | 102              |      | 99                |      | 70-130              | 3   |      | 30            |
| 1,3,5-Trimethylbenzene                                                                                         | 112              |      | 111               |      | 70-130              | 1   |      | 30            |
| 1,2,4-Trimethylbenzene                                                                                         | 114              |      | 112               |      | 70-130              | 2   |      | 30            |
| Ethyl ether                                                                                                    | 111              |      | 114               |      | 67-130              | 3   |      | 30            |
| Isopropyl Ether                                                                                                | 123              |      | 120               |      | 66-130              | 2   |      | 30            |
| Tert-Butyl Alcohol                                                                                             | 163              | Q    | 106               |      | 70-130              | 42  | Q    | 30            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24

| <b>Parameter</b>                                                                                               | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|----------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1935896-3 WG1935896-4 |                          |             |                           |             |                             |            |             |                       |
| Ethyl-Tert-Butyl-Ether                                                                                         | 113                      |             | 113                       |             | 70-130                      | 0          |             | 30                    |
| Tertiary-Amyl Methyl Ether                                                                                     | 109                      |             | 106                       |             | 70-130                      | 3          |             | 30                    |
| 1,4-Dioxane                                                                                                    | 105                      |             | 110                       |             | 65-136                      | 5          |             | 30                    |

| <b>Surrogate</b>      | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|-----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 1,2-Dichloroethane-d4 | 111                      |             | 110                       |             | 70-130                         |
| Toluene-d8            | 100                      |             | 101                       |             | 70-130                         |
| 4-Bromofluorobenzene  | 101                      |             | 101                       |             | 70-130                         |
| Dibromofluoromethane  | 96                       |             | 95                        |             | 70-130                         |

# SEMIVOLATILES

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 20:13  
**Analyst:** SZ  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 600 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 180 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 160 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 180 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 180 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 180 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 180 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 180 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 180 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 180 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 180 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 180 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 220 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 200 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 520 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 160 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 160 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 180 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 180 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 180 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 180 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 180 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 180 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 180 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 410 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 220 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 180 | --  | 1               |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 180 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 180 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 360 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 110 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 180 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 160 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 180 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 390 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 250 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 870 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 470 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 180 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 180 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 260 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 180 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 590 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 180 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 180 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 200 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 79         |           | 25-120              |
| Phenol-d6            | 75         |           | 10-120              |
| Nitrobenzene-d5      | 70         |           | 23-120              |
| 2-Fluorobiphenyl     | 66         |           | 30-120              |
| 2,4,6-Tribromophenol | 86         |           | 10-136              |
| 4-Terphenyl-d14      | 75         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01      D  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 14:37  
**Analyst:** JJW  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 36  | --  | 5               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 36  | --  | 5               |
| Fluoranthene                                         | 350    |           | ug/kg | 36  | --  | 5               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 36  | --  | 5               |
| Naphthalene                                          | ND     |           | ug/kg | 36  | --  | 5               |
| Benzo(a)anthracene                                   | 250    |           | ug/kg | 36  | --  | 5               |
| Benzo(a)pyrene                                       | 330    |           | ug/kg | 36  | --  | 5               |
| Benzo(b)fluoranthene                                 | 440    |           | ug/kg | 36  | --  | 5               |
| Benzo(k)fluoranthene                                 | 110    |           | ug/kg | 36  | --  | 5               |
| Chrysene                                             | 250    |           | ug/kg | 36  | --  | 5               |
| Acenaphthylene                                       | 160    |           | ug/kg | 36  | --  | 5               |
| Anthracene                                           | 82     |           | ug/kg | 36  | --  | 5               |
| Benzo(ghi)perylene                                   | 220    |           | ug/kg | 36  | --  | 5               |
| Fluorene                                             | ND     |           | ug/kg | 36  | --  | 5               |
| Phenanthrene                                         | 120    |           | ug/kg | 36  | --  | 5               |
| Dibenzo(a,h)anthracene                               | 48     |           | ug/kg | 36  | --  | 5               |
| Indeno(1,2,3-cd)Pyrene                               | 260    |           | ug/kg | 36  | --  | 5               |
| Pyrene                                               | 360    |           | ug/kg | 36  | --  | 5               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 36  | --  | 5               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 36  | --  | 5               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 140 | --  | 5               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 36  | --  | 5               |
| Hexachloroethane                                     | ND     |           | ug/kg | 36  | --  | 5               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01      D  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 74         |           | 25-120              |
| Phenol-d6            | 85         |           | 10-120              |
| Nitrobenzene-d5      | 97         |           | 23-120              |
| 2-Fluorobiphenyl     | 77         |           | 30-120              |
| 2,4,6-Tribromophenol | 108        |           | 10-136              |
| 4-Terphenyl-d14      | 57         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 20:36  
**Analyst:** SZ  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 560 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 490 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 390 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-02  
 Client ID: HA24-33\_2.5-4.5  
 Sample Location: CONCORD, NH

Date Collected: 06/12/24 08:55  
 Date Received: 06/12/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 370 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 820 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 250 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 560 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 81         |           | 25-120              |
| Phenol-d6            | 80         |           | 10-120              |
| Nitrobenzene-d5      | 75         |           | 23-120              |
| 2-Fluorobiphenyl     | 69         |           | 30-120              |
| 2,4,6-Tribromophenol | 89         |           | 10-136              |
| 4-Terphenyl-d14      | 79         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** JJW  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 6.8 | --  | 1               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| Fluoranthene                                         | 29     |           | ug/kg | 6.8 | --  | 1               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| Naphthalene                                          | ND     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(a)anthracene                                   | 20     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(a)pyrene                                       | 26     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(b)fluoranthene                                 | 33     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(k)fluoranthene                                 | 9.3    |           | ug/kg | 6.8 | --  | 1               |
| Chrysene                                             | 16     |           | ug/kg | 6.8 | --  | 1               |
| Acenaphthylene                                       | 16     |           | ug/kg | 6.8 | --  | 1               |
| Anthracene                                           | 7.5    |           | ug/kg | 6.8 | --  | 1               |
| Benzo(ghi)perylene                                   | 15     |           | ug/kg | 6.8 | --  | 1               |
| Fluorene                                             | ND     |           | ug/kg | 6.8 | --  | 1               |
| Phenanthrene                                         | ND     |           | ug/kg | 6.8 | --  | 1               |
| Dibenzo(a,h)anthracene                               | ND     |           | ug/kg | 6.8 | --  | 1               |
| Indeno(1,2,3-cd)Pyrene                               | 18     |           | ug/kg | 6.8 | --  | 1               |
| Pyrene                                               | 30     |           | ug/kg | 6.8 | --  | 1               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 27  | --  | 1               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 6.8 | --  | 1               |
| Hexachloroethane                                     | ND     |           | ug/kg | 6.8 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 64         |           | 25-120              |
| Phenol-d6            | 76         |           | 10-120              |
| Nitrobenzene-d5      | 87         |           | 23-120              |
| 2-Fluorobiphenyl     | 62         |           | 30-120              |
| 2,4,6-Tribromophenol | 90         |           | 10-136              |
| 4-Terphenyl-d14      | 47         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 20:59  
**Analyst:** SZ  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 560 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 380 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-03  
 Client ID: HA24-38\_0.5-2.5  
 Sample Location: CONCORD, NH

Date Collected: 06/12/24 10:30  
 Date Received: 06/12/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 360 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 810 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 550 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 80         |           | 25-120              |
| Phenol-d6            | 78         |           | 10-120              |
| Nitrobenzene-d5      | 72         |           | 23-120              |
| 2-Fluorobiphenyl     | 65         |           | 30-120              |
| 2,4,6-Tribromophenol | 86         |           | 10-136              |
| 4-Terphenyl-d14      | 74         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 18:45  
**Analyst:** JJW  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 6.8 | --  | 1               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| Fluoranthene                                         | ND     |           | ug/kg | 6.8 | --  | 1               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| Naphthalene                                          | ND     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(a)anthracene                                   | ND     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(a)pyrene                                       | ND     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(b)fluoranthene                                 | ND     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(k)fluoranthene                                 | ND     |           | ug/kg | 6.8 | --  | 1               |
| Chrysene                                             | ND     |           | ug/kg | 6.8 | --  | 1               |
| Acenaphthylene                                       | ND     |           | ug/kg | 6.8 | --  | 1               |
| Anthracene                                           | ND     |           | ug/kg | 6.8 | --  | 1               |
| Benzo(ghi)perylene                                   | ND     |           | ug/kg | 6.8 | --  | 1               |
| Fluorene                                             | ND     |           | ug/kg | 6.8 | --  | 1               |
| Phenanthrene                                         | ND     |           | ug/kg | 6.8 | --  | 1               |
| Dibenzo(a,h)anthracene                               | ND     |           | ug/kg | 6.8 | --  | 1               |
| Indeno(1,2,3-cd)Pyrene                               | ND     |           | ug/kg | 6.8 | --  | 1               |
| Pyrene                                               | ND     |           | ug/kg | 6.8 | --  | 1               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 6.8 | --  | 1               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 27  | --  | 1               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 6.8 | --  | 1               |
| Hexachloroethane                                     | ND     |           | ug/kg | 6.8 | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|-----------|--------|-----------|-------|----|-----|-----------------|
|-----------|--------|-----------|-------|----|-----|-----------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 62         |           | 25-120              |
| Phenol-d6            | 75         |           | 10-120              |
| Nitrobenzene-d5      | 83         |           | 23-120              |
| 2-Fluorobiphenyl     | 61         |           | 30-120              |
| 2,4,6-Tribromophenol | 90         |           | 10-136              |
| 4-Terphenyl-d14      | 44         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 08:20  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                    | Result | Qualifier | Units | RL  | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1935021-1 |        |           |       |     |     |
| Acenaphthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| 2-Chloronaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Fluoranthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Hexachlorobutadiene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Naphthalene                                                                                  | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)anthracene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)pyrene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Benzo(b)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Benzo(k)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Chrysene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Acenaphthylene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Anthracene                                                                                   | ND     |           | ug/kg | 6.5 | --  |
| Benzo(ghi)perylene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Fluorene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Phenanthrene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Dibenzo(a,h)anthracene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Indeno(1,2,3-cd)Pyrene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Pyrene                                                                                       | ND     |           | ug/kg | 6.5 | --  |
| 1-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| 2-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Pentachlorophenol                                                                            | ND     |           | ug/kg | 26  | --  |
| Hexachlorobenzene                                                                            | ND     |           | ug/kg | 6.5 | --  |
| Hexachloroethane                                                                             | ND     |           | ug/kg | 6.5 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 08:20  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                    | Result | Qualifier | Units | RL | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1935021-1 |        |           |       |    |     |

| Surrogate            | %Recovery | Qualifier | Acceptance<br>Criteria |
|----------------------|-----------|-----------|------------------------|
| 2-Fluorophenol       | 56        |           | 25-120                 |
| Phenol-d6            | 61        |           | 10-120                 |
| Nitrobenzene-d5      | 74        |           | 23-120                 |
| 2-Fluorobiphenyl     | 54        |           | 30-120                 |
| 2,4,6-Tribromophenol | 79        |           | 10-136                 |
| 4-Terphenyl-d14      | 48        |           | 18-120                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1935022-1 |        |           |       |     |     |
| Acenaphthene                                                                             | ND     |           | ug/kg | 130 | --  |
| Benzidine                                                                                | ND     |           | ug/kg | 540 | --  |
| 1,2,4-Trichlorobenzene                                                                   | ND     |           | ug/kg | 160 | --  |
| Hexachlorobenzene                                                                        | ND     |           | ug/kg | 98  | --  |
| Bis(2-chloroethyl)ether                                                                  | ND     |           | ug/kg | 150 | --  |
| 2-Chloronaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,2-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,3-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,4-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 3,3'-Dichlorobenzidine                                                                   | ND     |           | ug/kg | 160 | --  |
| 2,4-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| 2,6-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| Azobenzene                                                                               | ND     |           | ug/kg | 160 | --  |
| Fluoranthene                                                                             | ND     |           | ug/kg | 98  | --  |
| 4-Chlorophenyl phenyl ether                                                              | ND     |           | ug/kg | 160 | --  |
| 4-Bromophenyl phenyl ether                                                               | ND     |           | ug/kg | 160 | --  |
| Bis(2-chloroisopropyl)ether                                                              | ND     |           | ug/kg | 200 | --  |
| Bis(2-chloroethoxy)methane                                                               | ND     |           | ug/kg | 180 | --  |
| Hexachlorobutadiene                                                                      | ND     |           | ug/kg | 160 | --  |
| Hexachlorocyclopentadiene                                                                | ND     |           | ug/kg | 470 | --  |
| Hexachloroethane                                                                         | ND     |           | ug/kg | 130 | --  |
| Isophorone                                                                               | ND     |           | ug/kg | 150 | --  |
| Naphthalene                                                                              | ND     |           | ug/kg | 160 | --  |
| Nitrobenzene                                                                             | ND     |           | ug/kg | 150 | --  |
| NDPA/DPA                                                                                 | ND     |           | ug/kg | 130 | --  |
| n-Nitrosodi-n-propylamine                                                                | ND     |           | ug/kg | 160 | --  |
| Bis(2-ethylhexyl)phthalate                                                               | ND     |           | ug/kg | 160 | --  |
| Butyl benzyl phthalate                                                                   | ND     |           | ug/kg | 160 | --  |
| Di-n-butylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1935022-1 |        |           |       |     |     |
| Di-n-octylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |
| Diethyl phthalate                                                                        | ND     |           | ug/kg | 160 | --  |
| Dimethyl phthalate                                                                       | ND     |           | ug/kg | 160 | --  |
| Benzo(a)anthracene                                                                       | ND     |           | ug/kg | 98  | --  |
| Benzo(a)pyrene                                                                           | ND     |           | ug/kg | 130 | --  |
| Benzo(b)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Benzo(k)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Chrysene                                                                                 | ND     |           | ug/kg | 98  | --  |
| Acenaphthylene                                                                           | ND     |           | ug/kg | 130 | --  |
| Anthracene                                                                               | ND     |           | ug/kg | 98  | --  |
| Benzo(ghi)perylene                                                                       | ND     |           | ug/kg | 130 | --  |
| Fluorene                                                                                 | ND     |           | ug/kg | 160 | --  |
| Phenanthrene                                                                             | ND     |           | ug/kg | 98  | --  |
| Dibenzo(a,h)anthracene                                                                   | ND     |           | ug/kg | 98  | --  |
| Indeno(1,2,3-cd)pyrene                                                                   | ND     |           | ug/kg | 130 | --  |
| Pyrene                                                                                   | ND     |           | ug/kg | 98  | --  |
| Biphenyl                                                                                 | ND     |           | ug/kg | 370 | --  |
| Aniline                                                                                  | ND     |           | ug/kg | 200 | --  |
| 4-Chloroaniline                                                                          | ND     |           | ug/kg | 160 | --  |
| 1-Methylnaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 2-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 4-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| Dibenzofuran                                                                             | ND     |           | ug/kg | 160 | --  |
| 2-Methylnaphthalene                                                                      | ND     |           | ug/kg | 200 | --  |
| n-Nitrosodimethylamine                                                                   | ND     |           | ug/kg | 330 | --  |
| 2,4,6-Trichlorophenol                                                                    | ND     |           | ug/kg | 98  | --  |
| p-Chloro-m-cresol                                                                        | ND     |           | ug/kg | 160 | --  |
| 2-Chlorophenol                                                                           | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1935022-1 |        |           |       |     |     |
| 2,4-Dichlorophenol                                                                       | ND     |           | ug/kg | 150 | --  |
| 2,4-Dimethylphenol                                                                       | ND     |           | ug/kg | 160 | --  |
| 2-Nitrophenol                                                                            | ND     |           | ug/kg | 350 | --  |
| 4-Nitrophenol                                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4-Dinitrophenol                                                                        | ND     |           | ug/kg | 780 | --  |
| 4,6-Dinitro-o-cresol                                                                     | ND     |           | ug/kg | 420 | --  |
| Pentachlorophenol                                                                        | ND     |           | ug/kg | 130 | --  |
| Phenol                                                                                   | ND     |           | ug/kg | 160 | --  |
| 2-Methylphenol                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Methylphenol/4-Methylphenol                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4,5-Trichlorophenol                                                                    | ND     |           | ug/kg | 160 | --  |
| Benzoic Acid                                                                             | ND     |           | ug/kg | 530 | --  |
| Benzyl Alcohol                                                                           | ND     |           | ug/kg | 160 | --  |
| Carbazole                                                                                | ND     |           | ug/kg | 160 | --  |
| Pyridine                                                                                 | ND     |           | ug/kg | 180 | --  |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 80        |           | 25-120              |
| Phenol-d6            | 74        |           | 10-120              |
| Nitrobenzene-d5      | 70        |           | 23-120              |
| 2-Fluorobiphenyl     | 64        |           | 30-120              |
| 2,4,6-Tribromophenol | 78        |           | 10-136              |
| 4-Terphenyl-d14      | 67        |           | 18-120              |





# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432925

**Report Date:** 06/19/24

| Parameter                                                                                                       | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1935021-2 WG1935021-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                    | 58               |      | 63                |      | 40-140              | 8   |      | 50            |
| 2-Chloronaphthalene                                                                                             | 58               |      | 66                |      | 40-140              | 13  |      | 50            |
| Fluoranthene                                                                                                    | 63               |      | 64                |      | 40-140              | 2   |      | 50            |
| Hexachlorobutadiene                                                                                             | 55               |      | 67                |      | 34-107              | 20  |      | 50            |
| Naphthalene                                                                                                     | 56               |      | 68                |      | 40-140              | 19  |      | 50            |
| Benzo(a)anthracene                                                                                              | 64               |      | 66                |      | 40-140              | 3   |      | 50            |
| Benzo(a)pyrene                                                                                                  | 70               |      | 72                |      | 40-140              | 3   |      | 50            |
| Benzo(b)fluoranthene                                                                                            | 69               |      | 68                |      | 40-140              | 1   |      | 50            |
| Benzo(k)fluoranthene                                                                                            | 62               |      | 68                |      | 40-140              | 9   |      | 50            |
| Chrysene                                                                                                        | 62               |      | 65                |      | 40-140              | 5   |      | 50            |
| Acenaphthylene                                                                                                  | 59               |      | 66                |      | 40-140              | 11  |      | 50            |
| Anthracene                                                                                                      | 62               |      | 63                |      | 40-140              | 2   |      | 50            |
| Benzo(ghi)perylene                                                                                              | 57               |      | 58                |      | 40-140              | 2   |      | 50            |
| Fluorene                                                                                                        | 64               |      | 68                |      | 40-140              | 6   |      | 50            |
| Phenanthrene                                                                                                    | 61               |      | 63                |      | 40-140              | 3   |      | 50            |
| Dibenzo(a,h)anthracene                                                                                          | 63               |      | 65                |      | 40-140              | 3   |      | 50            |
| Indeno(1,2,3-cd)Pyrene                                                                                          | 75               |      | 78                |      | 40-140              | 4   |      | 50            |
| Pyrene                                                                                                          | 64               |      | 64                |      | 35-142              | 0   |      | 50            |
| 1-Methylnaphthalene                                                                                             | 58               |      | 68                |      | 40-140              | 16  |      | 50            |
| 2-Methylnaphthalene                                                                                             | 60               |      | 70                |      | 40-140              | 15  |      | 50            |
| Pentachlorophenol                                                                                               | 83               |      | 91                |      | 17-109              | 9   |      | 50            |
| Hexachlorobenzene                                                                                               | 59               |      | 60                |      | 40-140              | 2   |      | 50            |
| Hexachloroethane                                                                                                | 59               |      | 73                |      | 29-106              | 21  |      | 50            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEELEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24

| <b>Parameter</b>                                                                                                | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|-----------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1935021-2 WG1935021-3 |                          |             |                           |             |                             |            |             |                       |

| <b>Surrogate</b>     | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 2-Fluorophenol       | 52                       |             | 60                        |             | 25-120                         |
| Phenol-d6            | 57                       |             | 64                        |             | 10-120                         |
| Nitrobenzene-d5      | 65                       |             | 77                        |             | 23-120                         |
| 2-Fluorobiphenyl     | 51                       |             | 55                        |             | 30-120                         |
| 2,4,6-Tribromophenol | 83                       |             | 84                        |             | 10-136                         |
| 4-Terphenyl-d14      | 51                       |             | 49                        |             | 18-120                         |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432925

**Report Date:** 06/19/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                | 70               |      | 65                |      | 31-137              | 7   |      | 50            |
| Benzidine                                                                                                   | 75               | Q    | 69                | Q    | 10-66               | 8   |      | 50            |
| 1,2,4-Trichlorobenzene                                                                                      | 65               |      | 67                |      | 38-107              | 3   |      | 50            |
| Hexachlorobenzene                                                                                           | 76               |      | 70                |      | 40-140              | 8   |      | 50            |
| Bis(2-chloroethyl)ether                                                                                     | 69               |      | 70                |      | 40-140              | 1   |      | 50            |
| 2-Chloronaphthalene                                                                                         | 62               |      | 64                |      | 40-140              | 3   |      | 50            |
| 1,2-Dichlorobenzene                                                                                         | 64               |      | 66                |      | 40-140              | 3   |      | 50            |
| 1,3-Dichlorobenzene                                                                                         | 62               |      | 63                |      | 40-140              | 2   |      | 50            |
| 1,4-Dichlorobenzene                                                                                         | 61               |      | 63                |      | 28-104              | 3   |      | 50            |
| 3,3'-Dichlorobenzidine                                                                                      | 88               |      | 81                |      | 40-140              | 8   |      | 50            |
| 2,4-Dinitrotoluene                                                                                          | 72               |      | 67                |      | 40-132              | 7   |      | 50            |
| 2,6-Dinitrotoluene                                                                                          | 65               |      | 67                |      | 40-140              | 3   |      | 50            |
| Azobenzene                                                                                                  | 76               |      | 70                |      | 40-140              | 8   |      | 50            |
| Fluoranthene                                                                                                | 76               |      | 70                |      | 40-140              | 8   |      | 50            |
| 4-Chlorophenyl phenyl ether                                                                                 | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| 4-Bromophenyl phenyl ether                                                                                  | 75               |      | 69                |      | 40-140              | 8   |      | 50            |
| Bis(2-chloroisopropyl)ether                                                                                 | 54               |      | 53                |      | 40-140              | 2   |      | 50            |
| Bis(2-chloroethoxy)methane                                                                                  | 72               |      | 72                |      | 40-117              | 0   |      | 50            |
| Hexachlorobutadiene                                                                                         | 67               |      | 68                |      | 40-140              | 1   |      | 50            |
| Hexachlorocyclopentadiene                                                                                   | 16               | Q    | 18                | Q    | 40-140              | 12  |      | 50            |
| Hexachloroethane                                                                                            | 59               |      | 63                |      | 40-140              | 7   |      | 50            |
| Isophorone                                                                                                  | 78               |      | 74                |      | 40-140              | 5   |      | 50            |
| Naphthalene                                                                                                 | 64               |      | 62                |      | 40-140              | 3   |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432925

**Project Number:** 0208898-001

**Report Date:** 06/19/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Nitrobenzene                                                                                                | 75               |      | 74                |      | 40-140              | 1   |      | 50            |
| NDPA/DPA                                                                                                    | 71               |      | 65                |      | 36-157              | 9   |      | 50            |
| n-Nitrosodi-n-propylamine                                                                                   | 77               |      | 72                |      | 32-121              | 7   |      | 50            |
| Bis(2-ethylhexyl)phthalate                                                                                  | 78               |      | 70                |      | 40-140              | 11  |      | 50            |
| Butyl benzyl phthalate                                                                                      | 86               |      | 77                |      | 40-140              | 11  |      | 50            |
| Di-n-butylphthalate                                                                                         | 78               |      | 71                |      | 40-140              | 9   |      | 50            |
| Di-n-octylphthalate                                                                                         | 93               |      | 86                |      | 40-140              | 8   |      | 50            |
| Diethyl phthalate                                                                                           | 72               |      | 66                |      | 40-140              | 9   |      | 50            |
| Dimethyl phthalate                                                                                          | 62               |      | 62                |      | 40-140              | 0   |      | 50            |
| Benzo(a)anthracene                                                                                          | 74               |      | 69                |      | 40-140              | 7   |      | 50            |
| Benzo(a)pyrene                                                                                              | 68               |      | 67                |      | 40-140              | 1   |      | 50            |
| Benzo(b)fluoranthene                                                                                        | 72               |      | 67                |      | 40-140              | 7   |      | 50            |
| Benzo(k)fluoranthene                                                                                        | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| Chrysene                                                                                                    | 76               |      | 68                |      | 40-140              | 11  |      | 50            |
| Acenaphthylene                                                                                              | 60               |      | 63                |      | 40-140              | 5   |      | 50            |
| Anthracene                                                                                                  | 73               |      | 68                |      | 40-140              | 7   |      | 50            |
| Benzo(ghi)perylene                                                                                          | 74               |      | 64                |      | 40-140              | 14  |      | 50            |
| Fluorene                                                                                                    | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| Phenanthrene                                                                                                | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| Dibenzo(a,h)anthracene                                                                                      | 75               |      | 64                |      | 40-140              | 16  |      | 50            |
| Indeno(1,2,3-cd)pyrene                                                                                      | 80               |      | 69                |      | 40-140              | 15  |      | 50            |
| Pyrene                                                                                                      | 75               |      | 70                |      | 35-142              | 7   |      | 50            |
| Biphenyl                                                                                                    | 53               |      | 55                |      | 37-127              | 4   |      | 50            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2432925

**Project Number:** 0208898-001

**Report Date:** 06/19/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Aniline                                                                                                     | 63               |      | 60                |      | 40-140              | 5   |      | 50            |
| 4-Chloroaniline                                                                                             | 78               |      | 74                |      | 40-140              | 5   |      | 50            |
| 1-Methylnaphthalene                                                                                         | 61               |      | 64                |      | 26-130              | 5   |      | 50            |
| 2-Nitroaniline                                                                                              | 78               |      | 79                |      | 47-134              | 1   |      | 50            |
| 3-Nitroaniline                                                                                              | 82               |      | 74                |      | 26-129              | 10  |      | 50            |
| 4-Nitroaniline                                                                                              | 85               |      | 75                |      | 41-125              | 13  |      | 50            |
| Dibenzofuran                                                                                                | 68               |      | 64                |      | 40-140              | 6   |      | 50            |
| 2-Methylnaphthalene                                                                                         | 61               |      | 64                |      | 40-140              | 5   |      | 50            |
| n-Nitrosodimethylamine                                                                                      | 62               |      | 64                |      | 22-100              | 3   |      | 50            |
| 2,4,6-Trichlorophenol                                                                                       | 72               |      | 72                |      | 30-130              | 0   |      | 50            |
| p-Chloro-m-cresol                                                                                           | 74               |      | 75                |      | 26-103              | 1   |      | 50            |
| 2-Chlorophenol                                                                                              | 73               |      | 74                |      | 25-102              | 1   |      | 50            |
| 2,4-Dichlorophenol                                                                                          | 74               |      | 72                |      | 30-130              | 3   |      | 50            |
| 2,4-Dimethylphenol                                                                                          | 86               |      | 85                |      | 30-130              | 1   |      | 50            |
| 2-Nitrophenol                                                                                               | 79               |      | 78                |      | 30-130              | 1   |      | 50            |
| 4-Nitrophenol                                                                                               | 91               |      | 84                |      | 11-114              | 8   |      | 50            |
| 2,4-Dinitrophenol                                                                                           | 19               |      | 20                |      | 4-130               | 5   |      | 50            |
| 4,6-Dinitro-o-cresol                                                                                        | 22               |      | 22                |      | 10-130              | 0   |      | 50            |
| Pentachlorophenol                                                                                           | 70               |      | 64                |      | 17-109              | 9   |      | 50            |
| Phenol                                                                                                      | 72               |      | 71                |      | 26-90               | 1   |      | 50            |
| 2-Methylphenol                                                                                              | 77               |      | 76                |      | 30-130              | 1   |      | 50            |
| 3-Methylphenol/4-Methylphenol                                                                               | 83               |      | 81                |      | 30-130              | 2   |      | 50            |
| 2,4,5-Trichlorophenol                                                                                       | 72               |      | 74                |      | 30-130              | 3   |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEELEGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2432925

**Report Date:** 06/19/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCS<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1935022-2 WG1935022-3 |                  |      |                  |      |                     |     |      |               |
| Benzoic Acid                                                                                                | 55               |      | 52               |      | 10-110              | 6   |      | 50            |
| Benzyl Alcohol                                                                                              | 78               |      | 76               |      | 40-140              | 3   |      | 50            |
| Carbazole                                                                                                   | 70               |      | 65               |      | 54-128              | 7   |      | 50            |
| Pyridine                                                                                                    | 48               |      | 50               |      | 10-93               | 4   |      | 50            |

| Surrogate            | LCS<br>%Recovery | Qual | LCS<br>%Recovery | Qual | Acceptance<br>Criteria |
|----------------------|------------------|------|------------------|------|------------------------|
| 2-Fluorophenol       | 70               |      | 78               |      | 25-120                 |
| Phenol-d6            | 74               |      | 74               |      | 10-120                 |
| Nitrobenzene-d5      | 75               |      | 75               |      | 23-120                 |
| 2-Fluorobiphenyl     | 60               |      | 61               |      | 30-120                 |
| 2,4,6-Tribromophenol | 88               |      | 79               |      | 10-136                 |
| 4-Terphenyl-d14      | 76               |      | 71               |      | 18-120                 |

# **PETROLEUM HYDROCARBONS**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 16:38  
**Analyst:** CRE  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 21:58

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 35600               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 85         |           |           | 40-140              |     |                 |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 15:48  
**Analyst:** CRE  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 21:58

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 33200               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 89         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/17/24 16:13  
**Analyst:** CRE  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 21:58

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 33500               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 84         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8015D(M)  
 Analytical Date: 06/17/24 15:23  
 Analyst: CRE

Extraction Method: EPA 3546  
 Extraction Date: 06/16/24 21:58

| Parameter                                                                                    | Result | Qualifier | Units | RL    | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-------|-----|
| Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01-03 Batch: WG1935044-1 |        |           |       |       |     |
| TPH (C10-C36)                                                                                | ND     |           | ug/kg | 32500 | --  |

| Surrogate   | %Recovery | Qualifier | Acceptance Criteria |
|-------------|-----------|-----------|---------------------|
| o-Terphenyl | 85        |           | 40-140              |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24

| <b>Parameter</b>                                                                                    | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|-----------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 Batch: WG1935044-2 |                          |             |                           |             |                             |            |             |                       |
| TPH (C10-C36)                                                                                       | 78                       |             | -                         |             | 40-140                      | -          |             | 40                    |

| <b>Surrogate</b> | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| o-Terphenyl      | 85                       |             |                           |             | 40-140                         |

Lab Duplicate Analysis  
Batch Quality Control

Project Name: STEEPLEGATE MALL FORCE MAIN  
Project Number: 0208898-001

Lab Number: L2432925  
Report Date: 06/19/24

| Parameter                                                                                                                                                   | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1935044-3 QC Sample: L2432925-03 Client ID: HA24-38_0.5-2.5 |               |                  |       |     |      |            |
| TPH (C10-C36)                                                                                                                                               | ND            | ND               | ug/kg | NC  |      | 40         |

| Surrogate   | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|-------------|-----------|-----------|-----------|-----------|---------------------|
| o-Terphenyl | 84        |           | 96        |           | 40-140              |



# PCBS

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/17/24 22:48  
**Analyst:** RMP  
**Percent Solids:** 91%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 21:15  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/17/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/17/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 52.0 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 52.0 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 73         |           | 30-150              | A      |
| Decachlorobiphenyl           | 64         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 68         |           | 30-150              | B      |
| Decachlorobiphenyl           | 59         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/17/24 22:55  
**Analyst:** RMP  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 21:15  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/17/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/17/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 47.3 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 47.3 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 76         |           | 30-150              | A      |
| Decachlorobiphenyl           | 65         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 70         |           | 30-150              | B      |
| Decachlorobiphenyl           | 65         |           | 30-150              | B      |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/17/24 23:03  
**Analyst:** RMP  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 21:15  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/17/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/17/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 48.0 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 48.0 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 72         |           | 30-150              | A      |
| Decachlorobiphenyl           | 67         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 68         |           | 30-150              | B      |
| Decachlorobiphenyl           | 62         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8082A  
 Analytical Date: 06/17/24 22:25  
 Analyst: RMP

Extraction Method: EPA 3546  
 Extraction Date: 06/16/24 21:15  
 Cleanup Method: EPA 3665A  
 Cleanup Date: 06/17/24  
 Cleanup Method: EPA 3660B  
 Cleanup Date: 06/17/24

| Parameter                                                                                 | Result | Qualifier | Units | RL   | MDL | Column |
|-------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-03 Batch: WG1935043-1 |        |           |       |      |     |        |
| Aroclor 1016                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1221                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1232                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1242                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1248                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1254                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1260                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1262                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| Aroclor 1268                                                                              | ND     |           | ug/kg | 47.3 | --  | A      |
| PCBs, Total                                                                               | ND     |           | ug/kg | 47.3 | --  | A      |

| Surrogate                    | %Recovery | Qualifier | Acceptance<br>Criteria | Column |
|------------------------------|-----------|-----------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 73        |           | 30-150                 | A      |
| Decachlorobiphenyl           | 59        |           | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 65        |           | 30-150                 | B      |
| Decachlorobiphenyl           | 54        |           | 30-150                 | B      |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24

| <b>Parameter</b>                                                                                             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> | <b>Column</b> |
|--------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|---------------|
| Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-03 Batch: WG1935043-2 WG1935043-3 |                          |             |                           |             |                             |            |             |                       |               |
| Aroclor 1016                                                                                                 | 68                       |             | 74                        |             | 40-140                      | 8          |             | 50                    | A             |
| Aroclor 1260                                                                                                 | 56                       |             | 65                        |             | 40-140                      | 15         |             | 50                    | A             |

| <b>Surrogate</b>             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> | <b>Column</b> |
|------------------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|---------------|
| 2,4,5,6-Tetrachloro-m-xylene | 68                       |             | 76                        |             | 30-150                         | A             |
| Decachlorobiphenyl           | 58                       |             | 67                        |             | 30-150                         | A             |
| 2,4,5,6-Tetrachloro-m-xylene | 61                       |             | 70                        |             | 30-150                         | B             |
| Decachlorobiphenyl           | 51                       |             | 62                        |             | 30-150                         | B             |

## METALS

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-01

Date Collected: 06/12/24 08:40

Client ID: HA24-33\_0.5-2.5

Date Received: 06/12/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.98   |           | mg/kg | 0.825 | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |
| Barium, Total                | 15.6   |           | mg/kg | 0.825 | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |
| Cadmium, Total               | ND     |           | mg/kg | 0.825 | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |
| Chromium, Total              | 7.82   |           | mg/kg | 0.825 | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |
| Lead, Total                  | 8.90   |           | mg/kg | 4.12  | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |
| Mercury, Total               | ND     |           | mg/kg | 0.070 | --  | 1                  | 06/18/24 09:45   | 06/19/24 14:04   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.65  | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |
| Silver, Total                | ND     |           | mg/kg | 0.412 | --  | 2                  | 06/18/24 09:15   | 06/19/24 08:56   | EPA 3050B      | 1,6010D              | DHL     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-02

Date Collected: 06/12/24 08:55

Client ID: HA24-33\_2.5-4.5

Date Received: 06/12/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 97%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.97   |           | mg/kg | 0.790 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |
| Barium, Total                | 15.1   |           | mg/kg | 0.790 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |
| Cadmium, Total               | ND     |           | mg/kg | 0.790 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |
| Chromium, Total              | 5.86   |           | mg/kg | 0.790 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |
| Lead, Total                  | ND     |           | mg/kg | 3.95  | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |
| Mercury, Total               | ND     |           | mg/kg | 0.065 | --  | 1                  | 06/18/24 09:45   | 06/19/24 14:07   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.58  | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |
| Silver, Total                | ND     |           | mg/kg | 0.395 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:00   | EPA 3050B      | 1,6010D              | DHL     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**SAMPLE RESULTS**

Lab ID: L2432925-03

Date Collected: 06/12/24 10:30

Client ID: HA24-38\_0.5-2.5

Date Received: 06/12/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 97%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 7.26   |           | mg/kg | 0.789 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |
| Barium, Total                | 27.1   |           | mg/kg | 0.789 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |
| Cadmium, Total               | ND     |           | mg/kg | 0.789 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |
| Chromium, Total              | 8.76   |           | mg/kg | 0.789 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |
| Lead, Total                  | 5.09   |           | mg/kg | 3.94  | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |
| Mercury, Total               | ND     |           | mg/kg | 0.066 | --  | 1                  | 06/18/24 09:45   | 06/19/24 14:11   | EPA 7471B      | 1,7471B              | MJR     |
| Selenium, Total              | ND     |           | mg/kg | 1.58  | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |
| Silver, Total                | ND     |           | mg/kg | 0.394 | --  | 2                  | 06/18/24 09:15   | 06/19/24 09:04   | EPA 3050B      | 1,6010D              | DHL     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2432925

Project Number: 0208898-001

Report Date: 06/19/24

## Method Blank Analysis Batch Quality Control

| Parameter                                                            | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|----------------------------------------------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1935622-1 |        |           |       |       |     |                    |                  |                  |                      |         |
| Arsenic, Total                                                       | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |
| Barium, Total                                                        | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |
| Cadmium, Total                                                       | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |
| Chromium, Total                                                      | ND     |           | mg/kg | 0.400 | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |
| Lead, Total                                                          | ND     |           | mg/kg | 2.00  | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |
| Selenium, Total                                                      | ND     |           | mg/kg | 0.800 | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |
| Silver, Total                                                        | ND     |           | mg/kg | 0.200 | --  | 1                  | 06/18/24 09:15   | 06/18/24 12:16   | 1,6010D              | JMF     |

### Prep Information

Digestion Method: EPA 3050B

| Parameter                                                            | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|----------------------------------------------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1935624-1 |        |           |       |       |     |                    |                  |                  |                      |         |
| Mercury, Total                                                       | ND     |           | mg/kg | 0.083 | --  | 1                  | 06/18/24 09:45   | 06/18/24 11:51   | 1,7471B              | JWN     |

### Prep Information

Digestion Method: EPA 7471B





## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

| Parameter                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|-----------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1935622-2 |                  |      |                   |      |                     |     |      |            |
| Arsenic, Total                                                              | 99               |      | -                 |      | 80-120              | -   |      |            |
| Barium, Total                                                               | 99               |      | -                 |      | 80-120              | -   |      |            |
| Cadmium, Total                                                              | 101              |      | -                 |      | 80-120              | -   |      |            |
| Chromium, Total                                                             | 101              |      | -                 |      | 80-120              | -   |      |            |
| Lead, Total                                                                 | 101              |      | -                 |      | 80-120              | -   |      |            |
| Selenium, Total                                                             | 102              |      | -                 |      | 80-120              | -   |      |            |
| Silver, Total                                                               | 100              |      | -                 |      | 80-120              | -   |      |            |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1935624-2 |                  |      |                   |      |                     |     |      |            |
| Mercury, Total                                                              | 97               |      | -                 |      | 80-120              | -   |      |            |

# Matrix Spike Analysis

## Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

| Parameter                                                                                                                                 | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1935622-3 WG1935622-4 QC Sample: L2431167-01 Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Arsenic, Total                                                                                                                            | 3.55          | 9.62     | 14.1     | 110          |      | 14.4      | 113           |      | 75-125          | 2   |      | 20         |
| Barium, Total                                                                                                                             | 13.9          | 160      | 162      | 92           |      | 161       | 92            |      | 75-125          | 1   |      | 20         |
| Cadmium, Total                                                                                                                            | ND            | 4.25     | 4.01     | 94           |      | 3.90      | 92            |      | 75-125          | 3   |      | 20         |
| Chromium, Total                                                                                                                           | 16.9          | 16       | 35.1     | 114          |      | 37.5      | 128           | Q    | 75-125          | 7   |      | 20         |
| Lead, Total                                                                                                                               | 16.0          | 42.5     | 59.8     | 103          |      | 61.2      | 106           |      | 75-125          | 2   |      | 20         |
| Selenium, Total                                                                                                                           | ND            | 9.62     | 9.98     | 104          |      | 9.55      | 99            |      | 75-125          | 4   |      | 20         |
| Silver, Total                                                                                                                             | ND            | 4.01     | 3.82     | 95           |      | 3.70      | 92            |      | 75-125          | 3   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1935624-3 WG1935624-4 QC Sample: L2431167-01 Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Mercury, Total                                                                                                                            | ND            | 1.29     | 1.30     | 100          |      | 1.32      | 101           |      | 80-120          | 2   |      | 20         |

# **INORGANICS & MISCELLANEOUS**

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### SAMPLE RESULTS

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/18/24 16:21 | 1,1030            | REM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### SAMPLE RESULTS

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/18/24 16:21 | 1,1030            | REM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### SAMPLE RESULTS

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/18/24 16:21 | 1,1030            | REM     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-01  
**Client ID:** HA24-33\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:40  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 90.9   |           | %     | 0.100 | NA  | 1               | -              | 06/13/24 01:49 | 121,2540G         | WJM     |
| pH (H)                              | 7.37   |           | SU    | -     | NA  | 1               | -              | 06/18/24 04:57 | 1,9045D           | CAR     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/19/24 13:33 | 06/19/24 15:29 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/19/24 13:33 | 06/19/24 15:48 | 125,7.3           | JLB     |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

### SAMPLE RESULTS

**Lab ID:** L2432925-02  
**Client ID:** HA24-33\_2.5-4.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 08:55  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 97.1   |           | %     | 0.100 | NA  | 1               | -              | 06/13/24 01:49 | 121,2540G         | WJM     |
| pH (H)                              | 7.02   |           | SU    | -     | NA  | 1               | -              | 06/18/24 04:57 | 1,9045D           | CAR     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/19/24 13:33 | 06/19/24 15:30 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/19/24 13:33 | 06/19/24 15:49 | 125,7.3           | JLB     |





**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

**SAMPLE RESULTS**

**Lab ID:** L2432925-03  
**Client ID:** HA24-38\_0.5-2.5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/12/24 10:30  
**Date Received:** 06/12/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 96.9   |           | %     | 0.100 | NA  | 1               | -              | 06/13/24 01:49 | 121,2540G         | WJM     |
| pH (H)                              | 7.04   |           | SU    | -     | NA  | 1               | -              | 06/18/24 04:57 | 1,9045D           | CAR     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/19/24 13:33 | 06/19/24 15:30 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/19/24 13:33 | 06/19/24 15:49 | 125,7.3           | JLB     |



**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2432925**Project Number:** 0208898-001**Report Date:** 06/19/24**Method Blank Analysis**  
**Batch Quality Control**

| Parameter                                                                   | Result | Qualifier | Units | RL | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|-----------------------------------------------------------------------------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------------|---------|
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1936507-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Cyanide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/19/24 13:33   | 06/19/24 15:25   | 125,7.3              | JLB     |
| General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1936515-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Sulfide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/19/24 13:33   | 06/19/24 15:44   | 125,7.3              | JLB     |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

| Parameter                                                                          | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1935603-1 |                  |      |                   |      |                     |     |      |            |
| pH                                                                                 | 100              |      | -                 |      | 99-101              | -   |      |            |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1936507-2 |                  |      |                   |      |                     |     |      |            |
| Cyanide, Reactive                                                                  | 97               |      | -                 |      | 30-125              | -   |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1936515-2 |                  |      |                   |      |                     |     |      |            |
| Sulfide, Reactive                                                                  | 102              |      | -                 |      | 60-125              | -   |      | 40         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2432925  
**Report Date:** 06/19/24

| Parameter                                                                                                                             | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1933616-1 QC Sample: L2432676-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Solids, Total                                                                                                                         | 86.2          | 86.8             | %     | 1   |      | 20         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1935603-2 QC Sample: L2433521-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| pH                                                                                                                                    | 7.13          | 7.19             | SU    | 1   |      | 5          |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1936507-3 QC Sample: L2432762-04 Client ID: DUP Sample |               |                  |       |     |      |            |
| Cyanide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1936515-3 QC Sample: L2432762-04 Client ID: DUP Sample |               |                  |       |     |      |            |
| Sulfide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

Serial\_No:06192417:08  
**Lab Number:** L2432925  
**Report Date:** 06/19/24

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

#### Cooler Information

**Cooler**                      **Custody Seal**  
A                                      Absent

#### Container Information

| Container ID | Container Type                          | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal   | Frozen Date/Time | Analysis(*)                                                                                              |
|--------------|-----------------------------------------|--------|------------|----------|------------|------|--------|------------------|----------------------------------------------------------------------------------------------------------|
| L2432925-01A | Vial MeOH preserved                     | A      | NA         |          | 3.7        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2432925-01B | Vial water preserved                    | A      | NA         |          | 3.7        | Y    | Absent | 12-JUN-24 20:27  | 8260HLW-NH(14)                                                                                           |
| L2432925-01C | Vial water preserved                    | A      | NA         |          | 3.7        | Y    | Absent | 12-JUN-24 20:27  | 8260HLW-NH(14)                                                                                           |
| L2432925-01D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 3.7        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2432925-01E | Glass 60ml unpreserved split            | A      | NA         |          | 3.7        | Y    | Absent |                  | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |
| L2432925-01F | Glass 60ml/2oz unpreserved/No Headspace | A      | NA         |          | 3.7        | Y    | Absent |                  | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2432925-01G | Glass 500ml/16oz unpreserved            | A      | NA         |          | 3.7        | Y    | Absent |                  | REACTS(14),8270TCL(14),IGNIT-1030(14),PH-9045(1),8270TCL-SIM(14),PCB-8082(365),REACTCN(14),TPH-DRO-D(14) |
| L2432925-02A | Vial MeOH preserved                     | A      | NA         |          | 3.7        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2432925-02B | Vial water preserved                    | A      | NA         |          | 3.7        | Y    | Absent | 12-JUN-24 20:27  | 8260HLW-NH(14)                                                                                           |
| L2432925-02C | Vial water preserved                    | A      | NA         |          | 3.7        | Y    | Absent | 12-JUN-24 20:27  | 8260HLW-NH(14)                                                                                           |
| L2432925-02D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 3.7        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2432925-02E | Glass 60ml unpreserved split            | A      | NA         |          | 3.7        | Y    | Absent |                  | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |
| L2432925-02F | Glass 60ml/2oz unpreserved/No Headspace | A      | NA         |          | 3.7        | Y    | Absent |                  | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2432925-02G | Glass 500ml/16oz unpreserved            | A      | NA         |          | 3.7        | Y    | Absent |                  | REACTS(14),8270TCL(14),IGNIT-1030(14),PH-9045(1),8270TCL-SIM(14),TPH-DRO-D(14),PCB-8082(365),REACTCN(14) |
| L2432925-03A | Vial MeOH preserved                     | A      | NA         |          | 3.7        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2432925-03B | Vial water preserved                    | A      | NA         |          | 3.7        | Y    | Absent | 12-JUN-24 20:27  | 8260HLW-NH(14)                                                                                           |
| L2432925-03C | Vial water preserved                    | A      | NA         |          | 3.7        | Y    | Absent | 12-JUN-24 20:27  | 8260HLW-NH(14)                                                                                           |
| L2432925-03D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 3.7        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2432925-03E | Glass 60ml unpreserved split            | A      | NA         |          | 3.7        | Y    | Absent |                  | AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

Serial\_No:06192417:08  
**Lab Number:** L2432925  
**Report Date:** 06/19/24

**Container Information**

| <b>Container ID</b> | <b>Container Type</b>                   | <b>Cooler</b> | <b>Initial<br/>pH</b> | <b>Final<br/>pH</b> | <b>Temp<br/>deg C</b> | <b>Pres</b> | <b>Seal</b> | <b>Frozen<br/>Date/Time</b> | <b>Analysis(*)</b>                                                                                       |
|---------------------|-----------------------------------------|---------------|-----------------------|---------------------|-----------------------|-------------|-------------|-----------------------------|----------------------------------------------------------------------------------------------------------|
| L2432925-03F        | Glass 60ml/2oz unpreserved/No Headspace | A             | NA                    |                     | 3.7                   | Y           | Absent      |                             | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2432925-03G        | Glass 500ml/16oz unpreserved            | A             | NA                    |                     | 3.7                   | Y           | Absent      |                             | 8270TCL(14),IGNIT-1030(14),REACTS(14),PH-9045(1),8270TCL-SIM(14),PCB-8082(365),TPH-DRO-D(14),REACTCN(14) |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

## GLOSSARY

### Acronyms

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DL       | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                |
| EDL      | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).                                                                                         |
| EMPC     | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.                                                                                                                                                                                                                               |
| EPA      | - Environmental Protection Agency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LCS      | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                          |
| LCSD     | - Laboratory Control Sample Duplicate: Refer to LCS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LFB      | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                         |
| LOD      | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                                                               |
| LOQ      | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)<br><br>Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL      | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                          |
| MS       | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.                                                                                                                                                                                                    |
| MSD      | - Matrix Spike Sample Duplicate: Refer to MS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NA       | - Not Applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NC       | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.                                                                                                                                                                                                                                                                                                                                                                           |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NI       | - Not Ignitable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NP       | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NR       | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.                                                                                                                                                                                                                                                                                                                                                                    |
| RL       | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                                                                                                                                   |
| RPD      | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.                                                                  |
| SRM      | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.                                                                                                                                                                                                                                                                                                                                                                     |
| STLP     | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TEF      | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.                                                                                                                                                                                                                                                                                                                                                                                             |
| TEQ      | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.                                                                                                                                                                                                                                                                                                                                                        |
| TIC      | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.                                                                                                                                                                                                                                                                      |

Report Format: Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

## Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

## Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Chlordane:** The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Gasoline Range Organics (GRO):** Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

## Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**Report Format:** Data Usability Report





**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

#### **Data Qualifiers**

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2432925  
**Report Date:** 06/19/24

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 125 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates IIIA, April 1998.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**Alpha Analytical, Inc.**Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 21

Published Date: 04/17/2024

Page 1 of 1

**Certification Information**

The following analytes are not included in our Primary NELAP Scope of Accreditation:

**Westborough Facility****EPA 624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625.1:** alpha-Terpineol**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.**Mansfield Facility****SM 2540D:** TSS.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Nonpotable Water:** **EPA RSK-175 Dissolved Gases****Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

**Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables).**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.**EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1** Hg.**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

[illegible]

## HA24-43 Test Results



## ANALYTICAL REPORT

|                 |                                                               |
|-----------------|---------------------------------------------------------------|
| Lab Number:     | L2433315                                                      |
| Client:         | Haley & Aldrich<br>3 Bedford Farms Drive<br>Bedford, NH 03110 |
| ATTN:           | Erin Force                                                    |
| Phone:          | (603) 391-3332                                                |
| Project Name:   | STEEPLEGATE MALL FORCE MAIN                                   |
| Project Number: | 0208898-001                                                   |
| Report Date:    | 06/21/24                                                      |

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

| <b>Alpha<br/>Sample ID</b> | <b>Client ID</b> | <b>Matrix</b> | <b>Sample<br/>Location</b> | <b>Collection<br/>Date/Time</b> | <b>Receive Date</b> |
|----------------------------|------------------|---------------|----------------------------|---------------------------------|---------------------|
| L2433315-01                | HA24-43_1-3      | SOIL          | CONCORD, NH                | 06/13/24 08:00                  | 06/13/24            |
| L2433315-02                | HA24-43_3-5      | SOIL          | CONCORD, NH                | 06/13/24 08:20                  | 06/13/24            |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

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**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Case Narrative (continued)**

Semivolatile Organics by SIM

L2433315-01D and -02D: The sample has elevated detection limits due to the dilution required by the sample matrix.

Total Metals

L2433315-01 and -02: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Caitlin Walukevich

Title: Technical Director/Representative

Date: 06/21/24

# ORGANICS

# VOLATILES

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/19/24 17:47  
**Analyst:** LAC  
**Percent Solids:** 97%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 5.4  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.6  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.1  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.54 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.54 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 4.3  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.54 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.54 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.54 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.54 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.54 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 4.3  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.54 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.54 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 4.3  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.6  | --  | 1               |

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**SAMPLE RESULTS**

Lab ID: L2433315-01  
 Client ID: HA24-43\_1-3  
 Sample Location: CONCORD, NH

Date Collected: 06/13/24 08:00  
 Date Received: 06/13/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.54 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.2  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.1  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.1  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 11   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 27   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 11   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 11   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.2  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 4.3  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.1  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.54 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.2  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.1  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.2  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.2  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.2  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 4.3  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.1  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.1  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 4.3  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.1  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.2 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 22  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.2 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.2 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 86  | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 92         |           | 70-130              |
| Toluene-d8            | 99         |           | 70-130              |
| 4-Bromofluorobenzene  | 98         |           | 70-130              |
| Dibromofluoromethane  | 104        |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8260D  
**Analytical Date:** 06/19/24 18:13  
**Analyst:** LAC  
**Percent Solids:** 96%

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Methylene chloride                                  | ND     |           | ug/kg | 6.3  | --  | 1               |
| 1,1-Dichloroethane                                  | ND     |           | ug/kg | 1.3  | --  | 1               |
| Chloroform                                          | ND     |           | ug/kg | 1.9  | --  | 1               |
| Carbon tetrachloride                                | ND     |           | ug/kg | 1.3  | --  | 1               |
| 1,2-Dichloropropane                                 | ND     |           | ug/kg | 1.3  | --  | 1               |
| Dibromochloromethane                                | ND     |           | ug/kg | 1.3  | --  | 1               |
| 1,1,2-Trichloroethane                               | ND     |           | ug/kg | 1.3  | --  | 1               |
| Tetrachloroethene                                   | ND     |           | ug/kg | 0.63 | --  | 1               |
| Chlorobenzene                                       | ND     |           | ug/kg | 0.63 | --  | 1               |
| Trichlorofluoromethane                              | ND     |           | ug/kg | 5.1  | --  | 1               |
| 1,2-Dichloroethane                                  | ND     |           | ug/kg | 1.3  | --  | 1               |
| 1,1,1-Trichloroethane                               | ND     |           | ug/kg | 0.63 | --  | 1               |
| Bromodichloromethane                                | ND     |           | ug/kg | 0.63 | --  | 1               |
| trans-1,3-Dichloropropene                           | ND     |           | ug/kg | 1.3  | --  | 1               |
| cis-1,3-Dichloropropene                             | ND     |           | ug/kg | 0.63 | --  | 1               |
| 1,3-Dichloropropene, Total                          | ND     |           | ug/kg | 0.63 | --  | 1               |
| 1,1-Dichloropropene                                 | ND     |           | ug/kg | 0.63 | --  | 1               |
| Bromoform                                           | ND     |           | ug/kg | 5.1  | --  | 1               |
| 1,1,2,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.63 | --  | 1               |
| Benzene                                             | ND     |           | ug/kg | 0.63 | --  | 1               |
| Toluene                                             | ND     |           | ug/kg | 1.3  | --  | 1               |
| Ethylbenzene                                        | ND     |           | ug/kg | 1.3  | --  | 1               |
| Chloromethane                                       | ND     |           | ug/kg | 5.1  | --  | 1               |
| Bromomethane                                        | ND     |           | ug/kg | 2.5  | --  | 1               |
| Vinyl chloride                                      | ND     |           | ug/kg | 1.3  | --  | 1               |
| Chloroethane                                        | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,1-Dichloroethene                                  | ND     |           | ug/kg | 1.3  | --  | 1               |
| trans-1,2-Dichloroethene                            | ND     |           | ug/kg | 1.9  | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**SAMPLE RESULTS**

Lab ID: L2433315-02  
 Client ID: HA24-43\_3-5  
 Sample Location: CONCORD, NH

Date Collected: 06/13/24 08:20  
 Date Received: 06/13/24  
 Field Prep: Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL   | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|------|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |      |     |                 |
| Trichloroethene                                     | ND     |           | ug/kg | 0.63 | --  | 1               |
| 1,2-Dichlorobenzene                                 | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,3-Dichlorobenzene                                 | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,4-Dichlorobenzene                                 | ND     |           | ug/kg | 2.5  | --  | 1               |
| Methyl tert butyl ether                             | ND     |           | ug/kg | 2.5  | --  | 1               |
| p/m-Xylene                                          | ND     |           | ug/kg | 2.5  | --  | 1               |
| o-Xylene                                            | ND     |           | ug/kg | 1.3  | --  | 1               |
| Xylenes, Total                                      | ND     |           | ug/kg | 1.3  | --  | 1               |
| cis-1,2-Dichloroethene                              | ND     |           | ug/kg | 1.3  | --  | 1               |
| 1,2-Dichloroethene, Total                           | ND     |           | ug/kg | 1.3  | --  | 1               |
| Dibromomethane                                      | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,2,3-Trichloropropane                              | ND     |           | ug/kg | 2.5  | --  | 1               |
| Styrene                                             | ND     |           | ug/kg | 1.3  | --  | 1               |
| Dichlorodifluoromethane                             | ND     |           | ug/kg | 13   | --  | 1               |
| Acetone                                             | ND     |           | ug/kg | 32   | --  | 1               |
| Carbon disulfide                                    | ND     |           | ug/kg | 13   | --  | 1               |
| 2-Butanone                                          | ND     |           | ug/kg | 13   | --  | 1               |
| 4-Methyl-2-pentanone                                | ND     |           | ug/kg | 13   | --  | 1               |
| 2-Hexanone                                          | ND     |           | ug/kg | 13   | --  | 1               |
| Bromochloromethane                                  | ND     |           | ug/kg | 2.5  | --  | 1               |
| Tetrahydrofuran                                     | ND     |           | ug/kg | 5.1  | --  | 1               |
| 2,2-Dichloropropane                                 | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,2-Dibromoethane                                   | ND     |           | ug/kg | 1.3  | --  | 1               |
| 1,1,1,2-Tetrachloroethane                           | ND     |           | ug/kg | 0.63 | --  | 1               |
| Bromobenzene                                        | ND     |           | ug/kg | 2.5  | --  | 1               |
| n-Butylbenzene                                      | ND     |           | ug/kg | 1.3  | --  | 1               |
| sec-Butylbenzene                                    | ND     |           | ug/kg | 1.3  | --  | 1               |
| tert-Butylbenzene                                   | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,3,5-Trichlorobenzene                              | ND     |           | ug/kg | 2.5  | --  | 1               |
| o-Chlorotoluene                                     | ND     |           | ug/kg | 2.5  | --  | 1               |
| p-Chlorotoluene                                     | ND     |           | ug/kg | 2.5  | --  | 1               |
| 1,2-Dibromo-3-chloropropane                         | ND     |           | ug/kg | 3.8  | --  | 1               |
| Hexachlorobutadiene                                 | ND     |           | ug/kg | 5.1  | --  | 1               |
| Isopropylbenzene                                    | ND     |           | ug/kg | 1.3  | --  | 1               |
| p-Isopropyltoluene                                  | ND     |           | ug/kg | 1.3  | --  | 1               |
| Naphthalene                                         | ND     |           | ug/kg | 5.1  | --  | 1               |
| n-Propylbenzene                                     | ND     |           | ug/kg | 1.3  | --  | 1               |



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                           | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|-----------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab |        |           |       |     |     |                 |
| 1,2,3-Trichlorobenzene                              | ND     |           | ug/kg | 2.5 | --  | 1               |
| 1,2,4-Trichlorobenzene                              | ND     |           | ug/kg | 2.5 | --  | 1               |
| 1,3,5-Trimethylbenzene                              | ND     |           | ug/kg | 2.5 | --  | 1               |
| 1,2,4-Trimethylbenzene                              | ND     |           | ug/kg | 2.5 | --  | 1               |
| Ethyl ether                                         | ND     |           | ug/kg | 2.5 | --  | 1               |
| Isopropyl Ether                                     | ND     |           | ug/kg | 2.5 | --  | 1               |
| Tert-Butyl Alcohol                                  | ND     |           | ug/kg | 25  | --  | 1               |
| Ethyl-Tert-Butyl-Ether                              | ND     |           | ug/kg | 2.5 | --  | 1               |
| Tertiary-Amyl Methyl Ether                          | ND     |           | ug/kg | 2.5 | --  | 1               |
| 1,4-Dioxane                                         | ND     |           | ug/kg | 100 | --  | 1               |

| Surrogate             | % Recovery | Qualifier | Acceptance Criteria |
|-----------------------|------------|-----------|---------------------|
| 1,2-Dichloroethane-d4 | 93         |           | 70-130              |
| Toluene-d8            | 98         |           | 70-130              |
| 4-Bromofluorobenzene  | 98         |           | 70-130              |
| Dibromofluoromethane  | 105        |           | 70-130              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/19/24 11:36  
 Analyst: AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-02 Batch: WG1937007-5 |        |           |       |      |     |
| Methylene chloride                                                                          | ND     |           | ug/kg | 5.0  | --  |
| 1,1-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| Chloroform                                                                                  | ND     |           | ug/kg | 1.5  | --  |
| Carbon tetrachloride                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloropropane                                                                         | ND     |           | ug/kg | 1.0  | --  |
| Dibromochloromethane                                                                        | ND     |           | ug/kg | 1.0  | --  |
| 1,1,2-Trichloroethane                                                                       | ND     |           | ug/kg | 1.0  | --  |
| Tetrachloroethene                                                                           | ND     |           | ug/kg | 0.50 | --  |
| Chlorobenzene                                                                               | ND     |           | ug/kg | 0.50 | --  |
| Trichlorofluoromethane                                                                      | ND     |           | ug/kg | 4.0  | --  |
| 1,2-Dichloroethane                                                                          | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1-Trichloroethane                                                                       | ND     |           | ug/kg | 0.50 | --  |
| Bromodichloromethane                                                                        | ND     |           | ug/kg | 0.50 | --  |
| trans-1,3-Dichloropropene                                                                   | ND     |           | ug/kg | 1.0  | --  |
| cis-1,3-Dichloropropene                                                                     | ND     |           | ug/kg | 0.50 | --  |
| 1,3-Dichloropropene, Total                                                                  | ND     |           | ug/kg | 0.50 | --  |
| 1,1-Dichloropropene                                                                         | ND     |           | ug/kg | 0.50 | --  |
| Bromoform                                                                                   | ND     |           | ug/kg | 4.0  | --  |
| 1,1,2,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Benzene                                                                                     | ND     |           | ug/kg | 0.50 | --  |
| Toluene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Ethylbenzene                                                                                | ND     |           | ug/kg | 1.0  | --  |
| Chloromethane                                                                               | ND     |           | ug/kg | 4.0  | --  |
| Bromomethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| Vinyl chloride                                                                              | ND     |           | ug/kg | 1.0  | --  |
| Chloroethane                                                                                | ND     |           | ug/kg | 2.0  | --  |
| 1,1-Dichloroethene                                                                          | ND     |           | ug/kg | 1.0  | --  |
| trans-1,2-Dichloroethene                                                                    | ND     |           | ug/kg | 1.5  | --  |
| Trichloroethene                                                                             | ND     |           | ug/kg | 0.50 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D  
 Analytical Date: 06/19/24 11:36  
 Analyst: AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL   | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-02 Batch: WG1937007-5 |        |           |       |      |     |
| 1,2-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,3-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,4-Dichlorobenzene                                                                         | ND     |           | ug/kg | 2.0  | --  |
| Methyl tert butyl ether                                                                     | ND     |           | ug/kg | 2.0  | --  |
| p/m-Xylene                                                                                  | ND     |           | ug/kg | 2.0  | --  |
| o-Xylene                                                                                    | ND     |           | ug/kg | 1.0  | --  |
| Xylenes, Total                                                                              | ND     |           | ug/kg | 1.0  | --  |
| cis-1,2-Dichloroethene                                                                      | ND     |           | ug/kg | 1.0  | --  |
| 1,2-Dichloroethene, Total                                                                   | ND     |           | ug/kg | 1.0  | --  |
| Dibromomethane                                                                              | ND     |           | ug/kg | 2.0  | --  |
| 1,2,3-Trichloropropane                                                                      | ND     |           | ug/kg | 2.0  | --  |
| Styrene                                                                                     | ND     |           | ug/kg | 1.0  | --  |
| Dichlorodifluoromethane                                                                     | ND     |           | ug/kg | 10   | --  |
| Acetone                                                                                     | ND     |           | ug/kg | 25   | --  |
| Carbon disulfide                                                                            | ND     |           | ug/kg | 10   | --  |
| 2-Butanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| 4-Methyl-2-pentanone                                                                        | ND     |           | ug/kg | 10   | --  |
| 2-Hexanone                                                                                  | ND     |           | ug/kg | 10   | --  |
| Bromochloromethane                                                                          | ND     |           | ug/kg | 2.0  | --  |
| Tetrahydrofuran                                                                             | ND     |           | ug/kg | 4.0  | --  |
| 2,2-Dichloropropane                                                                         | ND     |           | ug/kg | 2.0  | --  |
| 1,2-Dibromoethane                                                                           | ND     |           | ug/kg | 1.0  | --  |
| 1,1,1,2-Tetrachloroethane                                                                   | ND     |           | ug/kg | 0.50 | --  |
| Bromobenzene                                                                                | ND     |           | ug/kg | 2.0  | --  |
| n-Butylbenzene                                                                              | ND     |           | ug/kg | 1.0  | --  |
| sec-Butylbenzene                                                                            | ND     |           | ug/kg | 1.0  | --  |
| tert-Butylbenzene                                                                           | ND     |           | ug/kg | 2.0  | --  |
| 1,3,5-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0  | --  |
| o-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0  | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### Method Blank Analysis Batch Quality Control

**Analytical Method:** 1,8260D  
**Analytical Date:** 06/19/24 11:36  
**Analyst:** AJK

| Parameter                                                                                   | Result | Qualifier | Units | RL  | MDL |
|---------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-02 Batch: WG1937007-5 |        |           |       |     |     |
| p-Chlorotoluene                                                                             | ND     |           | ug/kg | 2.0 | --  |
| 1,2-Dibromo-3-chloropropane                                                                 | ND     |           | ug/kg | 3.0 | --  |
| Hexachlorobutadiene                                                                         | ND     |           | ug/kg | 4.0 | --  |
| Isopropylbenzene                                                                            | ND     |           | ug/kg | 1.0 | --  |
| p-Isopropyltoluene                                                                          | ND     |           | ug/kg | 1.0 | --  |
| Naphthalene                                                                                 | ND     |           | ug/kg | 4.0 | --  |
| n-Propylbenzene                                                                             | ND     |           | ug/kg | 1.0 | --  |
| 1,2,3-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trichlorobenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,3,5-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| 1,2,4-Trimethylbenzene                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Ethyl ether                                                                                 | ND     |           | ug/kg | 2.0 | --  |
| Isopropyl Ether                                                                             | ND     |           | ug/kg | 2.0 | --  |
| Tert-Butyl Alcohol                                                                          | ND     |           | ug/kg | 20  | --  |
| Ethyl-Tert-Butyl-Ether                                                                      | ND     |           | ug/kg | 2.0 | --  |
| Tertiary-Amyl Methyl Ether                                                                  | ND     |           | ug/kg | 2.0 | --  |
| 1,4-Dioxane                                                                                 | ND     |           | ug/kg | 80  | --  |

| Surrogate             | %Recovery | Qualifier | Acceptance<br>Criteria |
|-----------------------|-----------|-----------|------------------------|
| 1,2-Dichloroethane-d4 | 90        |           | 70-130                 |
| Toluene-d8            | 99        |           | 70-130                 |
| 4-Bromofluorobenzene  | 100       |           | 70-130                 |
| Dibromofluoromethane  | 102       |           | 70-130                 |



# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2433315

**Project Number:** 0208898-001

**Report Date:** 06/21/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-02 Batch: WG1937007-3 WG1937007-4 |                  |      |                   |      |                     |     |      |               |
| Methylene chloride                                                                                             | 84               |      | 87                |      | 70-130              | 4   |      | 30            |
| 1,1-Dichloroethane                                                                                             | 81               |      | 84                |      | 70-130              | 4   |      | 30            |
| Chloroform                                                                                                     | 87               |      | 89                |      | 70-130              | 2   |      | 30            |
| Carbon tetrachloride                                                                                           | 89               |      | 90                |      | 70-130              | 1   |      | 30            |
| 1,2-Dichloropropane                                                                                            | 85               |      | 88                |      | 70-130              | 3   |      | 30            |
| Dibromochloromethane                                                                                           | 100              |      | 103               |      | 70-130              | 3   |      | 30            |
| 1,1,2-Trichloroethane                                                                                          | 87               |      | 91                |      | 70-130              | 4   |      | 30            |
| Tetrachloroethene                                                                                              | 79               |      | 81                |      | 70-130              | 3   |      | 30            |
| Chlorobenzene                                                                                                  | 89               |      | 92                |      | 70-130              | 3   |      | 30            |
| Trichlorofluoromethane                                                                                         | 86               |      | 89                |      | 70-139              | 3   |      | 30            |
| 1,2-Dichloroethane                                                                                             | 84               |      | 88                |      | 70-130              | 5   |      | 30            |
| 1,1,1-Trichloroethane                                                                                          | 90               |      | 91                |      | 70-130              | 1   |      | 30            |
| Bromodichloromethane                                                                                           | 91               |      | 94                |      | 70-130              | 3   |      | 30            |
| trans-1,3-Dichloropropene                                                                                      | 84               |      | 88                |      | 70-130              | 5   |      | 30            |
| cis-1,3-Dichloropropene                                                                                        | 79               |      | 82                |      | 70-130              | 4   |      | 30            |
| 1,1-Dichloropropene                                                                                            | 76               |      | 78                |      | 70-130              | 3   |      | 30            |
| Bromoform                                                                                                      | 86               |      | 91                |      | 70-130              | 6   |      | 30            |
| 1,1,2,2-Tetrachloroethane                                                                                      | 82               |      | 85                |      | 70-130              | 4   |      | 30            |
| Benzene                                                                                                        | 85               |      | 88                |      | 70-130              | 3   |      | 30            |
| Toluene                                                                                                        | 86               |      | 88                |      | 70-130              | 2   |      | 30            |
| Ethylbenzene                                                                                                   | 88               |      | 91                |      | 70-130              | 3   |      | 30            |
| Chloromethane                                                                                                  | 82               |      | 87                |      | 52-130              | 6   |      | 30            |
| Bromomethane                                                                                                   | 73               |      | 73                |      | 57-147              | 0   |      | 30            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2433315

**Project Number:** 0208898-001

**Report Date:** 06/21/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-02 Batch: WG1937007-3 WG1937007-4 |                  |      |                   |      |                     |     |      |               |
| Vinyl chloride                                                                                                 | 74               |      | 78                |      | 67-130              | 5   |      | 30            |
| Chloroethane                                                                                                   | 76               |      | 77                |      | 50-151              | 1   |      | 30            |
| 1,1-Dichloroethene                                                                                             | 78               |      | 80                |      | 65-135              | 3   |      | 30            |
| trans-1,2-Dichloroethene                                                                                       | 84               |      | 85                |      | 70-130              | 1   |      | 30            |
| Trichloroethene                                                                                                | 92               |      | 97                |      | 70-130              | 5   |      | 30            |
| 1,2-Dichlorobenzene                                                                                            | 86               |      | 89                |      | 70-130              | 3   |      | 30            |
| 1,3-Dichlorobenzene                                                                                            | 84               |      | 87                |      | 70-130              | 4   |      | 30            |
| 1,4-Dichlorobenzene                                                                                            | 84               |      | 87                |      | 70-130              | 4   |      | 30            |
| Methyl tert butyl ether                                                                                        | 88               |      | 92                |      | 66-130              | 4   |      | 30            |
| p/m-Xylene                                                                                                     | 84               |      | 87                |      | 70-130              | 4   |      | 30            |
| o-Xylene                                                                                                       | 83               |      | 86                |      | 70-130              | 4   |      | 30            |
| cis-1,2-Dichloroethene                                                                                         | 87               |      | 89                |      | 70-130              | 2   |      | 30            |
| Dibromomethane                                                                                                 | 92               |      | 96                |      | 70-130              | 4   |      | 30            |
| 1,2,3-Trichloropropane                                                                                         | 80               |      | 85                |      | 68-130              | 6   |      | 30            |
| Styrene                                                                                                        | 86               |      | 88                |      | 70-130              | 2   |      | 30            |
| Dichlorodifluoromethane                                                                                        | 81               |      | 85                |      | 30-146              | 5   |      | 30            |
| Acetone                                                                                                        | 100              |      | 107               |      | 54-140              | 7   |      | 30            |
| Carbon disulfide                                                                                               | 79               |      | 82                |      | 59-130              | 4   |      | 30            |
| 2-Butanone                                                                                                     | 102              |      | 112               |      | 70-130              | 9   |      | 30            |
| 4-Methyl-2-pentanone                                                                                           | 87               |      | 94                |      | 70-130              | 8   |      | 30            |
| 2-Hexanone                                                                                                     | 104              |      | 114               |      | 70-130              | 9   |      | 30            |
| Bromochloromethane                                                                                             | 99               |      | 103               |      | 70-130              | 4   |      | 30            |
| Tetrahydrofuran                                                                                                | 103              |      | 111               |      | 66-130              | 7   |      | 30            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2433315

**Report Date:** 06/21/24

| Parameter                                                                                                      | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-02 Batch: WG1937007-3 WG1937007-4 |                  |      |                   |      |                     |     |      |               |
| 2,2-Dichloropropane                                                                                            | 77               |      | 80                |      | 70-130              | 4   |      | 30            |
| 1,2-Dibromoethane                                                                                              | 96               |      | 101               |      | 70-130              | 5   |      | 30            |
| 1,1,1,2-Tetrachloroethane                                                                                      | 90               |      | 93                |      | 70-130              | 3   |      | 30            |
| Bromobenzene                                                                                                   | 82               |      | 85                |      | 70-130              | 4   |      | 30            |
| n-Butylbenzene                                                                                                 | 88               |      | 89                |      | 70-130              | 1   |      | 30            |
| sec-Butylbenzene                                                                                               | 88               |      | 90                |      | 70-130              | 2   |      | 30            |
| tert-Butylbenzene                                                                                              | 87               |      | 90                |      | 70-130              | 3   |      | 30            |
| 1,3,5-Trichlorobenzene                                                                                         | 80               |      | 83                |      | 70-139              | 4   |      | 30            |
| o-Chlorotoluene                                                                                                | 84               |      | 100               |      | 70-130              | 17  |      | 30            |
| p-Chlorotoluene                                                                                                | 85               |      | 88                |      | 70-130              | 3   |      | 30            |
| 1,2-Dibromo-3-chloropropane                                                                                    | 89               |      | 100               |      | 68-130              | 12  |      | 30            |
| Hexachlorobutadiene                                                                                            | 72               |      | 75                |      | 67-130              | 4   |      | 30            |
| Isopropylbenzene                                                                                               | 81               |      | 83                |      | 70-130              | 2   |      | 30            |
| p-Isopropyltoluene                                                                                             | 81               |      | 83                |      | 70-130              | 2   |      | 30            |
| Naphthalene                                                                                                    | 96               |      | 104               |      | 70-130              | 8   |      | 30            |
| n-Propylbenzene                                                                                                | 87               |      | 89                |      | 70-130              | 2   |      | 30            |
| 1,2,3-Trichlorobenzene                                                                                         | 82               |      | 86                |      | 70-130              | 5   |      | 30            |
| 1,2,4-Trichlorobenzene                                                                                         | 83               |      | 86                |      | 70-130              | 4   |      | 30            |
| 1,3,5-Trimethylbenzene                                                                                         | 87               |      | 89                |      | 70-130              | 2   |      | 30            |
| 1,2,4-Trimethylbenzene                                                                                         | 85               |      | 88                |      | 70-130              | 3   |      | 30            |
| Ethyl ether                                                                                                    | 88               |      | 92                |      | 67-130              | 4   |      | 30            |
| Isopropyl Ether                                                                                                | 105              |      | 108               |      | 66-130              | 3   |      | 30            |
| Tert-Butyl Alcohol                                                                                             | 92               |      | 103               |      | 70-130              | 11  |      | 30            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24

| <b>Parameter</b>                                                                                               | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|----------------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-02 Batch: WG1937007-3 WG1937007-4 |                          |             |                           |             |                             |            |             |                       |
| Ethyl-Tert-Butyl-Ether                                                                                         | 91                       |             | 95                        |             | 70-130                      | 4          |             | 30                    |
| Tertiary-Amyl Methyl Ether                                                                                     | 91                       |             | 95                        |             | 70-130                      | 4          |             | 30                    |
| 1,4-Dioxane                                                                                                    | 81                       |             | 96                        |             | 65-136                      | 17         |             | 30                    |

| <b>Surrogate</b>      | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|-----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 1,2-Dichloroethane-d4 | 90                       |             | 91                        |             | 70-130                         |
| Toluene-d8            | 99                       |             | 99                        |             | 70-130                         |
| 4-Bromofluorobenzene  | 97                       |             | 97                        |             | 70-130                         |
| Dibromofluoromethane  | 105                      |             | 104                       |             | 70-130                         |



# SEMIVOLATILES

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/20/24 10:43  
**Analyst:** ALS  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 19:59

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 560 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 390 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

Sample Depth:

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 370 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 810 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 550 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 43         |           | 25-120              |
| Phenol-d6            | 46         |           | 10-120              |
| Nitrobenzene-d5      | 45         |           | 23-120              |
| 2-Fluorobiphenyl     | 44         |           | 30-120              |
| 2,4,6-Tribromophenol | 35         |           | 10-136              |
| 4-Terphenyl-d14      | 48         |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01      D  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/21/24 12:22  
**Analyst:** RP  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 20:02

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 68  | --  | 10              |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 68  | --  | 10              |
| Fluoranthene                                         | ND     |           | ug/kg | 68  | --  | 10              |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 68  | --  | 10              |
| Naphthalene                                          | ND     |           | ug/kg | 68  | --  | 10              |
| Benzo(a)anthracene                                   | ND     |           | ug/kg | 68  | --  | 10              |
| Benzo(a)pyrene                                       | ND     |           | ug/kg | 68  | --  | 10              |
| Benzo(b)fluoranthene                                 | ND     |           | ug/kg | 68  | --  | 10              |
| Benzo(k)fluoranthene                                 | ND     |           | ug/kg | 68  | --  | 10              |
| Chrysene                                             | ND     |           | ug/kg | 68  | --  | 10              |
| Acenaphthylene                                       | ND     |           | ug/kg | 68  | --  | 10              |
| Anthracene                                           | ND     |           | ug/kg | 68  | --  | 10              |
| Benzo(ghi)perylene                                   | ND     |           | ug/kg | 68  | --  | 10              |
| Fluorene                                             | ND     |           | ug/kg | 68  | --  | 10              |
| Phenanthrene                                         | ND     |           | ug/kg | 68  | --  | 10              |
| Dibenzo(a,h)anthracene                               | ND     |           | ug/kg | 68  | --  | 10              |
| Indeno(1,2,3-cd)Pyrene                               | ND     |           | ug/kg | 68  | --  | 10              |
| Pyrene                                               | ND     |           | ug/kg | 68  | --  | 10              |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 68  | --  | 10              |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 68  | --  | 10              |
| Pentachlorophenol                                    | ND     |           | ug/kg | 270 | --  | 10              |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 68  | --  | 10              |
| Hexachloroethane                                     | ND     |           | ug/kg | 68  | --  | 10              |

**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**SAMPLE RESULTS**

Lab ID: L2433315-01 D

Date Collected: 06/13/24 08:00

Client ID: HA24-43\_1-3

Date Received: 06/13/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

| Parameter                                            | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |    |     |                 |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 64         |           | 25-120              |
| Phenol-d6            | 78         |           | 10-120              |
| Nitrobenzene-d5      | 91         |           | 23-120              |
| 2-Fluorobiphenyl     | 76         |           | 30-120              |
| 2,4,6-Tribromophenol | 67         |           | 10-136              |
| 4-Terphenyl-d14      | 68         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E  
**Analytical Date:** 06/20/24 04:07  
**Analyst:** KB  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 19:59

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| Benzidine                                        | ND     |           | ug/kg | 560 | --  | 1               |
| 1,2,4-Trichlorobenzene                           | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroethyl)ether                          | ND     |           | ug/kg | 150 | --  | 1               |
| 1,2-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,3-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 1,4-Dichlorobenzene                              | ND     |           | ug/kg | 170 | --  | 1               |
| 3,3'-Dichlorobenzidine                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2,6-Dinitrotoluene                               | ND     |           | ug/kg | 170 | --  | 1               |
| Azobenzene                                       | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Chlorophenyl phenyl ether                      | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Bromophenyl phenyl ether                       | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-chloroisopropyl)ether                      | ND     |           | ug/kg | 200 | --  | 1               |
| Bis(2-chloroethoxy)methane                       | ND     |           | ug/kg | 180 | --  | 1               |
| Hexachlorocyclopentadiene                        | ND     |           | ug/kg | 480 | --  | 1               |
| Isophorone                                       | ND     |           | ug/kg | 150 | --  | 1               |
| Nitrobenzene                                     | ND     |           | ug/kg | 150 | --  | 1               |
| NDPA/DPA                                         | ND     |           | ug/kg | 140 | --  | 1               |
| n-Nitrosodi-n-propylamine                        | ND     |           | ug/kg | 170 | --  | 1               |
| Bis(2-ethylhexyl)phthalate                       | ND     |           | ug/kg | 170 | --  | 1               |
| Butyl benzyl phthalate                           | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-butylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Di-n-octylphthalate                              | ND     |           | ug/kg | 170 | --  | 1               |
| Diethyl phthalate                                | ND     |           | ug/kg | 170 | --  | 1               |
| Dimethyl phthalate                               | ND     |           | ug/kg | 170 | --  | 1               |
| Biphenyl                                         | ND     |           | ug/kg | 390 | --  | 1               |
| Aniline                                          | ND     |           | ug/kg | 200 | --  | 1               |
| 4-Chloroaniline                                  | ND     |           | ug/kg | 170 | --  | 1               |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

| Parameter                                        | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|--------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS - Westborough Lab |        |           |       |     |     |                 |
| 2-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 4-Nitroaniline                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Dibenzofuran                                     | ND     |           | ug/kg | 170 | --  | 1               |
| n-Nitrosodimethylamine                           | ND     |           | ug/kg | 340 | --  | 1               |
| 2,4,6-Trichlorophenol                            | ND     |           | ug/kg | 100 | --  | 1               |
| p-Chloro-m-cresol                                | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Chlorophenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 2,4-Dichlorophenol                               | ND     |           | ug/kg | 150 | --  | 1               |
| 2,4-Dimethylphenol                               | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Nitrophenol                                    | ND     |           | ug/kg | 370 | --  | 1               |
| 4-Nitrophenol                                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4-Dinitrophenol                                | ND     |           | ug/kg | 810 | --  | 1               |
| 4,6-Dinitro-o-cresol                             | ND     |           | ug/kg | 440 | --  | 1               |
| Phenol                                           | ND     |           | ug/kg | 170 | --  | 1               |
| 2-Methylphenol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| 3-Methylphenol/4-Methylphenol                    | ND     |           | ug/kg | 240 | --  | 1               |
| 2,4,5-Trichlorophenol                            | ND     |           | ug/kg | 170 | --  | 1               |
| Benzoic Acid                                     | ND     |           | ug/kg | 550 | --  | 1               |
| Benzyl Alcohol                                   | ND     |           | ug/kg | 170 | --  | 1               |
| Carbazole                                        | ND     |           | ug/kg | 170 | --  | 1               |
| Pyridine                                         | ND     |           | ug/kg | 180 | --  | 1               |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 94         |           | 25-120              |
| Phenol-d6            | 94         |           | 10-120              |
| Nitrobenzene-d5      | 95         |           | 23-120              |
| 2-Fluorobiphenyl     | 102        |           | 30-120              |
| 2,4,6-Tribromophenol | 121        |           | 10-136              |
| 4-Terphenyl-d14      | 100        |           | 18-120              |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02      D  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/20/24 19:33  
**Analyst:** DV  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 20:02

| Parameter                                            | Result | Qualifier | Units | RL  | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|-----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |     |     |                 |
| Acenaphthene                                         | ND     |           | ug/kg | 34  | --  | 5               |
| 2-Chloronaphthalene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| Fluoranthene                                         | 54     |           | ug/kg | 34  | --  | 5               |
| Hexachlorobutadiene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| Naphthalene                                          | ND     |           | ug/kg | 34  | --  | 5               |
| Benzo(a)anthracene                                   | ND     |           | ug/kg | 34  | --  | 5               |
| Benzo(a)pyrene                                       | 36     |           | ug/kg | 34  | --  | 5               |
| Benzo(b)fluoranthene                                 | 47     |           | ug/kg | 34  | --  | 5               |
| Benzo(k)fluoranthene                                 | ND     |           | ug/kg | 34  | --  | 5               |
| Chrysene                                             | 36     |           | ug/kg | 34  | --  | 5               |
| Acenaphthylene                                       | 36     |           | ug/kg | 34  | --  | 5               |
| Anthracene                                           | ND     |           | ug/kg | 34  | --  | 5               |
| Benzo(ghi)perylene                                   | ND     |           | ug/kg | 34  | --  | 5               |
| Fluorene                                             | ND     |           | ug/kg | 34  | --  | 5               |
| Phenanthrene                                         | ND     |           | ug/kg | 34  | --  | 5               |
| Dibenzo(a,h)anthracene                               | ND     |           | ug/kg | 34  | --  | 5               |
| Indeno(1,2,3-cd)Pyrene                               | ND     |           | ug/kg | 34  | --  | 5               |
| Pyrene                                               | 64     |           | ug/kg | 34  | --  | 5               |
| 1-Methylnaphthalene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| 2-Methylnaphthalene                                  | ND     |           | ug/kg | 34  | --  | 5               |
| Pentachlorophenol                                    | ND     |           | ug/kg | 140 | --  | 5               |
| Hexachlorobenzene                                    | ND     |           | ug/kg | 34  | --  | 5               |
| Hexachloroethane                                     | ND     |           | ug/kg | 34  | --  | 5               |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**SAMPLE RESULTS**

Lab ID: L2433315-02 D

Date Collected: 06/13/24 08:20

Client ID: HA24-43\_3-5

Date Received: 06/13/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

| Parameter                                            | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|------------------------------------------------------|--------|-----------|-------|----|-----|-----------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab |        |           |       |    |     |                 |

| Surrogate            | % Recovery | Qualifier | Acceptance Criteria |
|----------------------|------------|-----------|---------------------|
| 2-Fluorophenol       | 85         |           | 25-120              |
| Phenol-d6            | 98         |           | 10-120              |
| Nitrobenzene-d5      | 109        |           | 23-120              |
| 2-Fluorobiphenyl     | 88         |           | 30-120              |
| 2,4,6-Tribromophenol | 132        |           | 10-136              |
| 4-Terphenyl-d14      | 80         |           | 18-120              |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E-SIM  
**Analytical Date:** 06/18/24 08:20  
**Analyst:** JJW

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                    | Result | Qualifier | Units | RL  | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-02 Batch: WG1935021-1 |        |           |       |     |     |
| Acenaphthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| 2-Chloronaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Fluoranthene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Hexachlorobutadiene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Naphthalene                                                                                  | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)anthracene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Benzo(a)pyrene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Benzo(b)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Benzo(k)fluoranthene                                                                         | ND     |           | ug/kg | 6.5 | --  |
| Chrysene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Acenaphthylene                                                                               | ND     |           | ug/kg | 6.5 | --  |
| Anthracene                                                                                   | ND     |           | ug/kg | 6.5 | --  |
| Benzo(ghi)perylene                                                                           | ND     |           | ug/kg | 6.5 | --  |
| Fluorene                                                                                     | ND     |           | ug/kg | 6.5 | --  |
| Phenanthrene                                                                                 | ND     |           | ug/kg | 6.5 | --  |
| Dibenzo(a,h)anthracene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Indeno(1,2,3-cd)Pyrene                                                                       | ND     |           | ug/kg | 6.5 | --  |
| Pyrene                                                                                       | ND     |           | ug/kg | 6.5 | --  |
| 1-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| 2-Methylnaphthalene                                                                          | ND     |           | ug/kg | 6.5 | --  |
| Pentachlorophenol                                                                            | ND     |           | ug/kg | 26  | --  |
| Hexachlorobenzene                                                                            | ND     |           | ug/kg | 6.5 | --  |
| Hexachloroethane                                                                             | ND     |           | ug/kg | 6.5 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8270E-SIM  
 Analytical Date: 06/18/24 08:20  
 Analyst: JJW

Extraction Method: EPA 3546  
 Extraction Date: 06/16/24 18:01

| Parameter                                                                                    | Result | Qualifier | Units | RL | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|----|-----|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-02 Batch: WG1935021-1 |        |           |       |    |     |

| Surrogate            | %Recovery | Qualifier | Acceptance<br>Criteria |
|----------------------|-----------|-----------|------------------------|
| 2-Fluorophenol       | 56        |           | 25-120                 |
| Phenol-d6            | 61        |           | 10-120                 |
| Nitrobenzene-d5      | 74        |           | 23-120                 |
| 2-Fluorobiphenyl     | 54        |           | 30-120                 |
| 2,4,6-Tribromophenol | 79        |           | 10-136                 |
| 4-Terphenyl-d14      | 48        |           | 18-120                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1935022-1 |        |           |       |     |     |
| Acenaphthene                                                                             | ND     |           | ug/kg | 130 | --  |
| Benzidine                                                                                | ND     |           | ug/kg | 540 | --  |
| 1,2,4-Trichlorobenzene                                                                   | ND     |           | ug/kg | 160 | --  |
| Hexachlorobenzene                                                                        | ND     |           | ug/kg | 98  | --  |
| Bis(2-chloroethyl)ether                                                                  | ND     |           | ug/kg | 150 | --  |
| 2-Chloronaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,2-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,3-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 1,4-Dichlorobenzene                                                                      | ND     |           | ug/kg | 160 | --  |
| 3,3'-Dichlorobenzidine                                                                   | ND     |           | ug/kg | 160 | --  |
| 2,4-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| 2,6-Dinitrotoluene                                                                       | ND     |           | ug/kg | 160 | --  |
| Azobenzene                                                                               | ND     |           | ug/kg | 160 | --  |
| Fluoranthene                                                                             | ND     |           | ug/kg | 98  | --  |
| 4-Chlorophenyl phenyl ether                                                              | ND     |           | ug/kg | 160 | --  |
| 4-Bromophenyl phenyl ether                                                               | ND     |           | ug/kg | 160 | --  |
| Bis(2-chloroisopropyl)ether                                                              | ND     |           | ug/kg | 200 | --  |
| Bis(2-chloroethoxy)methane                                                               | ND     |           | ug/kg | 180 | --  |
| Hexachlorobutadiene                                                                      | ND     |           | ug/kg | 160 | --  |
| Hexachlorocyclopentadiene                                                                | ND     |           | ug/kg | 470 | --  |
| Hexachloroethane                                                                         | ND     |           | ug/kg | 130 | --  |
| Isophorone                                                                               | ND     |           | ug/kg | 150 | --  |
| Naphthalene                                                                              | ND     |           | ug/kg | 160 | --  |
| Nitrobenzene                                                                             | ND     |           | ug/kg | 150 | --  |
| NDPA/DPA                                                                                 | ND     |           | ug/kg | 130 | --  |
| n-Nitrosodi-n-propylamine                                                                | ND     |           | ug/kg | 160 | --  |
| Bis(2-ethylhexyl)phthalate                                                               | ND     |           | ug/kg | 160 | --  |
| Butyl benzyl phthalate                                                                   | ND     |           | ug/kg | 160 | --  |
| Di-n-butylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1935022-1 |        |           |       |     |     |
| Di-n-octylphthalate                                                                      | ND     |           | ug/kg | 160 | --  |
| Diethyl phthalate                                                                        | ND     |           | ug/kg | 160 | --  |
| Dimethyl phthalate                                                                       | ND     |           | ug/kg | 160 | --  |
| Benzo(a)anthracene                                                                       | ND     |           | ug/kg | 98  | --  |
| Benzo(a)pyrene                                                                           | ND     |           | ug/kg | 130 | --  |
| Benzo(b)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Benzo(k)fluoranthene                                                                     | ND     |           | ug/kg | 98  | --  |
| Chrysene                                                                                 | ND     |           | ug/kg | 98  | --  |
| Acenaphthylene                                                                           | ND     |           | ug/kg | 130 | --  |
| Anthracene                                                                               | ND     |           | ug/kg | 98  | --  |
| Benzo(ghi)perylene                                                                       | ND     |           | ug/kg | 130 | --  |
| Fluorene                                                                                 | ND     |           | ug/kg | 160 | --  |
| Phenanthrene                                                                             | ND     |           | ug/kg | 98  | --  |
| Dibenzo(a,h)anthracene                                                                   | ND     |           | ug/kg | 98  | --  |
| Indeno(1,2,3-cd)pyrene                                                                   | ND     |           | ug/kg | 130 | --  |
| Pyrene                                                                                   | ND     |           | ug/kg | 98  | --  |
| Biphenyl                                                                                 | ND     |           | ug/kg | 370 | --  |
| Aniline                                                                                  | ND     |           | ug/kg | 200 | --  |
| 4-Chloroaniline                                                                          | ND     |           | ug/kg | 160 | --  |
| 1-Methylnaphthalene                                                                      | ND     |           | ug/kg | 160 | --  |
| 2-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| 4-Nitroaniline                                                                           | ND     |           | ug/kg | 160 | --  |
| Dibenzofuran                                                                             | ND     |           | ug/kg | 160 | --  |
| 2-Methylnaphthalene                                                                      | ND     |           | ug/kg | 200 | --  |
| n-Nitrosodimethylamine                                                                   | ND     |           | ug/kg | 330 | --  |
| 2,4,6-Trichlorophenol                                                                    | ND     |           | ug/kg | 98  | --  |
| p-Chloro-m-cresol                                                                        | ND     |           | ug/kg | 160 | --  |
| 2-Chlorophenol                                                                           | ND     |           | ug/kg | 160 | --  |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270E  
**Analytical Date:** 06/18/24 17:55  
**Analyst:** SZ

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/16/24 18:01

| Parameter                                                                                | Result | Qualifier | Units | RL  | MDL |
|------------------------------------------------------------------------------------------|--------|-----------|-------|-----|-----|
| Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1935022-1 |        |           |       |     |     |
| 2,4-Dichlorophenol                                                                       | ND     |           | ug/kg | 150 | --  |
| 2,4-Dimethylphenol                                                                       | ND     |           | ug/kg | 160 | --  |
| 2-Nitrophenol                                                                            | ND     |           | ug/kg | 350 | --  |
| 4-Nitrophenol                                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4-Dinitrophenol                                                                        | ND     |           | ug/kg | 780 | --  |
| 4,6-Dinitro-o-cresol                                                                     | ND     |           | ug/kg | 420 | --  |
| Pentachlorophenol                                                                        | ND     |           | ug/kg | 130 | --  |
| Phenol                                                                                   | ND     |           | ug/kg | 160 | --  |
| 2-Methylphenol                                                                           | ND     |           | ug/kg | 160 | --  |
| 3-Methylphenol/4-Methylphenol                                                            | ND     |           | ug/kg | 230 | --  |
| 2,4,5-Trichlorophenol                                                                    | ND     |           | ug/kg | 160 | --  |
| Benzoic Acid                                                                             | ND     |           | ug/kg | 530 | --  |
| Benzyl Alcohol                                                                           | ND     |           | ug/kg | 160 | --  |
| Carbazole                                                                                | ND     |           | ug/kg | 160 | --  |
| Pyridine                                                                                 | ND     |           | ug/kg | 180 | --  |

| Surrogate            | %Recovery | Qualifier | Acceptance Criteria |
|----------------------|-----------|-----------|---------------------|
| 2-Fluorophenol       | 80        |           | 25-120              |
| Phenol-d6            | 74        |           | 10-120              |
| Nitrobenzene-d5      | 70        |           | 23-120              |
| 2-Fluorobiphenyl     | 64        |           | 30-120              |
| 2,4,6-Tribromophenol | 78        |           | 10-136              |
| 4-Terphenyl-d14      | 67        |           | 18-120              |



# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Lab Number:** L2433315

**Project Number:** 0208898-001

**Report Date:** 06/21/24

| Parameter                                                                                                       | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-----------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-02 Batch: WG1935021-2 WG1935021-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                    | 58               |      | 63                |      | 40-140              | 8   |      | 50            |
| 2-Chloronaphthalene                                                                                             | 58               |      | 66                |      | 40-140              | 13  |      | 50            |
| Fluoranthene                                                                                                    | 63               |      | 64                |      | 40-140              | 2   |      | 50            |
| Hexachlorobutadiene                                                                                             | 55               |      | 67                |      | 34-107              | 20  |      | 50            |
| Naphthalene                                                                                                     | 56               |      | 68                |      | 40-140              | 19  |      | 50            |
| Benzo(a)anthracene                                                                                              | 64               |      | 66                |      | 40-140              | 3   |      | 50            |
| Benzo(a)pyrene                                                                                                  | 70               |      | 72                |      | 40-140              | 3   |      | 50            |
| Benzo(b)fluoranthene                                                                                            | 69               |      | 68                |      | 40-140              | 1   |      | 50            |
| Benzo(k)fluoranthene                                                                                            | 62               |      | 68                |      | 40-140              | 9   |      | 50            |
| Chrysene                                                                                                        | 62               |      | 65                |      | 40-140              | 5   |      | 50            |
| Acenaphthylene                                                                                                  | 59               |      | 66                |      | 40-140              | 11  |      | 50            |
| Anthracene                                                                                                      | 62               |      | 63                |      | 40-140              | 2   |      | 50            |
| Benzo(ghi)perylene                                                                                              | 57               |      | 58                |      | 40-140              | 2   |      | 50            |
| Fluorene                                                                                                        | 64               |      | 68                |      | 40-140              | 6   |      | 50            |
| Phenanthrene                                                                                                    | 61               |      | 63                |      | 40-140              | 3   |      | 50            |
| Dibenzo(a,h)anthracene                                                                                          | 63               |      | 65                |      | 40-140              | 3   |      | 50            |
| Indeno(1,2,3-cd)Pyrene                                                                                          | 75               |      | 78                |      | 40-140              | 4   |      | 50            |
| Pyrene                                                                                                          | 64               |      | 64                |      | 35-142              | 0   |      | 50            |
| 1-Methylnaphthalene                                                                                             | 58               |      | 68                |      | 40-140              | 16  |      | 50            |
| 2-Methylnaphthalene                                                                                             | 60               |      | 70                |      | 40-140              | 15  |      | 50            |
| Pentachlorophenol                                                                                               | 83               |      | 91                |      | 17-109              | 9   |      | 50            |
| Hexachlorobenzene                                                                                               | 59               |      | 60                |      | 40-140              | 2   |      | 50            |
| Hexachloroethane                                                                                                | 59               |      | 73                |      | 29-106              | 21  |      | 50            |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEELEGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24

| <b>Parameter</b> | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
|------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|

Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-02 Batch: WG1935021-2 WG1935021-3

| <b>Surrogate</b>     | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|----------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| 2-Fluorophenol       | 52                       |             | 60                        |             | 25-120                         |
| Phenol-d6            | 57                       |             | 64                        |             | 10-120                         |
| Nitrobenzene-d5      | 65                       |             | 77                        |             | 23-120                         |
| 2-Fluorobiphenyl     | 51                       |             | 55                        |             | 30-120                         |
| 2,4,6-Tribromophenol | 83                       |             | 84                        |             | 10-136                         |
| 4-Terphenyl-d14      | 51                       |             | 49                        |             | 18-120                         |



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2433315

**Report Date:** 06/21/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Acenaphthene                                                                                                | 70               |      | 65                |      | 31-137              | 7   |      | 50            |
| Benzidine                                                                                                   | 75               | Q    | 69                | Q    | 10-66               | 8   |      | 50            |
| 1,2,4-Trichlorobenzene                                                                                      | 65               |      | 67                |      | 38-107              | 3   |      | 50            |
| Hexachlorobenzene                                                                                           | 76               |      | 70                |      | 40-140              | 8   |      | 50            |
| Bis(2-chloroethyl)ether                                                                                     | 69               |      | 70                |      | 40-140              | 1   |      | 50            |
| 2-Chloronaphthalene                                                                                         | 62               |      | 64                |      | 40-140              | 3   |      | 50            |
| 1,2-Dichlorobenzene                                                                                         | 64               |      | 66                |      | 40-140              | 3   |      | 50            |
| 1,3-Dichlorobenzene                                                                                         | 62               |      | 63                |      | 40-140              | 2   |      | 50            |
| 1,4-Dichlorobenzene                                                                                         | 61               |      | 63                |      | 28-104              | 3   |      | 50            |
| 3,3'-Dichlorobenzidine                                                                                      | 88               |      | 81                |      | 40-140              | 8   |      | 50            |
| 2,4-Dinitrotoluene                                                                                          | 72               |      | 67                |      | 40-132              | 7   |      | 50            |
| 2,6-Dinitrotoluene                                                                                          | 65               |      | 67                |      | 40-140              | 3   |      | 50            |
| Azobenzene                                                                                                  | 76               |      | 70                |      | 40-140              | 8   |      | 50            |
| Fluoranthene                                                                                                | 76               |      | 70                |      | 40-140              | 8   |      | 50            |
| 4-Chlorophenyl phenyl ether                                                                                 | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| 4-Bromophenyl phenyl ether                                                                                  | 75               |      | 69                |      | 40-140              | 8   |      | 50            |
| Bis(2-chloroisopropyl)ether                                                                                 | 54               |      | 53                |      | 40-140              | 2   |      | 50            |
| Bis(2-chloroethoxy)methane                                                                                  | 72               |      | 72                |      | 40-117              | 0   |      | 50            |
| Hexachlorobutadiene                                                                                         | 67               |      | 68                |      | 40-140              | 1   |      | 50            |
| Hexachlorocyclopentadiene                                                                                   | 16               | Q    | 18                | Q    | 40-140              | 12  |      | 50            |
| Hexachloroethane                                                                                            | 59               |      | 63                |      | 40-140              | 7   |      | 50            |
| Isophorone                                                                                                  | 78               |      | 74                |      | 40-140              | 5   |      | 50            |
| Naphthalene                                                                                                 | 64               |      | 62                |      | 40-140              | 3   |      | 50            |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2433315

**Report Date:** 06/21/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Nitrobenzene                                                                                                | 75               |      | 74                |      | 40-140              | 1   |      | 50            |
| NDPA/DPA                                                                                                    | 71               |      | 65                |      | 36-157              | 9   |      | 50            |
| n-Nitrosodi-n-propylamine                                                                                   | 77               |      | 72                |      | 32-121              | 7   |      | 50            |
| Bis(2-ethylhexyl)phthalate                                                                                  | 78               |      | 70                |      | 40-140              | 11  |      | 50            |
| Butyl benzyl phthalate                                                                                      | 86               |      | 77                |      | 40-140              | 11  |      | 50            |
| Di-n-butylphthalate                                                                                         | 78               |      | 71                |      | 40-140              | 9   |      | 50            |
| Di-n-octylphthalate                                                                                         | 93               |      | 86                |      | 40-140              | 8   |      | 50            |
| Diethyl phthalate                                                                                           | 72               |      | 66                |      | 40-140              | 9   |      | 50            |
| Dimethyl phthalate                                                                                          | 62               |      | 62                |      | 40-140              | 0   |      | 50            |
| Benzo(a)anthracene                                                                                          | 74               |      | 69                |      | 40-140              | 7   |      | 50            |
| Benzo(a)pyrene                                                                                              | 68               |      | 67                |      | 40-140              | 1   |      | 50            |
| Benzo(b)fluoranthene                                                                                        | 72               |      | 67                |      | 40-140              | 7   |      | 50            |
| Benzo(k)fluoranthene                                                                                        | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| Chrysene                                                                                                    | 76               |      | 68                |      | 40-140              | 11  |      | 50            |
| Acenaphthylene                                                                                              | 60               |      | 63                |      | 40-140              | 5   |      | 50            |
| Anthracene                                                                                                  | 73               |      | 68                |      | 40-140              | 7   |      | 50            |
| Benzo(ghi)perylene                                                                                          | 74               |      | 64                |      | 40-140              | 14  |      | 50            |
| Fluorene                                                                                                    | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| Phenanthrene                                                                                                | 70               |      | 65                |      | 40-140              | 7   |      | 50            |
| Dibenzo(a,h)anthracene                                                                                      | 75               |      | 64                |      | 40-140              | 16  |      | 50            |
| Indeno(1,2,3-cd)pyrene                                                                                      | 80               |      | 69                |      | 40-140              | 15  |      | 50            |
| Pyrene                                                                                                      | 75               |      | 70                |      | 35-142              | 7   |      | 50            |
| Biphenyl                                                                                                    | 53               |      | 55                |      | 37-127              | 4   |      | 50            |

# **Lab Control Sample Analysis** **Batch Quality Control**

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2433315

**Report Date:** 06/21/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Aniline                                                                                                     | 63               |      | 60                |      | 40-140              | 5   |      | 50            |
| 4-Chloroaniline                                                                                             | 78               |      | 74                |      | 40-140              | 5   |      | 50            |
| 1-Methylnaphthalene                                                                                         | 61               |      | 64                |      | 26-130              | 5   |      | 50            |
| 2-Nitroaniline                                                                                              | 78               |      | 79                |      | 47-134              | 1   |      | 50            |
| 3-Nitroaniline                                                                                              | 82               |      | 74                |      | 26-129              | 10  |      | 50            |
| 4-Nitroaniline                                                                                              | 85               |      | 75                |      | 41-125              | 13  |      | 50            |
| Dibenzofuran                                                                                                | 68               |      | 64                |      | 40-140              | 6   |      | 50            |
| 2-Methylnaphthalene                                                                                         | 61               |      | 64                |      | 40-140              | 5   |      | 50            |
| n-Nitrosodimethylamine                                                                                      | 62               |      | 64                |      | 22-100              | 3   |      | 50            |
| 2,4,6-Trichlorophenol                                                                                       | 72               |      | 72                |      | 30-130              | 0   |      | 50            |
| p-Chloro-m-cresol                                                                                           | 74               |      | 75                |      | 26-103              | 1   |      | 50            |
| 2-Chlorophenol                                                                                              | 73               |      | 74                |      | 25-102              | 1   |      | 50            |
| 2,4-Dichlorophenol                                                                                          | 74               |      | 72                |      | 30-130              | 3   |      | 50            |
| 2,4-Dimethylphenol                                                                                          | 86               |      | 85                |      | 30-130              | 1   |      | 50            |
| 2-Nitrophenol                                                                                               | 79               |      | 78                |      | 30-130              | 1   |      | 50            |
| 4-Nitrophenol                                                                                               | 91               |      | 84                |      | 11-114              | 8   |      | 50            |
| 2,4-Dinitrophenol                                                                                           | 19               |      | 20                |      | 4-130               | 5   |      | 50            |
| 4,6-Dinitro-o-cresol                                                                                        | 22               |      | 22                |      | 10-130              | 0   |      | 50            |
| Pentachlorophenol                                                                                           | 70               |      | 64                |      | 17-109              | 9   |      | 50            |
| Phenol                                                                                                      | 72               |      | 71                |      | 26-90               | 1   |      | 50            |
| 2-Methylphenol                                                                                              | 77               |      | 76                |      | 30-130              | 1   |      | 50            |
| 3-Methylphenol/4-Methylphenol                                                                               | 83               |      | 81                |      | 30-130              | 2   |      | 50            |
| 2,4,5-Trichlorophenol                                                                                       | 72               |      | 74                |      | 30-130              | 3   |      | 50            |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** STEELEGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2433315

**Report Date:** 06/21/24

| Parameter                                                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits |
|-------------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|
| Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1935022-2 WG1935022-3 |                  |      |                   |      |                     |     |      |               |
| Benzoic Acid                                                                                                | 55               |      | 52                |      | 10-110              | 6   |      | 50            |
| Benzyl Alcohol                                                                                              | 78               |      | 76                |      | 40-140              | 3   |      | 50            |
| Carbazole                                                                                                   | 70               |      | 65                |      | 54-128              | 7   |      | 50            |
| Pyridine                                                                                                    | 48               |      | 50                |      | 10-93               | 4   |      | 50            |

| Surrogate            | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria |
|----------------------|------------------|------|-------------------|------|------------------------|
| 2-Fluorophenol       | 70               |      | 78                |      | 25-120                 |
| Phenol-d6            | 74               |      | 74                |      | 10-120                 |
| Nitrobenzene-d5      | 75               |      | 75                |      | 23-120                 |
| 2-Fluorobiphenyl     | 60               |      | 61                |      | 30-120                 |
| 2,4,6-Tribromophenol | 88               |      | 79                |      | 10-136                 |
| 4-Terphenyl-d14      | 76               |      | 71                |      | 18-120                 |

# **PETROLEUM HYDROCARBONS**

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/20/24 15:25  
**Analyst:** MTC  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/19/24 14:33

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 33100               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 63         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/20/24 15:25  
**Analyst:** MTC  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/19/24 14:33

| Parameter                                            | Result     | Qualifier | Units     | RL                  | MDL | Dilution Factor |
|------------------------------------------------------|------------|-----------|-----------|---------------------|-----|-----------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab |            |           |           |                     |     |                 |
| TPH (C10-C36)                                        | ND         |           | ug/kg     | 34100               | --  | 1               |
| Surrogate                                            | % Recovery |           | Qualifier | Acceptance Criteria |     |                 |
| o-Terphenyl                                          | 83         |           |           | 40-140              |     |                 |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8015D(M)  
**Analytical Date:** 06/20/24 14:47  
**Analyst:** MTC

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/19/24 14:33

| Parameter                                                                                    | Result | Qualifier | Units | RL    | MDL |
|----------------------------------------------------------------------------------------------|--------|-----------|-------|-------|-----|
| Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01-02 Batch: WG1936598-1 |        |           |       |       |     |
| TPH (C10-C36)                                                                                | ND     |           | ug/kg | 31900 | --  |

| Surrogate   | %Recovery | Qualifier | Acceptance<br>Criteria |
|-------------|-----------|-----------|------------------------|
| o-Terphenyl | 79        |           | 40-140                 |



**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24

| <b>Parameter</b>                                                                                    | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> |
|-----------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-02 Batch: WG1936598-2 |                          |             |                           |             |                             |            |             |                       |
| TPH (C10-C36)                                                                                       | 64                       |             | -                         |             | 40-140                      | -          |             | 40                    |

| <b>Surrogate</b> | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> |
|------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|
| o-Terphenyl      | 69                       |             |                           |             | 40-140                         |

Lab Duplicate Analysis  
Batch Quality Control

Project Name: STEEPLGATE MALL FORCE MAIN  
Project Number: 0208898-001

Lab Number: L2433315  
Report Date: 06/21/24

| Parameter                                                                                                                                               | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1936598-3 QC Sample: L2433315-01 Client ID: HA24-43_1-3 |               |                  |       |     |      |            |
| TPH (C10-C36)                                                                                                                                           | ND            | ND               | ug/kg | NC  |      | 40         |

| Surrogate   | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|-------------|-----------|-----------|-----------|-----------|---------------------|
| o-Terphenyl | 63        |           | 73        |           | 40-140              |



# PCBS

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/19/24 21:37  
**Analyst:** MHG  
**Percent Solids:** 97%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/18/24 13:38  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/19/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/19/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 47.0 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 47.0 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 48         |           | 30-150              | A      |
| Decachlorobiphenyl           | 39         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 58         |           | 30-150              | B      |
| Decachlorobiphenyl           | 39         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**

**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 06/20/24 07:08  
**Analyst:** MEO  
**Percent Solids:** 96%

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/20/24 01:50  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/20/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/20/24

| Parameter                                         | Result | Qualifier | Units | RL   | MDL | Dilution Factor | Column |
|---------------------------------------------------|--------|-----------|-------|------|-----|-----------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab |        |           |       |      |     |                 |        |
| Aroclor 1016                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1221                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1232                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1242                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1248                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1254                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1260                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1262                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| Aroclor 1268                                      | ND     |           | ug/kg | 48.8 | --  | 1               | A      |
| PCBs, Total                                       | ND     |           | ug/kg | 48.8 | --  | 1               | A      |

| Surrogate                    | % Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|------------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 67         |           | 30-150              | A      |
| Decachlorobiphenyl           | 69         |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 79         |           | 30-150              | B      |
| Decachlorobiphenyl           | 78         |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8082A  
**Analytical Date:** 06/18/24 11:41  
**Analyst:** RMP

**Extraction Method:** EPA 3546  
**Extraction Date:** 06/18/24 02:07  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 06/18/24  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 06/18/24

| Parameter                                                                              | Result | Qualifier | Units | RL   | MDL | Column |
|----------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1935588-1 |        |           |       |      |     |        |
| Aroclor 1016                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1221                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1232                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1242                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1248                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1254                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1260                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1262                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| Aroclor 1268                                                                           | ND     |           | ug/kg | 47.0 | --  | A      |
| PCBs, Total                                                                            | ND     |           | ug/kg | 47.0 | --  | A      |

| Surrogate                    | %Recovery | Qualifier | Acceptance Criteria | Column |
|------------------------------|-----------|-----------|---------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 66        |           | 30-150              | A      |
| Decachlorobiphenyl           | 72        |           | 30-150              | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 72        |           | 30-150              | B      |
| Decachlorobiphenyl           | 77        |           | 30-150              | B      |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A  
 Analytical Date: 06/20/24 06:44  
 Analyst: MEO

Extraction Method: EPA 3546  
 Extraction Date: 06/20/24 01:50  
 Cleanup Method: EPA 3665A  
 Cleanup Date: 06/20/24  
 Cleanup Method: EPA 3660B  
 Cleanup Date: 06/20/24

| Parameter                                                                              | Result | Qualifier | Units | RL   | MDL | Column |
|----------------------------------------------------------------------------------------|--------|-----------|-------|------|-----|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 02 Batch: WG1936794-1 |        |           |       |      |     |        |
| Aroclor 1016                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1221                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1232                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1242                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1248                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1254                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1260                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1262                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| Aroclor 1268                                                                           | ND     |           | ug/kg | 47.7 | --  | A      |
| PCBs, Total                                                                            | ND     |           | ug/kg | 47.7 | --  | A      |

| Surrogate                    | %Recovery | Qualifier | Acceptance<br>Criteria | Column |
|------------------------------|-----------|-----------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 78        |           | 30-150                 | A      |
| Decachlorobiphenyl           | 98        |           | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 82        |           | 30-150                 | B      |
| Decachlorobiphenyl           | 101       |           | 30-150                 | B      |

**Lab Control Sample Analysis****Batch Quality Control****Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24

| <b>Parameter</b>                                                                                          | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>%Recovery<br/>Limits</b> | <b>RPD</b> | <b>Qual</b> | <b>RPD<br/>Limits</b> | <b>Column</b> |
|-----------------------------------------------------------------------------------------------------------|--------------------------|-------------|---------------------------|-------------|-----------------------------|------------|-------------|-----------------------|---------------|
| Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 Batch: WG1935588-2 WG1935588-3 |                          |             |                           |             |                             |            |             |                       |               |
| Aroclor 1016                                                                                              | 67                       |             | 68                        |             | 40-140                      | 1          |             | 50                    | A             |
| Aroclor 1260                                                                                              | 63                       |             | 65                        |             | 40-140                      | 3          |             | 50                    | A             |

| <b>Surrogate</b>             | <b>LCS<br/>%Recovery</b> | <b>Qual</b> | <b>LCSD<br/>%Recovery</b> | <b>Qual</b> | <b>Acceptance<br/>Criteria</b> | <b>Column</b> |
|------------------------------|--------------------------|-------------|---------------------------|-------------|--------------------------------|---------------|
| 2,4,5,6-Tetrachloro-m-xylene | 65                       |             | 65                        |             | 30-150                         | A             |
| Decachlorobiphenyl           | 71                       |             | 79                        |             | 30-150                         | A             |
| 2,4,5,6-Tetrachloro-m-xylene | 70                       |             | 71                        |             | 30-150                         | B             |
| Decachlorobiphenyl           | 75                       |             | 82                        |             | 30-150                         | B             |



# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN

**Project Number:** 0208898-001

**Lab Number:** L2433315

**Report Date:** 06/21/24

| Parameter                                                                                                 | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD<br>Limits | Column |
|-----------------------------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|---------------|--------|
| Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 02 Batch: WG1936794-2 WG1936794-3 |                  |      |                   |      |                     |     |      |               |        |
| Aroclor 1016                                                                                              | 90               |      | 86                |      | 40-140              | 5   |      | 50            | A      |
| Aroclor 1260                                                                                              | 91               |      | 84                |      | 40-140              | 8   |      | 50            | A      |

| Surrogate                    | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | Acceptance<br>Criteria | Column |
|------------------------------|------------------|------|-------------------|------|------------------------|--------|
| 2,4,5,6-Tetrachloro-m-xylene | 80               |      | 76                |      | 30-150                 | A      |
| Decachlorobiphenyl           | 88               |      | 76                |      | 30-150                 | A      |
| 2,4,5,6-Tetrachloro-m-xylene | 84               |      | 81                |      | 30-150                 | B      |
| Decachlorobiphenyl           | 96               |      | 87                |      | 30-150                 | B      |

## METALS

**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**SAMPLE RESULTS**

Lab ID: L2433315-01

Date Collected: 06/13/24 08:00

Client ID: HA24-43\_1-3

Date Received: 06/13/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 97%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 7.31   |           | mg/kg | 0.809 | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |
| Barium, Total                | 26.4   |           | mg/kg | 0.809 | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |
| Cadmium, Total               | ND     |           | mg/kg | 0.809 | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |
| Chromium, Total              | 10.7   |           | mg/kg | 0.809 | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |
| Lead, Total                  | 6.33   |           | mg/kg | 4.05  | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |
| Mercury, Total               | ND     |           | mg/kg | 0.074 | --  | 1                  | 06/19/24 20:24   | 06/20/24 08:31   | EPA 7471B      | 1,7471B              | JWN     |
| Selenium, Total              | ND     |           | mg/kg | 1.62  | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |
| Silver, Total                | ND     |           | mg/kg | 0.405 | --  | 2                  | 06/19/24 20:03   | 06/19/24 23:59   | EPA 3050B      | 1,6010D              | JMF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**SAMPLE RESULTS**

Lab ID: L2433315-02

Date Collected: 06/13/24 08:20

Client ID: HA24-43\_3-5

Date Received: 06/13/24

Sample Location: CONCORD, NH

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 96%

| Parameter                    | Result | Qualifier | Units | RL    | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Prep<br>Method | Analytical<br>Method | Analyst |
|------------------------------|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| Total Metals - Mansfield Lab |        |           |       |       |     |                    |                  |                  |                |                      |         |
| Arsenic, Total               | 4.54   |           | mg/kg | 0.820 | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |
| Barium, Total                | 17.7   |           | mg/kg | 0.820 | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |
| Cadmium, Total               | ND     |           | mg/kg | 0.820 | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |
| Chromium, Total              | 6.15   |           | mg/kg | 0.820 | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |
| Lead, Total                  | 8.50   |           | mg/kg | 4.10  | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |
| Mercury, Total               | ND     |           | mg/kg | 0.076 | --  | 1                  | 06/19/24 20:24   | 06/20/24 08:34   | EPA 7471B      | 1,7471B              | JWN     |
| Selenium, Total              | ND     |           | mg/kg | 1.64  | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |
| Silver, Total                | ND     |           | mg/kg | 0.410 | --  | 2                  | 06/19/24 20:03   | 06/20/24 00:03   | EPA 3050B      | 1,6010D              | JMF     |



Project Name: STEEPLGATE MALL FORCE MAIN

Lab Number: L2433315

Project Number: 0208898-001

Report Date: 06/21/24

## Method Blank Analysis Batch Quality Control

| Parameter                                                            | Result Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|----------------------------------------------------------------------|------------------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1936525-1 |                  |       |       |     |                 |                |                |                   |         |
| Arsenic, Total                                                       | ND               | mg/kg | 0.400 | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |
| Barium, Total                                                        | ND               | mg/kg | 0.400 | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |
| Cadmium, Total                                                       | ND               | mg/kg | 0.400 | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |
| Chromium, Total                                                      | ND               | mg/kg | 0.400 | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |
| Lead, Total                                                          | ND               | mg/kg | 2.00  | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |
| Selenium, Total                                                      | ND               | mg/kg | 0.800 | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |
| Silver, Total                                                        | ND               | mg/kg | 0.200 | --  | 1               | 06/19/24 20:03 | 06/19/24 23:09 | 1,6010D           | JMF     |

### Prep Information

Digestion Method: EPA 3050B

| Parameter                                                            | Result Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|----------------------------------------------------------------------|------------------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1936530-1 |                  |       |       |     |                 |                |                |                   |         |
| Mercury, Total                                                       | ND               | mg/kg | 0.083 | --  | 1               | 06/19/24 20:24 | 06/20/24 07:34 | 1,7471B           | JWN     |

### Prep Information

Digestion Method: EPA 7471B



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

| Parameter                                                                   | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|-----------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1936525-2 |                  |      |                   |      |                     |     |      |            |
| Arsenic, Total                                                              | 99               |      | -                 |      | 80-120              | -   |      |            |
| Barium, Total                                                               | 102              |      | -                 |      | 80-120              | -   |      |            |
| Cadmium, Total                                                              | 99               |      | -                 |      | 80-120              | -   |      |            |
| Chromium, Total                                                             | 98               |      | -                 |      | 80-120              | -   |      |            |
| Lead, Total                                                                 | 102              |      | -                 |      | 80-120              | -   |      |            |
| Selenium, Total                                                             | 96               |      | -                 |      | 80-120              | -   |      |            |
| Silver, Total                                                               | 100              |      | -                 |      | 80-120              | -   |      |            |
| Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1936530-2 |                  |      |                   |      |                     |     |      |            |
| Mercury, Total                                                              | 100              |      | -                 |      | 80-120              | -   |      |            |

# Matrix Spike Analysis

## Batch Quality Control

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

| Parameter                                                                                                                              | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-02    QC Batch ID: WG1936525-3    QC Sample: L2432392-23    Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Arsenic, Total                                                                                                                         | 4.06          | 11.7     | 15.9     | 101          |      | -         | -             |      | 75-125          | -   |      | 20         |
| Barium, Total                                                                                                                          | 114           | 195      | 294      | 92           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Cadmium, Total                                                                                                                         | ND            | 5.17     | 4.72     | 91           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Chromium, Total                                                                                                                        | 20.1          | 19.5     | 39.9     | 101          |      | -         | -             |      | 75-125          | -   |      | 20         |
| Lead, Total                                                                                                                            | 9.95          | 51.7     | 59.5     | 96           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Selenium, Total                                                                                                                        | ND            | 11.7     | 10.6     | 90           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Silver, Total                                                                                                                          | ND            | 4.88     | 4.53     | 93           |      | -         | -             |      | 75-125          | -   |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-02    QC Batch ID: WG1936530-3    QC Sample: L2432392-23    Client ID: MS Sample |               |          |          |              |      |           |               |      |                 |     |      |            |
| Mercury, Total                                                                                                                         | ND            | 1.72     | 1.82     | 105          |      | -         | -             |      | 80-120          | -   |      | 20         |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2433315  
**Report Date:** 06/21/24

| Parameter                                                                                                                      | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|--------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1936525-4 QC Sample: L2432392-23 Client ID: DUP Sample |               |                  |       |     |      |            |
| Arsenic, Total                                                                                                                 | 4.06          | 4.25             | mg/kg | 5   |      | 20         |
| Barium, Total                                                                                                                  | 114           | 109              | mg/kg | 4   |      | 20         |
| Cadmium, Total                                                                                                                 | ND            | ND               | mg/kg | NC  |      | 20         |
| Chromium, Total                                                                                                                | 20.1          | 20.3             | mg/kg | 1   |      | 20         |
| Lead, Total                                                                                                                    | 9.95          | 11.1             | mg/kg | 11  |      | 20         |
| Selenium, Total                                                                                                                | ND            | ND               | mg/kg | NC  |      | 20         |
| Silver, Total                                                                                                                  | ND            | ND               | mg/kg | NC  |      | 20         |
| Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1936530-4 QC Sample: L2432392-23 Client ID: DUP Sample |               |                  |       |     |      |            |
| Mercury, Total                                                                                                                 | ND            | ND               | mg/kg | NC  |      | 20         |



Lab Serial Dilution  
Analysis  
Batch Quality Control

Project Name: STEEPLGATE MALL FORCE MAIN  
Project Number: 0208898-001

Lab Number: L2433315  
Report Date: 06/21/24

| Parameter                                                                                                                      | Native Sample | Serial Dilution | Units | % D | Qual | RPD Limits |
|--------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------|-------|-----|------|------------|
| Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1936525-6 QC Sample: L2432392-23 Client ID: DUP Sample |               |                 |       |     |      |            |
| Barium, Total                                                                                                                  | 114           | 119             | mg/kg | 4   |      | 20         |



# **INORGANICS & MISCELLANEOUS**

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### SAMPLE RESULTS

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/18/24 20:38 | 1,1030            | GEF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

### SAMPLE RESULTS

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Sand  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

| Parameter                                | Result | Date Analyzed  | Analytical Method | Analyst |
|------------------------------------------|--------|----------------|-------------------|---------|
| Ignitability of Solids - Westborough Lab |        |                |                   |         |
| Ignitability                             | NI     | 06/18/24 20:38 | 1,1030            | GEF     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-01  
**Client ID:** HA24-43\_1-3  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:00  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 97.0   |           | %     | 0.100 | NA  | 1               | -              | 06/13/24 22:38 | 121,2540G         | WJM     |
| pH (H)                              | 6.63   |           | SU    | -     | NA  | 1               | -              | 06/18/24 18:41 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/20/24 11:06 | 06/20/24 12:30 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/20/24 11:06 | 06/20/24 12:47 | 125,7.3           | JLB     |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

**SAMPLE RESULTS**

**Lab ID:** L2433315-02  
**Client ID:** HA24-43\_3-5  
**Sample Location:** CONCORD, NH

**Date Collected:** 06/13/24 08:20  
**Date Received:** 06/13/24  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

| Parameter                           | Result | Qualifier | Units | RL    | MDL | Dilution Factor | Date Prepared  | Date Analyzed  | Analytical Method | Analyst |
|-------------------------------------|--------|-----------|-------|-------|-----|-----------------|----------------|----------------|-------------------|---------|
| General Chemistry - Westborough Lab |        |           |       |       |     |                 |                |                |                   |         |
| Solids, Total                       | 96.4   |           | %     | 0.100 | NA  | 1               | -              | 06/13/24 22:38 | 121,2540G         | WJM     |
| pH (H)                              | 6.59   |           | SU    | -     | NA  | 1               | -              | 06/18/24 18:41 | 1,9045D           | AAS     |
| Cyanide, Reactive                   | ND     |           | mg/kg | 130   | --  | 1               | 06/20/24 11:06 | 06/20/24 12:30 | 125,7.3           | JLB     |
| Sulfide, Reactive                   | ND     |           | mg/kg | 250   | --  | 1               | 06/20/24 11:06 | 06/20/24 12:48 | 125,7.3           | JLB     |



**Project Name:** STEEPLGATE MALL FORCE MAIN**Lab Number:** L2433315**Project Number:** 0208898-001**Report Date:** 06/21/24**Method Blank Analysis**  
**Batch Quality Control**

| Parameter                                                                   | Result | Qualifier | Units | RL | MDL | Dilution<br>Factor | Date<br>Prepared | Date<br>Analyzed | Analytical<br>Method | Analyst |
|-----------------------------------------------------------------------------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------------|---------|
| General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1936712-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Cyanide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/20/24 11:06   | 06/20/24 12:27   | 125,7.3              | JLB     |
| General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1936713-1 |        |           |       |    |     |                    |                  |                  |                      |         |
| Sulfide, Reactive                                                           | ND     |           | mg/kg | 10 | --  | 1                  | 06/20/24 11:06   | 06/20/24 12:44   | 125,7.3              | JLB     |

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

| Parameter                                                                          | LCS<br>%Recovery | Qual | LCSD<br>%Recovery | Qual | %Recovery<br>Limits | RPD | Qual | RPD Limits |
|------------------------------------------------------------------------------------|------------------|------|-------------------|------|---------------------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1936049-1 |                  |      |                   |      |                     |     |      |            |
| pH                                                                                 | 100              |      | -                 |      | 99-101              | -   |      |            |
| General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1936712-2 |                  |      |                   |      |                     |     |      |            |
| Cyanide, Reactive                                                                  | 89               |      | -                 |      | 30-125              | -   |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1936713-2 |                  |      |                   |      |                     |     |      |            |
| Sulfide, Reactive                                                                  | 102              |      | -                 |      | 60-125              | -   |      | 40         |



**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Duplicate Analysis**  
*Batch Quality Control*

**Lab Number:** L2433315  
**Report Date:** 06/21/24

| Parameter                                                                                                                             | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-------|-----|------|------------|
| General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1934128-1 QC Sample: L2433162-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| Solids, Total                                                                                                                         | 87.0          | 85.2             | %     | 2   |      | 20         |
| General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1936049-2 QC Sample: L2432843-01 Client ID: DUP Sample |               |                  |       |     |      |            |
| pH                                                                                                                                    | 7.85          | 7.64             | SU    | 3   |      | 5          |
| General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1936712-3 QC Sample: L2433521-02 Client ID: DUP Sample |               |                  |       |     |      |            |
| Cyanide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |
| General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1936713-3 QC Sample: L2433521-02 Client ID: DUP Sample |               |                  |       |     |      |            |
| Sulfide, Reactive                                                                                                                     | ND            | ND               | mg/kg | NC  |      | 40         |

**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

Serial\_No:06212413:42  
**Lab Number:** L2433315  
**Report Date:** 06/21/24

**Sample Receipt and Container Information**

Were project specific reporting limits specified? YES

**Cooler Information**

|               |                     |
|---------------|---------------------|
| <b>Cooler</b> | <b>Custody Seal</b> |
| A             | Absent              |

**Container Information**

| Container ID | Container Type                          | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal   | Frozen Date/Time | Analysis(*)                                                                                              |
|--------------|-----------------------------------------|--------|------------|----------|------------|------|--------|------------------|----------------------------------------------------------------------------------------------------------|
| L2433315-01A | Vial MeOH preserved                     | A      | NA         |          | 5.9        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2433315-01B | Vial water preserved                    | A      | NA         |          | 5.9        | Y    | Absent | 13-JUN-24 21:44  | 8260HLW-NH(14)                                                                                           |
| L2433315-01C | Vial water preserved                    | A      | NA         |          | 5.9        | Y    | Absent | 13-JUN-24 21:44  | 8260HLW-NH(14)                                                                                           |
| L2433315-01D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 5.9        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2433315-01E | Glass 60ml unpreserved split            | A      | NA         |          | 5.9        | Y    | Absent |                  | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |
| L2433315-01F | Glass 60ml/2oz unpreserved/No Headspace | A      | NA         |          | 5.9        | Y    | Absent |                  | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2433315-01G | Glass 500ml/16oz unpreserved            | A      | NA         |          | 5.9        | Y    | Absent |                  | 8270TCL(14),IGNIT-1030(14),REACTS(14),PH-9045(1),8270TCL-SIM(14),TPH-DRO-D(14),PCB-8082(365),REACTCN(14) |
| L2433315-02A | Vial MeOH preserved                     | A      | NA         |          | 5.9        | Y    | Absent |                  | 8260HLW-NH(14)                                                                                           |
| L2433315-02B | Vial water preserved                    | A      | NA         |          | 5.9        | Y    | Absent | 13-JUN-24 21:44  | 8260HLW-NH(14)                                                                                           |
| L2433315-02C | Vial water preserved                    | A      | NA         |          | 5.9        | Y    | Absent | 13-JUN-24 21:44  | 8260HLW-NH(14)                                                                                           |
| L2433315-02D | Plastic 2oz unpreserved for TS          | A      | NA         |          | 5.9        | Y    | Absent |                  | TS(7)                                                                                                    |
| L2433315-02E | Glass 60ml unpreserved split            | A      | NA         |          | 5.9        | Y    | Absent |                  | BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),HG-T(28),CD-TI(180)                    |
| L2433315-02F | Glass 60ml/2oz unpreserved/No Headspace | A      | NA         |          | 5.9        | Y    | Absent |                  | HEXCR-RELOG(),HOLD-WETCHEM()                                                                             |
| L2433315-02G | Glass 500ml/16oz unpreserved            | A      | NA         |          | 5.9        | Y    | Absent |                  | REACTS(14),8270TCL(14),IGNIT-1030(14),PH-9045(1),8270TCL-SIM(14),PCB-8082(365),TPH-DRO-D(14),REACTCN(14) |

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

## GLOSSARY

### Acronyms

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DL       | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                |
| EDL      | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).                                                                                         |
| EMPC     | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.                                                                                                                                                                                                                               |
| EPA      | - Environmental Protection Agency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LCS      | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                          |
| LCSD     | - Laboratory Control Sample Duplicate: Refer to LCS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LFB      | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.                                                                                                                                                                                                                                                                                                                         |
| LOD      | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)                                                                                                                                                                                                               |
| LOQ      | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)<br><br>Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL      | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                          |
| MS       | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.                                                                                                                                                                                                    |
| MSD      | - Matrix Spike Sample Duplicate: Refer to MS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NA       | - Not Applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NC       | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.                                                                                                                                                                                                                                                                                                                                                                           |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NI       | - Not Ignitable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NP       | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NR       | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.                                                                                                                                                                                                                                                                                                                                                                    |
| RL       | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.                                                                                                                                                                                                                                                                                                   |
| RPD      | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.                                                                  |
| SRM      | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.                                                                                                                                                                                                                                                                                                                                                                     |
| STLP     | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TEF      | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.                                                                                                                                                                                                                                                                                                                                                                                             |
| TEQ      | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.                                                                                                                                                                                                                                                                                                                                                        |
| TIC      | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.                                                                                                                                                                                                                                                                      |

Report Format: Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

## Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

## Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Chlordane:** The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Gasoline Range Organics (GRO):** Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

## Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**Report Format:** Data Usability Report



**Project Name:** STEEPLGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

#### **Data Qualifiers**

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** STEEPLEGATE MALL FORCE MAIN  
**Project Number:** 0208898-001

**Lab Number:** L2433315  
**Report Date:** 06/21/24

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 125 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates IIIA, April 1998.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**Alpha Analytical, Inc.**Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 21

Published Date: 04/17/2024

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**Certification Information**

The following analytes are not included in our Primary NELAP Scope of Accreditation:

**Westborough Facility****EPA 624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625.1:** alpha-Terpineol**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.**Mansfield Facility****SM 2540D:** TSS.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Nonpotable Water:** **EPA RSK-175 Dissolved Gases****Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

**Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables).**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.**EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1** Hg.**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



|  <b>CHAIN OF CUSTODY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    | <b>Service Centers</b><br>Brewer, ME 04412    Portsmouth, NH 03801 Mahwah, NJ 07430<br>Albany, NY 12205<br>Tonawanda, NY 14150    Holmes, PA 19043                                                                                                  |             | Page 1<br>of 1                                                                                                                                                                                                     |                  | Date Rec'd in Lab <b>6/13/24</b>                                                                                                                                                                                                  |                                     | ALPHA Job # <b>62433315</b>                                                                                                                                                                                                    |                                     |                                                                                                                                                                                                   |                                     |                                                                         |                                     |                                     |                                     |                      |         |                                |                        |                             |                          |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |
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                                                                                                    |                                     |                                                                         |                                     |                                     |                                     |                      |         |                                |                        |                             |                          |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |
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of Days: |                  | <b>Regulatory Requirements (Program/Criteria)</b><br>Note: Select State from menu & identify criteria.                                                                                                                            |                                     | <b>Disposal Site Information</b><br>Please identify below location of applicable disposal facilities:<br>Disposal Facility:<br><input type="checkbox"/> NJ <input type="checkbox"/> NY<br><input type="checkbox"/> Other:      |                                     |                                                                                                                                                                                                   |                                     |                                                                         |                                     |                                     |                                     |                      |         |                                |                        |                             |                          |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |
| These samples have been previously analyzed by Alpha <input type="checkbox"/><br>Other project specific requirements/comments:<br>Please specify Metals or TAL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                                                                                                          |                                     |                                                                                                                                                                                                                                |                                     | <b>Sample Filtration</b><br><input type="checkbox"/> Done<br><input type="checkbox"/> Lab to do<br><b>Preservation</b><br><input checked="" type="checkbox"/> Lab to do<br>(Please Specify below) |                                     |                                                                         |                                     |                                     |                                     |                      |         |                                |                        |                             |                          |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  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| <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">ALPHA Lab ID<br/>(Lab Use Only)</th> <th rowspan="2">Sample ID</th> <th colspan="2">Collection</th> <th rowspan="2">Sample Matrix</th> <th rowspan="2">Sampler Initials</th> <th rowspan="2">Depth</th> <th rowspan="2">VOCs 8260D/5035 H&amp;L</th> <th rowspan="2">PAHs 8270E</th> <th rowspan="2">TPH DRO</th> <th rowspan="2">Total Solids SM 2540</th> <th rowspan="2">pH 9045</th> <th rowspan="2">PCBs 8082A</th> <th rowspan="2">RCRA 8 Metals 6010D/74</th> <th rowspan="2">Haz. Waste Characterization</th> <th rowspan="2">Sample Specific Comments</th> </tr> <tr> <th>Date</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td><b>33315 01</b></td> <td><b>H424-43-1-3</b></td> <td><b>6/13/24</b></td> <td><b>0800</b></td> <td><b>SO/RA</b></td> <td><b>SGS</b></td> <td><b>1-3</b></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td><b>02</b></td> <td><b>H424-43-3-5</b></td> <td><b>6/13/24</b></td> <td><b>0820</b></td> <td><b>SO/RA</b></td> <td><b>SGS</b></td> <td><b>3-5</b></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> |                    |                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                    |                  | ALPHA Lab ID<br>(Lab Use Only)                                                                                                                                                                                                    | Sample ID                           | Collection                                                                                                                                                                                                                     |                                     | Sample Matrix                                                                                                                                                                                     | Sampler Initials                    | Depth                                                                   | VOCs 8260D/5035 H&L                 | PAHs 8270E                          | TPH DRO                             | Total Solids SM 2540 | pH 9045 | PCBs 8082A                     | RCRA 8 Metals 6010D/74 | Haz. Waste Characterization | Sample Specific Comments | Date       | Time    | <b>33315 01</b>      | <b>H424-43-1-3</b> | <b>6/13/24</b> | <b>0800</b>            | <b>SO/RA</b>                | <b>SGS</b>               | <b>1-3</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <b>02</b> | <b>H424-43-3-5</b> | <b>6/13/24</b> | <b>0820</b> | <b>SO/RA</b> | <b>SGS</b> | <b>3-5</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2022-24-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical. |  |  |  |
| ALPHA Lab ID<br>(Lab Use Only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| <b>33315 01</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| Preservative Code:<br>A = None<br>B = HCl<br>C = HNO <sub>3</sub><br>D = H <sub>2</sub> SO <sub>4</sub><br>E = NaOH<br>F = MeOH<br>G = NaHSO <sub>4</sub><br>H = Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub><br>K/E = Zn Ac/NaOH<br>O = Other                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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Bacteria Cup<br>C = Cube<br>O = Other<br>E = Encore<br>D = BOD Bottle                                                                           |                                     |                                                                                                                                                                                                                                |                                     |                                                                                                                                                                                                   |                                     | Westboro: Certification No: MA935<br>Mansfield: Certification No: MA015 |                                     |                                     |                                     |                      |         | Container Type<br>Preservative |                        |                             |            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                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                    |                  | Date/Time: <b>6/13/24 1130</b>                                                                                                                                                                                                    |                                     |                                                                                                                                                                                                                                |                                     |                                                                                                                                                                                                   |                                     | Received By: <b>[Signature]</b>                                         |                                     |                                     |                                     |                      |         | Date/Time: <b>6/13/24 1335</b> |                        |                             |                          |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  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| Relinquished By: <b>[Signature]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                                                          |                                     |                                                                                                                                                                                                                                |                                     |                                                                                                                                                                                                   |                                     | Received By: <b>[Signature]</b>                                         |                                     |                                     |                                     |                      |         | Date/Time: <b>6/13/24 1945</b> |                        |                             |                          |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  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| Document ID: 20455 Rev 4 (11/22/2021)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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        |            |         |                      |                    |                |                        |                             |                          |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |           |                    |                |             |              |            |            |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |  |  |  |  |  |  |  |  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**APPENDIX B**  
**Bid Alternates #1 and #2**



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|                                                                                                                                                |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Loudon Road Lining Recommendations: Overview</b><br>Concord, NH                                                                             |                 |
| PROJ NO: 21775                                                                                                                                 | DATE: 3/10/2026 |
| <b>WRIGHT-PIERCE</b> <br>Engineering a Better Environment |                 |
| <b>FIGURE: 1</b>                                                                                                                               |                 |



Data courtesy of the City of Concord, NH. Basemap by ESRI.

KTM W:\Gis\_Development\Projects\NH\Concord\21775\_HeightsSewerImprovements\MXDs\LiningRecommendations.aprx - Fig\_RecBidAltOne\_11x17-L





Data courtesy of the City of Concord, NH. Basemap by ESRI.

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