THE CITY OF CONCORD
in conjunction with the
STATE OF NEW HAMPSHIRE,
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENVIRONMENT
and the
FEDERAL HIGHWAY ADMINISTRATION

Concord, BRF-X-5099 (021), 12004
Draft
Alternative Analysis

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Draft
July 19, 2013
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Introduction

The Sewalls Falls Road Bridge over the Merrimack River (070/117) in the City of Concord is a 2-span steel Pratt Truss built in 1915 with a multi-span steel approach constructed on the westerly side in 1939 after the 1938 flood, to allow for floodwater storage. The bridge is supported by a cast-in-place concrete abutment on the west, a cut stone center pier and a cut stone pier on the west which also supports the east end of the steel approach structure which is further supported by a series of steel pile bents. The bridge was designed by John William Storrs, a noted bridge designer and five-term Mayor of Concord and is the only one of Storrs’ designs remaining in Concord and only one of two 2-span steel Pratt Truss bridges remaining in the State of New Hampshire. The bridge was evaluated according to the National Register of Historic Places criteria. Based on this survey, the bridge is eligible for the National Register as an early example of a steel High Pratt Truss bridge.

This project was initiated in 1994 by the New Hampshire Department of Transportation (NHDOT). In 1999, NHDOT retained the services of Clough, Harbour and Associates LLP, now CHA Consulting, Inc. (CHA), to perform the design engineering evaluations for the replacement of the Sewalls Falls Bridge under the Part A, Preliminary Engineering Services Phase of the project. Initial engineering evaluations focused on roadway alignment alternatives and associated impacts to cultural and natural resources. Through the public engagement process and meetings with stakeholders, design alternatives also included means of preserving and rehabilitating the existing bridge to carry legal highway loads. At the end of the NHDOT initiated Part A, the Preferred Alternative was to rehabilitate the existing Sewalls Falls Road Bridge to carry one lane of northbound traffic and construct a new single lane, steel beam bridge just upstream of the existing bridge to carry a single lane of southbound traffic. Both structures would be placed on a new cast-in-place concrete substructure. This was identified as the Proposed Action in the Final Environmental Study and Programmatic Section 4(f) Evaluation that was prepared by NHDOT in 2010 (2010 Studies).

At the conclusion of the Part A Preliminary Engineering Phase, NHDOT turned the project over to the City of Concord to complete the final design and construction as a Municipally Managed Project under the Department’s Bridge Aid Program. One of the first steps that the City undertook was to perform a detailed structural inspection and load rating analysis of the existing bridge to determine the extent of rehabilitation required, as this had not been performed under the NHDOT Part A Phase of the project. The results of the inspection and load rating determined that, while the bridge could be rehabilitated to carry legal highway loads, the extent of rehabilitation was substantial and included either strengthening or replacing the majority of the structural members. As a result of these findings, the City of Concord decided to reevaluate previously investigated alternatives to determine which alternative would best meet the near-term and long-term needs of the City and best serve the public safety. Documents and reports referenced and footnoted herein can be found at the City of Concord’s website http://nh-concord.civicplus.com/index.aspx?nid=426.

Purpose and Need

The Purpose of this project is to address the current structural deficiencies and substandard roadway approach geometry associated with the existing Sewalls Falls Road Bridge, including the southern approach trestle and substructure units, in order to provide for the safe, sustainable, efficient, and cost effective multimodal movement of people and goods across the Merrimack River, while supporting the City of Concord’s short and long-term transportation, economic development, and regional emergency response needs.

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1 Concord, BRF-X-5099 (021), 12004, Environmental Study and Programmatic 4(f) Evaluation, Draft, November 2010 prepared by the State of New Hampshire Department of Transportation Bureau of Environment
The Need for the project is based on the following:

a) Sewalls Falls Road at its Merrimack River crossing is a critically important transportation link connecting an existing dense commercial/residential mixed-use corridor to the south and west to a proposed mixed-use development corridor with potential interstate access to the north and east side of Concord. Transportation system alternatives must balance the future needs of economic development in these areas with the protection of cultural and natural resources;

b) The structural deficiencies in the southern approach trestle, truss structure, and substructure units threaten access across the Merrimack River. A Federal Sufficiency Rating of zero (0) has limited its use as a one-lane bridge with a 3-ton load posting for passenger cars only, which precludes emergency response vehicles as well as all non-passenger car traffic from using the bridge;

c) The erodible nature of the riverbed and foundation design of the existing substructure units leave the bridge susceptible to scour during flood events;

d) The continuous maintenance needs of the bridge due to its critical condition are not sustainable with the City of Concord’s limited physical and financial resources;

e) The structural deficiencies and critical condition of the structures have resulted in a number of bridge closures, compromising the reliability of this critically important transportation link;

f) The narrow width and the limited load capacity of the existing bridge only accommodates a single lane of passenger car traffic resulting in operational inefficiencies to the traveling public such as delays for alternating one-way traffic as well as the need for non-passenger cars and those vehicles exceeding the 3-ton posting to seek alternate routes;

g) The narrow width and existing open steel grid decking of the truss structure do not meet current Americans with Disabilities Act (ADA) requirements and do not allow for safe passage of pedestrians and bicycles, severing the connectivity of the recreational trail system that exists on both sides of the bridge which is not consistent with the City of Concord’s Complete Streets Policy requirements;

h) The substandard horizontal and vertical roadway geometry on the east approach provides inadequate stopping sight distance which is not compliant with operational safety standards.

**Existing Conditions**

The Sewalls Falls Road Bridge over the Merrimack River (070/117) in the City of Concord is a 2-span steel Pratt Truss built in 1915. A multi-span steel approach was constructed on the westerly side in 1939 after the 1938 flood, to allow for floodwater storage. The bridge is supported by a cast-in-place concrete abutment on the west, a cut stone center pier and a cut stone pier on the west which also supports the east end of the steel approach structure which is further supported by a series of steel pile bents. The bridge was evaluated according to the National Register of Historic Places criteria. Based on this survey, the bridge is eligible for the National Register as an early example of a steel High Pratt Truss bridge. It retains a high level of integrity, location, design, setting, materials, workmanship, feeling and association.

The existing bridge is 338 feet long and just under 18 feet wide with a vertical clearance dictated by the existing portal geometry of 15.33 feet. It has one travel lane on an open steel grid deck that allows alternate one-way traffic flow, eastbound and westbound, with no sidewalks. This roadway provides local access to both the east and west sides of the Merrimack River in the north part of the City of Concord, without the need to access Interstate-93. Since the bridge is limited to one lane of traffic, this necessitates alternating travel directions and the need for vehicles to stop to wait for oncoming traffic to cross the bridge. The current posted speed is 30 mph with the recommended speed being 20 mph due to one-way alternating traffic and the presence of poor sight distance.

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approaching the bridge from the northeast and exiting the bridge from the southwest. The existing sight distance around the curve at the north end of the bridge is approximately 200 feet. The minimum stopping sight distance per AASHTO guidelines for the 30 mph posted speed limit is 200 feet. The cut slope embankment and vegetation on the inside of the curve is what controls the available sight distance.

The existing bridge and steel approach spans are in very poor condition (See Exhibit # 6) and have been on the Municipal Red List for a number of years. Over the years the weight load has been downgraded from 14 tons to 10 tons, preventing the use of this bridge by City of Concord Emergency Vehicles. At a July 8, 2013 City Council Meeting, the City Council concurred with City Staff that the bridge be further down-posted to 3 tons and limited to passenger cars only. It has two steel spans with a single granite pier in the Merrimack River. The steel trusses are in poor condition and need repair and repainting. Both abutments have extensive cracking and spalling of the concrete and there have been significant problems with the cut granite pier. A considerable number of stones have cracked, shifted, and/or fallen into the river, thereby compromising the overall integrity of the pier. Although NHDOT Bridge Maintenance forces have performed repairs, these are not considered as permanently addressing concerns with the pier. The existing substructure elements are founded on spread footings placed on original soil at the excavated depths. Piles supporting the substructure were not utilized making the bridge susceptible to scour. NHDOT recently placed riprap around the center pier to help correct scour at the pier.

On the east side of the Merrimack River are two properties, adjacent to the approach to the bridge. The Concord Monitor Newspaper facility (Parcel #1) is located on the northeast side of Sewalls Falls Road and a residential property (Parcel #2) is located on the southeast side of the road. There is an active railroad line to the east of the bridge, just east of the entrance to the Concord Monitor. The rail crossing of Sewalls Falls Road will be impacted by the widening of the roadway to include a left turn lane from the west, into the Concord Monitor parking area. On the west side of the Merrimack River there is a New Hampshire Fish and Game (NHF&G) boat launch and parking lot on the south side of Sewalls Falls Road (Parcel #4) and Conservation Land, owned by NHF&G and purchased with Land Conservation Investment Program Funds (LCIP), currently Conservation Land Stewardship property (CLS), on the north side of the road. Another railroad line occurs west of the NHF&G boat launch entrance. The project will end just before this rail line, so there should be no impacts to it. Traffic data from 2007 indicate an Average Daily Traffic (ADT) of 3,900. There have been 13 vehicular accidents in this area from January of 1998 to December of 2009 with no fatalities and only one injury. Most of these accidents appear to have possibly been due to wet or icy roads. More current traffic and accident data is being compiled and will be included in the final Study Documents.

The Boston and Maine Railroad line on the east side of the Merrimack River was originally constructed in the early 1850’s. It was part of the Boston, Concord and Montreal Railroad that was chartered in 1844. Sewalls Falls Road was in existence prior to the rail line, so this crossing was initially constructed in the 1850’s. The signals were added in the late 1930’s when the NH State Highway Department petitioned the NH Public Service Commission to require signals at the two at-grade railroad crossings on Sewalls Falls Road, due to the increased automobile traffic. The crossing includes an abandoned electric signal control box and railroad crossing signs. Originally a passing train would trigger a flashing light and possibly a bell. The lights and/or bell are no longer present and most of the inner workings of the signal box are missing.

An Individual Inventory Form was completed for this intersection in regards to the Historic Railroad District. The signal box was evaluated according to the National Register of Historic Places criteria. Based on this inventory, the signal has been determined to be eligible as a contributing factor to the Boston, Concord and Montreal Railroad Historic District. It retains integrity for location, design, setting, materials, workmanship, feeling and association.
Proposed Action: On-Line Replacement Alternative 8

Because the alternative analysis and plan development extended over a long period of time, some of the alternatives, including the Proposed Action, were developed in metric units while others were in English units depending on what the standard unit convention was at the time of development. Therefore, the narrative describing the Proposed Action is presented in both English and metric units to aid in the comparison of alternatives.

The City of Concord proposes a design to replace the bridge over the Merrimack River at Sewalls Falls Road (Alternative 8 On-Line Replacement). The proposed project will construct a new two-lane steel beam bridge with concrete decking along the existing alignment replacing the existing structure. A new pier and abutments will be constructed as the existing pier and abutments are in poor condition.

The proposed roadway geometry includes providing 2 – 12’ (3.6 m) travel lanes with 5’ (1.5 m) shoulders and 5’ (1.5 m) sidewalk(s) on either side of the road. The roadway alignments are based on a 35 MPH (60 KPH) design speed. The proposed sidewalk extends from the Fish and Game Park (Parcel 4) driveway to the Concord Monitor (Parcel 1) driveway. Widening and improvements to the roadway approaches will be constructed northeast past the Boston and Maine Railroad crossing and southwest up to the Boston and Maine Railroad corridor. The road will be widened to the east and west of the rail crossing to provide a protected left turn lane into the Concord Monitor entrance drive from the southwesterly direction. The existing railroad signal box will be within the new roadway and slope work of this widening and will be relocated. The total construction distance is 2,000 linear feet (610 m), 830 feet (253 m) on the east side of the bridge and 840 feet (256 m) on the west side of the bridge.

The horizontal roadway alignment will closely mimic the existing alignment. However, the vertical alignment will be raised approximately 10’ (3 m) higher at the western abutment and approximately 16’ (5 m) higher at the eastern abutment. While the profile is substantially higher than existing, it does provide for a smooth vertical geometry, with vertical curve lengths and profile grades greater than the minimum required. This vertical geometry also minimizes impacts to Parcels 1 and 2 on the northern (eastern) approach.

The existing sewer and gas mains located on the existing structure will need to be relocated. Provisions for maintaining these utilities during construction will need to be incorporated into the Final Design. The City of Concord is also proposing to extend the existing water service across the bridge from Manor Road to connect into the existing service in the vicinity of the Concord Monitor driveway (Parcel 1). In addition, the existing 24” (600 mm) storm drain at the southwest quadrant will need to be relocated.

Drainage facilities in the project area will be re-designed and water quality facilities will be installed on unused areas of Parcel 4, the NHF&G Boat Launch parcel, beneath the existing Unitil easement. Additional water quality treatment for Sewalls Falls Road may be provided using the existing Concord Monitor water quality basin located in the northwest quadrant pending an agreement between the City of Concord and the property owner.

A flood control dam was constructed in Franklin Falls on the Pemigewasset River, upstream from the Sewalls Falls Bridge in 1943, and protects the areas downstream, including the towns of Franklin, Northfield, Concord and Bow, from flooding. Since this flood control dam was constructed, there is no longer a need for the steel approach spans on the west approach to the Sewalls Falls Bridge. The spans are in poor condition and will be removed and a typical fill approach will be constructed. Currently there is a recreational trail from the NHF&G boat launch area, passing under the approach span that connects to a trail on Parcel 5 on the north side of Sewalls Falls Road. This trail connects to another trail south of the boat launch area, to the old Sewalls Falls Dam and extends northwest approximately 1000 feet (305 m) along the Merrimack River on Parcel 5. The proposed design

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4 Refer to letter report prepared by CHA Consulting, Inc. dated November 28, 2012 entitled Re-Revaluation of Preliminary Design Alternatives.
will relocate the west abutment further away from the river thereby allowing pedestrians and wildlife to pass in front of the proposed abutment. The estimated cost for the Proposed Action is approximately:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction including Engineering and ROW</td>
<td>$9,833,000</td>
</tr>
<tr>
<td>Maintenance cost over a 25 year period</td>
<td>$534,980</td>
</tr>
</tbody>
</table>

**Alternatives Considered**

As noted previously, several alternatives were evaluated during the Preliminary Engineering Phase. A summary of the 11 alternatives evaluated is provided below and further detailed information on these alternatives can be obtained from the NHDOT project files. All alternatives include removal of the approach trestle on the west side of the river as well as relocation of the existing railroad signal box at the east end of the project. Alternative structure types were also evaluated which included a new steel truss structure as well as a wooden covered bridge. The majority of these alternatives were dismissed early in the project development process due to excessive environmental impacts, cost, constructability, as well as their inability to meet the project’s Purpose and Need. Build alternatives **bolded** (Alternatives 4, 5, 8, A, & H) below were further evaluated and are described in more detail in this document.

1. **Alternative 1 – Off-line Upstream Replacement:** This alternative consists of an upstream alignment shift with the entire proposed bridge on a large radius curve. The west approach is a long tangent which is tied into the existing roadway at the west limits with a large curve. The east approach is on a curve, which compounds with the radius bridge curve. This alternative requires minor superelevation transition over the bridge due to the offset of the proposed abutments. In addition, short term road closures would be required for this alternative.

2. **Alternative 2 – Downstream Shift:** This alternative allows for staged bridge construction while minimizing ROW impacts. Current traffic patterns would be maintained on the existing bridge while the downstream half of the proposed bridge is being constructed. Two-way traffic could then be maintained on the newly constructed portion of the bridge while the remaining portion is constructed.

3. **Alternative 3 – On-line Replacement:** Construction of a 2 lane bridge in the same location as the existing. This alternative would require closing the road and detouring traffic but minimizes impacts to the abutting properties. Alignments are slightly different than Alternative 8.

4. **Alternative 4 – Off-line/Upstream:** Construction of a 2 lane bridge parallel to the existing Bridge. The existing bridge would be left in place.

5. **Alternative 5 – Off-line/Downstream:** Construction of a 2 lane bridge skewed away from the Concord Monitor. This alternative minimizes impacts to the Concord Monitor and LCIP property while increasing impacts to the Fish & Game property and Parcel 2. The existing bridge would be left in place.

6. **Alternative 6 – Upstream Staged Construction:** Construction of a 2 lane bridge parallel to the existing bridge. This alternative allows for traffic to be maintained on the existing bridge while half (1 lane) of the new bridge is being constructed. Then traffic will be shifted to the new bridge while the existing bridge is being removed so the other half of the new bridge can be constructed.

7. **Alternative 8 – On-line Replacement (Proposed Action):** Construction of a 2 lane bridge in the same location as the existing. This alternative would require closing the road and detouring traffic but minimizes impacts to the abutting properties.

8. **Alternative 9 – Off-line Downstream Replacement:** This alternative consists of a downstream alignment shift with the entire proposed bridge on tangent. This tangent continues through the western approach, which is tied into the existing roadway at the southern limits with a large radius curve and a normal crowned section. The eastern approach maintains similar geometry as existing. This alternative requires the existing bridge structure to be removed without maintaining traffic during construction.

9. **Alternative A:** Rehabilitation of the existing bridge and maintaining it as a one lane bridge.
10. **Alternative B:** Rehabilitation of the existing bridge and constructing a new one lane “twin” truss bridge adjacent to and upstream of the existing.

11. **Alternative H:** Rehabilitation of the existing bridge and constructing a new one lane steel girder / reinforced concrete deck bridge adjacent to and upstream of the existing.

**No-Build Alternative**

The No-Build alternative does not meet the Purpose and Need of the project since it would not address the public safety concerns associated with the existing conditions. Failure to address the substandard and existing unsafe conditions would perpetuate the roadway deficiencies, which would likely become more severe if left unaddressed and lead to the closure of the bridge and eventual removal from the location.

**Rehabilitate the Existing Bridge (Alternative A)**

This alternative would rehabilitate the existing bridge by replacing the lower chord and floor-beam system, replacing or strengthening structural members, and constructing a new concrete deck to carry legal highway loads. In addition, the bridge would be cleaned and painted and a new bridge rail system would be constructed within the existing truss panels to help prevent vehicular impact damage. This alternative would also include the construction of a 10’ wide culvert in west approach fill to provide a connection between the two trails that exist on either side of Sewalls Falls Road. The estimated cost for this alternative is approximately:

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction including Engineering and ROW</td>
<td>$5,070,320</td>
</tr>
<tr>
<td>Maintenance cost over a 25 year period</td>
<td>$1,903,000</td>
</tr>
</tbody>
</table>

After considering the Purpose and Need of the project, this alternative was abandoned for the following reasons:

- The bridge would still not allow for two-way traffic due to the width of the bridge. Widening is not recommended as the existing pier and sub-structure are in poor condition and would not support the weight of the wider structure.
- The existing structure would continue to deteriorate and require regular maintenance. Rehabilitation of the existing bridge would require closure of the bridge during the entire time of rehabilitation, which would cause substantial inconvenience to those who use the bridge daily. Even with this rehabilitation, traffic would be limited to alternating one-way travel.
- The City of Concord has anticipated future development of this area and a one-way, alternating bridge would not be adequate to handle the increased traffic.
- The rehabilitated bridge would not have sidewalks, which does not meet the City’s Complete Streets Policy.
- The substandard horizontal and vertical roadway geometry on the east approach provides inadequate stopping sight distance, which is not compliant with operational safety.

**Rehabilitate the Existing Bridge & Add an Additional One-lane Bridge (Alternative H)**

This option was the preferred alternative/proposed action in the 2010 Study and consists of rehabilitating the existing Sewalls Falls Road Bridge to carry one lane of northbound traffic and constructing a new single lane, steel beam bridge just upstream of the existing bridge to carry a single lane of southbound traffic. Both structures would be placed on new cast-in-place concrete substructures. Based on a detailed structural inspection\(^5\) and load

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\(^5\) *Sewalls Falls Bridge 2012 In-Depth Inspection*, dated March 2012, prepared by CHA Consulting, Inc., prepared for the City of Concord, New Hampshire Engineering Services Division.
rating analysis\(^6\) of the existing bridge conducted by CHA in the Spring of 2012, it was determined that a more extensive amount of rehabilitation would be required to the existing truss in order to carry legal highway loads than initially assumed. The estimated cost for this alternative is approximately:

Construction including Engineering and ROW : $12,923,100

Maintenance cost over a 25 year period:  
- $ 1,903,000 for the truss bridge
- $ 534,980 for the new bridge

After considering the Purpose and Need of the project, this alternative was abandoned for the following reasons:

- Higher overall construction costs associated with the extent of rehabilitation required in order for the existing trusses to carry legal highway loads.
- Operational safety concerns of split traffic along the bridge approaches and compound horizontal and vertical geometry of the east approach.
- Continuous long-term and on-going cost associated with the maintenance needs of the rehabilitated truss.
- Unsustainability of the bridge once rehabilitated due to anticipated development and increased traffic demands on Sewalls Falls Road.
- The uncontrolled mid-block crosswalks to provide connectivity to the recreational trails on both sides of the bridge create a safety concern for pedestrians.
- Greater environmental and ROW impacts than the Proposed Action, as this alternative would require ROW impacts to a larger portion of the LCIP parcel (Parcel 5), impacting more wetlands and potential eagle roosting trees on that property.

**New Two-Lane Bridge Upstream Replacement (Alternative 4)**

This alternative would provide a new crossing of the Merrimack River by constructing a 2 lane bridge parallel and upstream of the existing bridge. The existing bridge would be left in place and could either be rehabilitated for pedestrian use or left in place without rehabilitation as a static monument. The estimated cost for this alternative is approximately:

Construction including Engineering and ROW : $10,011,000 for new bridge
- $ 600,000 for truss rehabilitation for pedestrian use

Maintenance cost over a 25 year period:  
- $ 534,980 for the new bridge
- $ 81,000 for the truss bridge

After considering the Purpose and Need of the project, this alternative was abandoned for the following reasons:

- Higher overall construction costs associated with the rehabilitation of the truss in order to preserve the structure or to be used for recreational purposes.
- Continuous cost associated with the maintenance needs of the rehabilitated truss. If the existing structure were bypassed and not maintained, the bridge would eventually deteriorate and need to be removed.
- Greater environmental and ROW impacts than the Proposed Action:
  - Would require a larger strip of land from the Concord Monitor parcel (Parcel 1) and would impact their parking lot;
  - Would require a larger portion of the LCIP parcel (Parcel 5), impacting more wetlands and potential eagle roosting trees on that property and possibly impacting areas that are sensitive for archaeological resources.

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**New Two-Lane Bridge Downstream Replacement (Alternative 5)**

This alternative would provide a new crossing of the Merrimack River by constructing a 2 lane bridge parallel and downstream of the existing bridge. The existing bridge would be left in place and could either be rehabilitated for pedestrian use or left in place without rehabilitation as a static monument. The estimated cost for this alternative is approximately:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction including Engineering and ROW*</td>
<td>$10,011,000</td>
</tr>
<tr>
<td>Maintenance cost over a 25 year period</td>
<td>$534,980</td>
</tr>
</tbody>
</table>

*Does not include potential acquisition of Parcel 2*

After considering the Purpose and Need of the project, this alternative was abandoned for the following reasons:

- Higher overall construction costs associated with the rehabilitation of the truss in order to preserve the structure or to be used for recreational purposes.
- Continuous cost associated with the maintenance needs of the rehabilitated truss. If the existing structure were bypassed and not maintained, the bridge would eventually deteriorate and need to be removed.
- Greater environmental and ROW impacts than the Proposed Action:
  - The residential property (Parcel 2) on the east side of the Merrimack River would be greatly impacted, with the possibility of having to relocate the residents;
  - The NH Fish and Game parcel (Parcel 4) boat launch and parking area on the west side of the river would require complete reconstruction and reconfiguration.

**On-line Replacement (Alternative 8) Proposed Action**

This alternative replaces the existing bridge with a new two-lane steel beam bridge with concrete decking along the existing alignment. A new pier and abutments will be constructed as the existing pier and abutments are in poor condition. The estimated cost for this alternative is approximately:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction including Engineering and ROW</td>
<td>$9,833,000</td>
</tr>
<tr>
<td>Maintenance cost over a 25 year period</td>
<td>$534,980</td>
</tr>
</tbody>
</table>

This alternative was further pursued and it is the Proposed Action because it meets the Purpose and Need as follows:

- The new bridge will be able to reliably serve as a critically important transportation link connecting the existing dense commercial/residential mixed-use corridor to the south and west to a proposed mixed-use development corridor with potential interstate access to the north and east side of Concord.
- The alternative balances the future needs of economic development in the area with the protection of cultural and natural resources to greatest extent practical.
- The new bridge will be designed to carry legal highway loads, thereby not precluding its use for any legally loaded vehicle.
- The new substructures will be designed to meet current scour design standards.
- The new bridge requires minimal maintenance needs.
The new bridge accommodates two lanes of traffic with traditional two lane roadway approaches greatly improving the operation safety through the project area.

The new bridge and roadway approaches have 5 foot shoulders and sidewalks on either side meeting ADA requirements as well as the City’s Complete Streets Policy by further providing connectivity to the recreational trail system that exists on both sides of the bridge.

The horizontal and vertical roadway geometry on the roadway approaches meets current AASHTO design standards.

The new structure has the lowest initial construction cost as well as future maintenance costs.

A Summary Matrix comparing the No Build, Rehabilitate the Existing Bridge, New Two-Lane Bridge Upstream Replacement (Alternative 4), New Two-Lane Bridge Downstream Replacement (Alternative 5), On-line Replacement (Alternative 8), and Rehabilitate the Existing Bridge & Add An Additional One-lane Bridge (Alternative H) Alternatives’ ability to meet the Purpose and Need of the project is provided in the Appendix (Exhibit 7).

**Coordination and Public Participation**

Meetings were held periodically with various Federal, State and local agencies, as well as with the general public and Consulting Parties throughout the development of this project. Under the NHDOT lead design alternative evaluations concluding with the 2010 Study, these meeting are as follows:

The proposed project was presented at Cultural Resource Agency Coordination meetings on the following dates:
- May 25, 2000;
- December 7, 2000;
- March 13, 2003;
- January 12, 2006;
- November 12, 2009;
- April 1, 2010;
- May 6, 2010;
- October 7, 2010.

The proposed project was presented at Natural Resource Agency Coordination meetings on January 17, 2001, August 15, 2007, and September 15, 2010.

This project was presented to the Concord City Council on October 11, 2011.

Under the current City of Concord lead design alternative evaluations, these meetings are as follows:

The proposed project was presented at Cultural Resource Agency Coordination meetings on the following dates:
- September 13, 2012;
- December 6, 2012;
- April 4, 2013;
- June 11, 2013.

The proposed project was presented to representatives from NHDHR on August 10, 2012.

The proposed project was presented at Natural Resource Agency Coordination meeting on December 19, 2012.

This project was presented to the Concord City Council on August 13, 2012, and February 11, 2013.

This project was presented to the Concord Heritage Commission on September 6, 2012 and January 3, 2013.

This project was presented at a City of Concord Public Information Meeting on January 23, 2013 as part of the Section 106 Process. Consulting Parties were solicited at this meeting.
Exhibit 1- Map of Project Area
Exhibit 2 - Topographic Map of Project Area

- Merrimack River
- I-93 SB
- I-93 NB
- Sewell’s Falls Road
- Project Area
Exhibit 3 - Proposed Alignment of New Bridge and Roadway

East side of project
West side of project
Exhibit 4 - Air Photo of Project Area
Exhibit 5- Photo of existing bridge looking north
Exhibit 6- Photos showing bridge

Looking west from bridge

Looking east from bridge
Looking at the north side of the bridge from the west bank.

Approach spans
Deteriorated concrete and exposed rebar on supports.

Deterioration of the approach span on the west side.
## Exhibit 7 – Alternative Analysis Summary Matrix

**Concord 12004**

**Sewalls Falls Road Bridge over the Merrimack River**

**Alternatives Analysis Summary Matrix**

<table>
<thead>
<tr>
<th>Alternative / Purpose and Need Criteria</th>
<th>No-Build</th>
<th>Rehabilitate Existing Bridge</th>
<th>Alternative 4 Off-Line Upstream</th>
<th>Alternative 5 Off-Line Downstream</th>
<th>Proposed Action Alternative 8 On-Line</th>
<th>Alternative H Rehab Exist Add 2nd One Way Steel Girder/Concrete Deck on Upstream Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supports Future Economic Development</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Minimizes Impacts to Cultural Resources (see note 1)</td>
<td>Yes</td>
<td>Yes, provided that the bridge continued to be maintained.</td>
<td>Yes</td>
<td>No - The existing bridge will be removed.</td>
<td>Yes - More impacts than the No-Build and Rehabilitation Alternatives, but less than Alternatives 4, 5, and H.</td>
<td>Yes - More impacts than Alternative 8 as well as the No-Build and Rehabilitation Alternatives, but less than Alternatives 4 and 5.</td>
</tr>
<tr>
<td>Minimizes Impacts to Natural Resources</td>
<td>Yes - There would be no impacts.</td>
<td>No - There would be minimal impacts, mostly temporary associated with construction activities.</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes - However, the truss bridge will require more frequent maintenance in order to maintain structural integrity.</td>
</tr>
<tr>
<td>Addresses Structural Deficiencies</td>
<td>No</td>
<td>Yes - However, the bridge will require more frequent maintenance in order to maintain structural integrity.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes - However, the truss bridge will require more frequent maintenance in order to maintain structural integrity.</td>
</tr>
<tr>
<td>Addresses Scour Vulnerability</td>
<td>No</td>
<td>Yes - Appropriate countermeasures could be installed.</td>
<td>Yes - the new bridge would meet current scour foundation design requirements and appropriate countermeasures could be installed at the existing pier.</td>
<td>Yes - the new bridge would meet current scour foundation design requirements and appropriate countermeasures could be installed at the existing pier.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cost Effective Solution and Minimizes Future Maintenance Needs</td>
<td>No</td>
<td>No</td>
<td>No - The initial construction cost is higher than the Proposed Action and the existing bridge may still require future maintenance.</td>
<td>No - The initial construction cost is higher than the Proposed Action and the existing bridge may still require future maintenance.</td>
<td>Yes - Lowest initial construction costs as well as future maintenance costs.</td>
<td>Yes - Highest initial construction costs as well as future maintenance costs.</td>
</tr>
<tr>
<td>Reliability to the Transportation Network</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes - However, the rehabilitated truss will require more frequent maintenance in order to maintain structural integrity.</td>
</tr>
<tr>
<td>Corrects Operational Deficiencies</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Supports Multimodal / Complete Streets Policy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No - Mid-block crosswalks pose a safety hazard to pedestrians. In addition, east bound bicyclists would be forced to travel on the new bridge against traffic flow.</td>
</tr>
<tr>
<td>Corrects Operational Safety Deficiencies</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Note 1:** All alternatives, with the exception of the "No Build" Alternative, result in an adverse effect due to the removal of character defining features of the bridge as a result of the removal of the approach trestle, rehabilitation or removal of the truss as well as rehabilitation or removal of the existing cut stone piers.