

# Chapter 5

## Draft Section 4(f) Evaluation

### 5.1 Introduction

The project proposes improvements to the Interstate Route 93 (I-93) corridor between the Town of Bow and the City of Concord, Merrimack County, New Hampshire, a distance of approximately 4.5 miles from just south of the I-93/Interstate Route 89 (I-89) Interchange in Bow to just north of the I-93/Interstate Route 393 (I-393) Interchange (Exit 15) in Concord.

Under Section 4(f) of the Department of Transportation Act as amended by the Federal-Aid Highway Act of 1968 (Public Law 90-495, 49 USC 1653), the Secretary of Transportation shall not approve any program or project that “requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance as so determined by federal, state, or officials having jurisdiction thereof, or any land from a historic site of national, state or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use.”

A “use” of a Section 4(f) resource, as defined in 23 C.F.R. § 774.17, occurs 1) when land is permanently incorporated into a transportation facility (a direct use); 2) when there is a temporary occupancy of land that is adverse in terms of the statute’s preservationist purpose (a direct use), as determined by the criteria in 23 C.F.R. § 774.13(d); or 3) when there is a constructive use of land as determined by the criteria in 23 C.F.R. § 774.15. A constructive use of a Section 4(f) resource occurs when the transportation project does not incorporate land from the Section 4(f) resource, but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the resource are substantially diminished (23 C.F.R. § 774.15).

Resources afforded protection under Section 4(f) were identified through coordination with the NH State Historic Preservation Office (SHPO) and Federal Highway Administration (FHWA), as well as local organizations, local officials, and the public. Section 4(f) resources in the project area consist of properties eligible for the National Register of Historic Places and publicly owned recreation areas. There are no wildlife or waterfowl refuges in the project area.

This Section 4(f) Evaluation provides the required documentation to demonstrate that there is no prudent and feasible alternative to the use of Section 4(f) resources. This

evaluation also outlines coordination that has occurred, and the measures proposed to minimize harm to these resources.

## 5.2 Purpose & Need

### Purpose

The purpose of the Interstate Route 93 Bow-Concord project is to address the existing and future transportation needs for all users of this 4.5-mile segment of I-93, while balancing the needs of the surrounding communities, by providing a safe and efficient transportation corridor for people, goods, and services.

### Need

The need for this project is demonstrated by deficiencies in capacity that result in increased congestion and increased travel times, as well as geometric deficiencies that create safety concerns. The project need is described in detail in Section 1.7.2 of the Environmental Assessment.

## 5.3 Existing Conditions

The segment of I-93 under study is located in central New Hampshire within the Town of Bow and the City of Concord, Merrimack County. This 4.5-mile segment of I-93 and the adjoining land area comprises the I-93 study area. The study area is depicted on **Figure 1.1**. This section of I-93 extends from south of the I-89/I-93 Interchange to north of I-393 where I-93 crosses over the Merrimack River. I-93 is a limited (fully controlled) access highway originally constructed in the late 1950s and early 1960s. This segment of I-93 is fed by a network of state and local roadways. Major roads include I-89, NH Route 3A, US Route 3 (Manchester/Water Street), NH Route 9 (Loudon Road), and I-393.

### 5.3.1 Capacity Concerns

I-93 through Bow and Concord is a four-lane divided urban principal arterial highway, a major roadway whose primary purpose is to move high volumes of traffic, with limited access provided only at interchanges. An additional lane exists southbound from Exit 12 and extends south of I-89. South of the project limits, I-93 is a six-lane divided urban arterial highway. The posted speed limit within the project area is 55 miles per hour (mph). The design speed within the project limits varies but exceeds 60 mph in most cases. The 60-mph design speed is acceptable for urban freeways according to the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Design Standards – Interstate System* and *A Policy on Geometric Design of Highways and Streets*.

I-93, as originally constructed in the late 1950s and early 1960s, was expected to carry 20,000 vehicles per day within its design life of 20 years. This 4.5-mile segment now serves almost 75,000 vehicles per day with peak summer travel at over 85,000 vehicles

per day. While the traffic on I-93 has leveled over the last decade, 2016 had the highest AADT on record.

Just south of the I-93/I-89 Interchange, I-93 is reduced from six lanes to four lanes. This lane reduction, coupled with the traffic from I-89, results in congestion on I-93 entering and through Concord during peak periods. The traffic backup on northbound I-93 during peak periods can stretch as far south as the Hooksett Toll Booth, a distance of about seven miles from the interchange. The traffic backup on southbound I-93 during peak periods can stretch as far north as Exit 17, a distance of about five miles from the Merrimack River.

There are seven existing interchanges within the project limits. Details of each, as well as additional details on the roadway network, are provided in Section 1.4 of the Environmental Assessment.

### **5.3.2 Safety and Roadway Geometry Issues**

There are several safety issues that exist along I-93 within the project limits. Many of these issues are to be expected with a transportation system that is approaching 60 years of age. The primary safety concerns involve inadequate weaving lengths and inadequate deceleration distances at exit ramps.

Inadequate weaving lengths occur in several places and are a result of interchanges located too close to one another. Inadequate deceleration distances exist at all four exit ramps at Exit 12. The four exit ramps have curved geometry with posted speed limits of 25 mph. The exit ramps leading to these curves are not of sufficient length for vehicles to comfortably decelerate outside the main flow of traffic on I-93 from 55 mph to 25 mph.

For the ten-year period from January 2007 to December 2016, a total of 2,195 crashes were reported to the NHDOT within the study area limits. These crashes occurred on I-93, I-89, I-393, the on and off ramps to each interstate, the intersections where the ramps terminate with other roadways, and these other roadways, all within the project limits. Of the 2,195 crashes, 512 resulted in 622 injuries, and there were 6 fatalities.

Section 1.6 of the Environmental Assessment provides additional information on safety concerns.

## 5.4 Overview of Build Alternatives

Within the project area there are seven full access interchanges that would be impacted by the widening of I-93. Each of these interchanges has its own issues and deficiencies that must be addressed to fully meet the project's purpose and need. Some of these interchanges are in close proximity to each other and must be evaluated together due to their interaction. Therefore, for the purposes of alternatives development, the project area has been separated into four segments:

- I-89 Area (Includes Exit 1 on I-89)
- Exit 12 Area
- Exit 13 Area
- Exit 14/15 Area (Includes Exit 1 on I-393)

Chapter 2 of the Environmental Assessment describes the multi-phased development of alternatives. The final range of build concepts that was considered is summarized below in **Table 5.1 Range of Build Alternatives**.

All build alternatives developed for the project include the widening of I-93 to a basic six-lane interstate from south of I-89 through Exit 15, as well as auxiliary lanes between interchanges.

**Table 5.1 Range of Build Alternatives**

Segment	Concept	Description
I-89 Area	C	Shifted I-89 Exit 1.
	K (Preferred)	Eliminate weaving between I-89 Exit 1 and I-93.
	P	Same as Concept K with all directional ramps between I-89 and I-93.
Exit 12 Area	E	Partial cloverleaf with signalized intersections.
	F (Preferred)	Partial cloverleaf with hybrid roundabout intersections.
Exit 13 Area	A	Retain Exit 13 with new signal for northbound exit ramp.
	B (Preferred)	Retain Exit 13 with new signal and dual right turn for northbound exit ramp.
Exit 14/15 Area	D2	Retain Exit 14 and 15 configurations except eliminate northbound entrance ramp at Exit 14.
	F	SPUI <sup>1</sup> at Exit 14 and cloverstack at Exit 15 with C-D <sup>2</sup> Roads between Exits 14 & 15.
	F2 (Preferred)	Retain Exit 14 configuration except eliminate northbound entrance ramp and cloverstack at Exit 15.
	O3	Flip Exit 14 orientation, depress I-93, directional ramps at Exit 15, C-D Road southbound between Exits 14 & 15.
<sup>1</sup> Single Point Urban Interchange <sup>2</sup> Collector-Distributor Road		

## 5.5 Description of Proposed Action

The proposed action within each project segment is summarized below. More details can be found in Chapter 2 of the Environmental Assessment.

### 5.5.1 – Interstate 89 Area/Exit 1 Concept K

Concept K retains the basic configuration of the I-89 Exit 1 and the I-93/I-89 interchanges; however, it proposes “braided” ramps between the two interchanges. The term “braid” refers to a grade separated crossing that occurs at an acute angle that resembles braids. The braided ramps eliminate the weaving section between the two interchanges. Additional ramps are proposed to allow retention of all the existing accesses, but without the need for vehicles to cross each other in a weave. See **Figure 2.6** for a plan of I-89 Area Concept K.

Concept K proposes a C-D Road for southbound I-89 traffic that would accommodate traffic utilizing Exit 1 and travelling southbound on I-93. The Exit 1 ramp would diverge from the C-D Road, which would continue and cross over the Exit 1 entrance ramp via a bridge. The Exit 1 entrance ramps would later split to accommodate traffic destined for northbound I-93, along I-89 south to the existing loop ramp area, and southbound I-93. Concept K proposes a connector road between Route 3A and South Street to accommodate northbound I-89 traffic. This connector road would provide access to South Street from Bow Junction. The southbound exit ramp from I-93 to northbound I-89 would cross, or braid, the connector road, thereby eliminating the existing northbound weave. A signal would be necessary at the intersection of South Street, the new connector road, and the I-89 northbound ramps. All improvements proposed by Concept K would be accommodated by the recently replaced bridges that carry I-93 over I-89 and the Turkey River as well as the existing bridge that carries the C-D Road over I-89 and the Turkey River. New bridges would be needed to realize the braided ramps for both I-89 segments between I-93 and Exit 1.

Concept K would include construction of a new directional ramp for northbound I-93 to northbound I-89 traffic. The new directional ramp proposed in Concept K would have a 40-mph design speed as compared to the existing loop ramp that has a 25-mph design speed. While the existing northbound C-D Road would remain, a significant portion of the traffic volume in the weave would be diverted since the northbound I-93 to northbound I-89 traffic would use the new directional ramp. The reduced traffic would result in an improvement of the weave from LOS F/F to LOS D/B by 2035. The existing loop would be reconfigured to terminate at the new connector road, which would provide an access route to Bow Junction from I-93 that currently does not exist. This connection also perpetuates the connection for northbound I-93 traffic to access South Street.

Providing the new directional ramp for northbound I-93 to northbound I-89 traffic would result in the elimination of the direct connection of the I-89 extension to Bow Junction. This traffic could still access Bow Junction, but would have a longer route to do so, using Exit 1 on I-89, Exit 12 on I-93, or the proposed I-93/I-89 interchange. This diversion of traffic is of concern, including for local businesses, as Route 3A is a truck route and many trucks use the Bow Junction intersection to access I-89. The additional traffic on South Street and Logging Hill Road would require that both Exit 1 ramp intersections be signalized. Improvements to Logging Hill Road would also be included to provide adequate sight distance near the southbound ramps intersection.

There are two structures within the I-89/Exit 1 Area that do not need to be modified to accommodate Concept K, but which would have routine preservation work conducted by the project. Routine preservation includes, but is not limited to, new pavement, new joints and protective membrane for bridges and concrete repairs for the culvert. The structures are:

- I-93 northbound C-D Road bridge over I-89 and the Turkey River
- I-89 over the Turkey River (box culvert)

Retaining walls would be required along several of the ramps to minimize property impacts and impacts to the Turkey River. These walls would be between 6 feet and 25 feet in height and would be adjacent to homes and businesses.

The total cost for Concept K is estimated at \$70.0 million.

### **5.5.2 – Exit 12 Area Concept F**

This alternative would consist of a partial cloverleaf with single exit and entrance ramps as hybrid roundabouts. A hybrid roundabout is one that has some two-lane movements and some one-lane movements. The southbound Route 3A traffic would have two lanes and the northbound traffic would have one lane. The northbound ramp intersection roundabout would also include a slip ramp for northbound Route 3A traffic entering northbound I-93. See **Figure 2.10** for a plan of Exit 12 Area Concept F.

The LOS at the southbound intersection roundabout would be LOS A/C and the northbound intersection roundabout would be LOS B/B by 2035.

Retaining walls would be required along southbound I-93 near the South End Marsh to avoid impacts to the City of Concord's sewer main and wetlands. Retaining walls would be required along the northbound entrance ramp to avoid impacts to the railroad, wetlands, and an existing wetland mitigation site.

The sidewalk along the west side of Route 3A would be retained. Also, shoulder/bike lanes would be provided in both directions of Route 3A within the project limits.

The total cost for Concept F is estimated at \$33.9 million.

### **5.5.3 – Exit 13 Area Concept B**

Concept B proposes retaining the existing configuration of Exit 13 with widening the northbound exit ramp to Manchester Street and the right turn would be signalized. The widening of the ramp would allow for a dual right turn onto Manchester Street to address the heavy volume of traffic. The backup issue on the ramp would be eliminated. See **Figure 2.13** for a plan of Exit 13 Area Concept B.

The widening of the ramp requires an approximately 160-foot bridge from the shore connecting to the existing bridge that carries Manchester Street over the Merrimack River. Property acquisition is also required. The existing bridge can accommodate the proposed ramp bridge. Retaining walls would also be required to avoid impacts to the river.

The total cost for Concept B is estimated at \$39.0 million. Most of the cost for the Exit 13 Area Concept B is for the widening of I-93.

### 5.5.4 – Exit 14/15 Area Concept F2

Concept F2 includes a modified diamond interchange at Exit 14 where the northbound entrance ramp would be eliminated. The elimination of the entrance ramp at Exit 14 would also eliminate the northbound weave between Exits 14 and 15. This alternative would also include a southbound C-D Road between Exits 14 and 15, and a cloverstack interchange at Exit 15 where two of the loop ramps would be eliminated. The directional ramps for Concept F2 would have a design speed of 30 mph in order to eliminate impacts to the bus depot on Stickney Avenue. See **Figure 2.18** for a plan of Exit 14/15 Area Concept F2.

A retaining wall would be required along the east side I-93 south of Exit 14 at the “pinch point” to avoid impacts to the Merrimack River.

The total cost for Concept F2 is estimated at \$125.0 million.

### 5.6 Description of Section 4(f) Properties

The project area contains publicly owned recreation trails and twelve historic sites located in three of the four project segments. Properties are listed in **Table 5.2** and shown in **Figure 5-1 Section 4(f) Resources Overview**. Refer to **Figures 5.2 to 5.10** for details on each 4(f) resource.

Historic properties within and adjacent to the project area consist of nine residential and commercial buildings and three historic districts. All are eligible for listing on the National Register. Each property is described in detail in inventory forms that are on file at the SHPO and NHDOT.

The project area contains two public recreational trail systems. The first trail system is a two-mile trail network located within Healy and Terrill Parks. A paved bicycle/pedestrian path located off Manchester Street at Exit 13 provides access to this trail system. The second trail system consists of approximately 3 miles of trails located between Exits 15 and 16 and includes both off-road and on-road sections of the New Hampshire Heritage Trail. Only a portion of this trail system is located within the project area. One trail segment starts off College Drive along the Merrimack River, continues on Institute Drive on the NHTI campus, crosses over I-93 on Delta Drive, and continues on Commercial Street along Horseshoe Pond. Another section of the Heritage Trail continues along the bike path that crosses the river between Delta Drive and Portsmouth Street. All sections of the Heritage Trail within the project area follow roads and a paved bicycle/pedestrian path that are all part of the existing transportation network. The Heritage Trail is a Statewide initiative that started in 1988 and seeks to provide a continuous trail corridor through New Hampshire from Massachusetts to Canada. It is the responsibility of communities along the corridor to identify and designate local trail segments. Currently, the Heritage Trail exists in only a few communities, and the segments in Concord remain discontinuous within the City.



The project also contains sections of paved bicycle/pedestrian paths that were constructed as part the interstate system to provide multi-modal connectivity. These segments are not continuous through the project area and do not function as recreational sites. One section of path is located in Bow at the I-89/I-93 interchange. The path starts at the end of Valley Street, which once connected to Route 3A prior to the construction of I-89. This path was constructed with the interstate to restore that connectivity for pedestrians and bicyclists. The path is within the I-89 ROW and is part of the transportation network. The Town of Bow identifies this bike path as a proposed connection to a proposed section of the Heritage Trail; however, the town has not begun any implementation of establishing the Heritage Trail and does not currently own or maintain the path. The path is not identified as a destination for recreation and was not constructed for recreation. There is no indication that the path could be considered a significant public recreational resource and, therefore, is not subject to Section 4(f) protection.

## 5.7 Impacts to Section 4(f) Properties

### 5.7.1 Historic Sites

**Table 5.2 Section 4(f) Impacts from Proposed Alternative** provides a summary of impacts, as well as avoidance and minimization measures.

Effects on historic properties were determined by the FHWA, NHDOT, and SHPO based on the Section 106 review process established by the National Historic Preservation Act of 1966 and outlined at 36 CFR 800.9. Based on that review, it has been determined that the proposed action would result in an adverse effect to two historic properties: Lamora's Garage and House and the Upton House and Store.

The proposed alternative would result in full or partial acquisition of three historic properties (Lamora's Garage and House; NH Highway Garage Historic District; and the NH Technical Institute Historic District) and would require permanent easements on one historic property (Boston, Concord & Montreal Railroad Historic District), resulting in a direct use of these 4(f) resources from the permanent incorporation of land into the transportation facility.

The proposed alternative would result in temporary impacts to two historic resources: The Concord Shoe Company/Ralph Pill Building and the Concord Electric Light Station. The boundary for each of these National Register eligible resources is each building and its immediate surroundings. It has been determined that impacts to both resources would meet the criteria for a temporary occupancy exception and, therefore, would not constitute a 4(f) use. According to 23 CFR 774.13(d), a temporary occupancy does not constitute a Section 4(f) use when all of the following conditions are satisfied:

- 1) Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

- 2) Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;
- 3) There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;
- 4) The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and
- 5) There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

Loudon Road would be approximately seven feet closer to the Ralph Pill Building and eight feet closer to the Concord Electric Light Station but would remain within the existing Bridge Street right-of-way. Temporary impacts would be required for minor modifications to the shared driveway into the property on which these two resources are located. The duration of this work would be less than the time needed for construction of the project. The proposed driveway modifications would not require the purchase of property or permanent easements. This work would result in negligible change to the shared driveway and no adverse impacts to the features, activities, or attributes that make the resources eligible for the National Register. The driveway would be fully restored and repaved. The concurrence of the SHPO is documented in the Section 106 effect memo.

### **5.7.2 Parks and Recreation Areas**

The proposed project would temporarily impact recreational trails. The first impact consists of the relocation of a 20 to 30 foot section of path within the Healy Park trail system. The trail would be relocated approximately 10 feet to the east to accommodate the widening of the Exit 13 NB off-ramp widening. The City of Concord Planning Department has no concerns with the proposed relocation (Appendix B, Exhibit 19). Trail connectivity would be maintained, and the proposed relocation would not constitute a 4(f) use.

The second impact consists of the replacement of the Delta Drive bridge over I-93. The bridge is on a section of an on-street trail identified as part of the Heritage Trail by the City of Concord. Although the City has designated the sidewalk on this bridge as part of the Heritage Trail, it is part of the local transportation system and functions primarily for transportation. Therefore, this section of the Heritage Trail is not subject to Section 4(f) protection and the proposed bridge replacement would not constitute a 4(f) use.

### **5.7.3 De Minimis Impact Determinations**

The FHWA has made a *de minimis* impact finding for proposed impacts on three historic properties: the Boston, Concord, & Montreal Railroad Historic District; the NH Highway Garage Complex; and the NH Technical Institute Historic District. A *de minimis* impact is one that, after taking into account any measures to minimize harm (such as avoidance,

minimization, mitigation, or enhancement measures), results in either: 1) a Section 106 finding of no adverse effect or no historic properties affected on a historic property; or 2) a determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or refuge for protection under Section 4(f).

Avoidance and minimization measures that were relied upon to make the *de minimis* impact findings are summarized in Table 5.2.

The concurrence of the SHPO is documented in the Section 106 effect memo (Appendix B).

Table 5.2 Section 4(f) Impacts from Proposed Alternative

Property	Project Segment	Property Location	Size of Property	Section 106 Effect Finding	Impact	Section 4(f) Use	Measures to Minimize Harm	Section 4(f) de minimis Impact Finding
<b>Historic Sites</b>								
Lamora's Garage and House	I-89	521 South St/1 Valley Rd, Bow	0.31 ac	Adverse Effect	Full acquisition	Permanent Incorporation	Impacts could not be minimized or avoided.	N/A
Upton House and Store	I-89	2 Valley Rd, Bow	0.5 ac	Adverse Effect	Visual setting	No Use – The impact to the visual setting would not result in substantial impairment to the property's activities, features, or attributes that make this property eligible for the National Register.	Direct use of the property was avoided; a new ramp would be located approximately 20' from the property boundary at its nearest point. A potential mitigation measure would consist of providing an aesthetic façade on the retaining wall.	N/A
8 Logging Hill Road	I-89	8 Logging Hill Rd, Bow	1.4 ac	No Effect	No Impact	No Use	All work near this resource would be limited to the existing right-of-way and will entail only minor roadway improvements.	N/A
Boston, Concord, & Montreal RR Historic District	Exit 14/15	Concord (adjacent to I-93 SB)	1.63 mi	No Adverse Effect	Permanent easement for slope grading and/or utilities (strip easement up to 1,500 linear feet)	Permanent Incorporation	Impacts to the rail line and associated structures were avoided.	De minimis
NH Highway Garage Complex Historic District	Exit 14/15	Stickney Ave, Concord	6.08 ac	No Adverse Effect	Partial acquisition for slope grading, sidewalk relocation (250 sq ft)	Permanent Incorporation	Impacts to the buildings on this property were avoided.	De minimis
NH Technical Institute Historic District	Exit 14/15	31 College Dr, Concord	196 ac	No Adverse Effect	Partial acquisition or permanent easements for slope grading and stormwater BMP (1.8 ac); proposed noise wall adjacent to property	Permanent Incorporation	All impacts will be located along the perimeter of the property and no buildings will be impacted. The proposed stormwater treatment area would be more than 1,000' from the campus buildings. The proposed noise wall would be located within existing right-of-way and NHDOT would continue to consult with the NHTI on an appropriate design and aesthetic treatment for the wall.	De minimis
Concord Shoe Company/Ralph Pill Building	Exit 14/15	22 Bridge St, Concord	Building and immediate surroundings	No Adverse Effect	Temporary impacts for driveway modifications	No Use - Exception for temporary occupancy	Loudon Road would be approximately 7' closer to the resource but would remain within the existing Bridge St. right-of-way. Driveway modifications would extend onto the property on which the resource is located.	N/A
Concord Electric Light Station	Exit 14/15	24 Bridge St, Concord	Building and immediate surroundings	No Adverse Effect	Temporary impacts for driveway modifications	No Use - Exception for temporary occupancy	Loudon Road would be approximately 8' closer to the resource but would remain within the existing Bridge St. right-of-way. Driveway modifications would extend onto the property on which the resource is located.	N/A
Robert J. Hart Building	Exit 14/15	50 Storrs St	3.49 ac	No Effect	No Impact	No Use	Project activities would be over 150' from this property.	N/A
207 North Main Street	Exit 14/15	207 North Main St, Concord	0.95 ac	No Effect	No Impact	No Use	Project activities would be over 1,200' from this property.	N/A
Carrigain House	Exit 14/15	224-246 North Main St, Concord	0.47 ac	No Effect	No Impact	No Use	Project activities would be over 1,200' from this property.	N/A
Rumford Arms	Exit 14/15	248-250 North Main St, Concord	0.75 ac	No Effect	No Impact	No Use	Project activities would be over 1,000' from this property.	N/A
<b>Public Recreation Areas</b>								
Bike/Pedestrian Path	Exit 13	Concord	2 mi	N/A	Relocation	No Use	Approx. 20'-30' of trail will be relocated approx. 10'. The continuity of the trail will be preserved	N/A
East Concord Heritage Trail	Exit 14/15	Concord	3 mi	N/A	Bridge replacement	No Use	The portion of the trail that will be impacted by the project consists of an existing public road and sidewalk (Delta Drive); the proposed bridge replacement on this road does not constitute a 4(f) use.	N/A

## 5.8 Avoidance Alternatives

An avoidance alternative is prudent and feasible if it avoids using the Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. An avoidance alternative is not feasible if it cannot be built as a matter of sound engineering judgment. According to 23 CFR 774.117, an alternative is not prudent if:

- (i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need (i.e., the alternative doesn't address the purpose and need of the project);
- (ii) It results in unacceptable safety or operational problems;
- (iii) After reasonable mitigation, it still causes:
  - (a) Severe social, economic, or environmental impacts;
  - (b) Severe disruption to established communities;
  - (c) Severe disproportionate impacts to minority or low income populations;
  - (d) Severe impacts to environmental resources protected under other Federal statutes;
- (iv) It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
- (v) It causes other unique problems or unusual factors; or
- (vi) It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

A variety of concepts were studied in the Part A *Summary/Classification Report for the Bow-Concord Interstate 93 Transportation Planning Study*. While many of these alternatives would avoid the use of the Section 4(f) resources described in this Section 4(f) Evaluation, they would result in the use of Section 4(f) resources located elsewhere along the corridor and would increase impacts to other protected resources.

The only project segment where more than a *de minimis* impact to Section 4(f) resources would occur under the proposed action is the I-89 Area. Alternatives that would avoid the use of Section 4(f) resources within the I-89 Area are described below.

*De minimis* use of Section 4(f) resources occurs in three of the four project segments. A *de minimis* impact determination is made after consideration of measures that have been incorporated into the project to minimize harm to the 4(f) resource. A use of Section 4(f) property having a *de minimis* impact can be approved by FHWA without the need to develop and evaluate alternatives that would avoid using the Section 4(f) property. For these reasons, avoidance alternatives are not included below for properties with *de minimis* impacts. Measures to minimize harm are summarized in Table 5.2.

## **5.8.1 Corridor Alternatives**

### **5.8.1.1 – No Build**

The No Build alternative assumes that no improvements would be made to the I-93 corridor or its interchanges to address capacity and operational issues within the project area. It is assumed that traffic volumes for the corridor would continue to increase based on projections prepared by the Central NH Regional Planning Commission (CNRPC), and the increased volumes would result in increased congestion, especially during peak periods. Crashes would likely increase with the higher traffic volumes and existing deficiencies. Other aspects of the No Build alternative include the continued deterioration of Red List and other bridges.

This alternative would not address safety or capacity concerns in the corridor and would, therefore, not meet the purpose and need of the project. For these reasons, the no build alternative is not a feasible and prudent avoidance alternative and was eliminated from further consideration.

### **5.8.1.2 – Passenger Rail Service**

There is currently no passenger rail service in the Concord region. Although a rail corridor exists for freight service, implementing passenger service would require large-scale, regional improvements to the rail line itself and to stations that would provide access to the line. For the purpose of this Section 4(f) Evaluation, it is assumed that these improvements would not necessitate the use of 4(f) resources.

The only passenger rail service currently in New Hampshire is Amtrak's Downeaster between Boston, MA and Portland, ME, which has stops in Exeter and Durham, NH, and the Vermonter between Washington, DC and St. Albans, VT, which has a stop in Claremont, NH. The potential for passenger rail from the Massachusetts border to Manchester has been under regional study but has not been actively pursued to date. Although passenger rail would address a portion of the congestion projected for the corridor, it would not address it completely. With a system-wide 10% reduction in trips, which would represent a highly successful transit/rail system, traffic model results indicate that there is enough background demand that congestion along I-93 would only marginally diminish. This alternative would also not address existing safety concerns that result from geometric deficiencies and would not fully meet the purpose and need of the project. For these reasons, this alternative is not a feasible and prudent avoidance alternative and was eliminated from further consideration.

### **5.8.1.3 – Travel Demand Management/Travel System Management**

Travel Demand Management (TDM) strategies aim to reduce the demand for travel during peak travel periods such as the morning and afternoon commuting times, rather than increase the capacity of the transportation system. These strategies require changing travel behavior during peak travel periods to reduce the number of vehicles on the road. By eliminating trips, shortening trips, or shifting trips out of the peak periods,

there is less demand for the transportation network to accommodate. Typical TDM strategies include:

- Expanded Transit Service
- Park and Ride Facilities
- Work from Home
- Flexible Work Hours
- Toll Pricing
- Increased Law Enforcement
- High Occupancy Vehicle Lanes
- Car-Pooling

Transportation Systems Management (TSM) refers to low cost easy to implement measures to address safety and congestions issues. These measures typically can be implemented without significant impacts or cost. Typical TSM measures include:

- Intelligent Transportation Systems
- Ramp Metering
- New Traffic Signals
- Re-timing Traffic Signals
- Turn Lanes
- New Lane Striping
- Signage

On their own, these strategies do not fully address safety, capacity, and mobility concerns in the corridor. Therefore, TDM/TSM strategies do not constitute a feasible and prudent avoidance alternative. Although eliminated from further consideration as an avoidance alternative, TDM/TSM strategies have been incorporated into the proposed alternative where practicable.

## 5.8.2 Interstate 89/Exit 1 Area Alternatives

### 5.8.2.1 – Interstate 89/Exit 1 Area Concept C

Concept C proposes shifting Exit 1 further to the west to lengthen the weave between Exit 1 and the I-93 ramps to approximately 1,000 feet, which is less than the 2,000 feet recommended by AASHTO. Providing a longer weaving length does improve the operations of both the northbound and southbound weaves. The southbound weave would improve from LOS F/E to LOS D/C in 2035. The northbound weave would improve from LOS F/E to LOS B/B in 2035. Concept C does not address the weave for the northbound C-D Road within the I-93/I-89 Interchange. This concept replaces the I-89 Bridge over South Street, which is on the Red List. See **Figure 2.5** for a plan of I-89 Area Concept C.

The total cost for Concept C is estimated at \$34.1 million.

The Upton House & Store, and Lamora's Garage and House would not be impacted. This alternative would, however, impact approximately 10 acres of Cilley State Forest, which is a substantial increase in impacts to this conservation land. Furthermore, this alternative would not address one weave, which would perpetuate safety concerns at that location and would not fully meet the project's purpose and need.

For these reasons, this alternative is not a feasible and prudent avoidance alternative and was eliminated from further consideration.

### 5.8.3 Avoidance Alternatives Summary

There are no feasible and prudent alternatives to the use of Lamora's Garage and House, a property that qualifies for protection under Section 4(f) as a National Register-eligible historic site.

## 5.9 Use Alternatives

Only alternatives considered for the I-89 Area are included below, since this is the only project segment with more than *de minimis* impacts to Section 4(f) resources. For detailed descriptions of alternatives considered for the remaining project segments, see Chapter 2.

### 5.9.1 Interstate 89/Exit 1 Area Concept P

Concept P is identical to Concept K (Proposed Action) except that it proposes new 50 mph directional ramps to replace both loop ramps at the I-93/I-89 Interchange. The northbound I-93 to northbound I-89 directional ramp proposed in Concept K would have a 40-mph design speed. All of the results discussed above in Section 5.5.1 for Concept K, concerning Exit 1 and the weaving between Exit 1 and I-93, would be the same for Concept P. The proposed southbound I-89 to northbound I-93 directional ramp would be a third level flyover bridge. See **Figure 2.7** for a plan of I-89 Area Concept P.

The new directional ramps at the I-93/I-89 Interchange eliminate the need for the existing C-D Road and eliminate the weave within the interchange. Concept P also proposes a ramp off the northbound I-93 to northbound I-89 ramp to the new connector road. This provides access to Bow Junction from I-93 that currently does not exist. The area once utilized for the northbound I-93 to northbound I-89 loop ramp could be used as a Park and Ride lot as shown in the plan for Concept P, **Figure 2.7**.

Retaining walls would be required along several of the ramps to minimize impacts to properties and impacts to the Turkey River. These walls would be between 6 feet and 25 feet in height and would be adjacent to homes and businesses. The proposed flyover ramp for Concept P would require a 40-foot high retaining wall along I-89 to allow the flyover ramp to rise adjacent to I-89. A retaining wall would also be required along I-93 northbound to minimize impacts to properties and impacts to Bow Brook. This alternative would result in the same impacts to the Upton House & Store and Lamora's Garage and House as Concept K. This alternative would more than double wetland impacts.

The total cost for Concept P is estimated at \$92.8 million.



## 5.10 Least Harm Analysis

No feasible and prudent alternative exists that would avoid the use of Section 4(f) resources in the project area and meet the project's purpose and need. When there are no feasible and prudent alternatives that avoid harm to a Section 4(f) resource, then only the alternative that causes the least overall harm in light of the statute's preservation purpose can be chosen. If the net harm to Section 4(f) resources in all the alternatives considered is equal, then any of the alternatives may be selected. In accordance with 23 CFR 774.3(c)(1), the least overall harm is determined by balancing the following seven factors:

1. Ability to mitigate adverse impacts to each Section 4(f) resource;
2. Relative severity of the remaining harm, after mitigation, to the protected activities and attributes or features;
3. Relative significance of each Section 4(f) property;
4. Views of the officials with jurisdiction over each Section 4(f) property;
5. Degree to which each alternative meets the purpose and need;
6. After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
7. Substantial differences in costs among alternatives.

Each of these seven factors is considered in **Table 5.3 Least Harm Analysis** for the feasible and prudent alternatives that were considered for the I-89 Area.

**Table 5.3 Least Harm Analysis**

Factor	I-89 Area Concept K (Proposed Action)	I-89 Area Concept P
1. Ability to mitigate adverse impacts	Mitigation for adverse impacts to Lamora's Garage & House and the Upton House & Store will be developed through consultation with SHPO and Consulting Parties and will be documented through an MOA signed by NHDOT, FHWA, and SHPO. Specific elements of mitigation have not yet been discussed. Potential mitigation could consist of providing further property documentation of the resources and/or aesthetic design elements.	Mitigation for adverse impacts would consist of the same potential components as would be considered under Concept K.
2. Relative severity of remaining harm after mitigation	This alternative would require the demolition of Lamora's Garage and House. Remaining harm to the Upton House & Store would be minimal since potential aesthetic design elements would reduce impacts to the visual setting of this property.	This alternative would require the demolition of Lamora's Garage and House. Remaining harm to the Upton House & Store would be minimal since potential aesthetic design elements would reduce impacts to the visual setting of this property.
3. Relative significance of each Section 4(f) property	<p>The property on the east side of the road immediately south of I-89 includes a mid-20th century automotive garage (Lamora's Garage) at 521 South Street and a small, late nineteenth century, single family dwelling at 1 Valley Road. The house on this property was built in the 1880s, while the auto service garage was built c. 1947. This appears to be the only known example of auto-centric service needs of this type in the Town of Bow, which is a disappearing business model property type in the state. Although some post-1980 changes have occurred to the building, it retains a high level of integrity through its 1950s expansion and conveys the building's significance under Criterion A. Both buildings on the property contribute to the National Register-eligible property.</p> <p>The Upton House &amp; Store is a well-preserved late 19th-century building. The Queen Anne style dwelling has a basement-level commercial space and an ell with attached carriage barn topped by a cupola. It retains architectural details such as porches, bay windows, patterned cut shingles, stick work and gable ornament. The Upton House &amp; Store is significant under Criteria A and C.</p>	
4. Views of officials with jurisdiction	SHPO concurred that an adverse effect would result from the acquisition of the Lamora's Garage property and the construction of a ramp closer to the Upton House & Store.	SHPO concurred that an adverse effect would result from the acquisition of the Lamora's Garage property and the construction of a ramp closer to the Upton House & Store.
5. Ability to meet purpose and need	Both alternatives fully meet the project's purpose and need.	
6. Magnitude of impacts to non-4(f) resources	This alternative would result in approximately 0.7 acres of wetland impacts, 0.7 acres of impact to Cilley State Forest, and acquisition of 5 full parcels and 14 partial parcels.	This alternative would result in approximately 1.8 acres of wetland impacts, 0.7 acres of impact to Cilley State Forest, and acquisition of 5 full parcels and 16 partial parcels.
7. Substantial cost Differences	\$70.0 million	\$92.8 million

As detailed in Table 5.3, Concept K and Concept P would have the same impacts to two Section 4(f) resources: both alternatives would require the complete demolition of the structures on the Lamora's Garage property, and both alternatives would result in a Section 106 Adverse Effect to the Upton House & Store due to impacts to the visual setting. The most substantial differences between the two alternatives consist of cost and impacts to non-Section 4(f) resources. Concept K would result in less impact to private property and less impact to wetlands. Concept K would also cost \$22.8 million less than Concept P. For these reasons, the I-89 Area Concept K would result in the least overall harm of the feasible and prudent alternatives that were considered for the I-89 Area.

### **5.11 Measures to Minimize Harm**

When there is no feasible and prudent alternative to the use of a Section 4(f) resource, the project must include all possible planning to minimize harm to the Section 4(f) property. The design of the proposed action has been developed with the intent of minimizing the potential impacts to properties that are eligible for the National Register of Historic Places and to public recreational areas. Impacts to ten historic properties have been minimized or avoided altogether. However, it was determined that avoidance of a Section 4(f) adverse use of one historic property was not feasible and prudent.

Measures to minimize harm to each Section 4(f) resource are summarized in Table 5.2.

Much of the proposed widening of I-93 is symmetric, meaning the centerline of the corridor is retained and the widening occurs equally on both sides. This allows the widening to be completed within the existing right-of-way in most areas. Retaining walls are proposed in several locations to avoid additional impacts to environmental and cultural resources and to reduce impacts outside of the existing right-of-way.

Measures to mitigate for the proposed impacts to historic sites will be documented in a Memorandum of Agreement (MOA) that will be submitted to the Advisory Council on Historic Preservation and signed by NHDOT, FHWA, and SHPO.

### **5.12 Coordination & Public Participation**

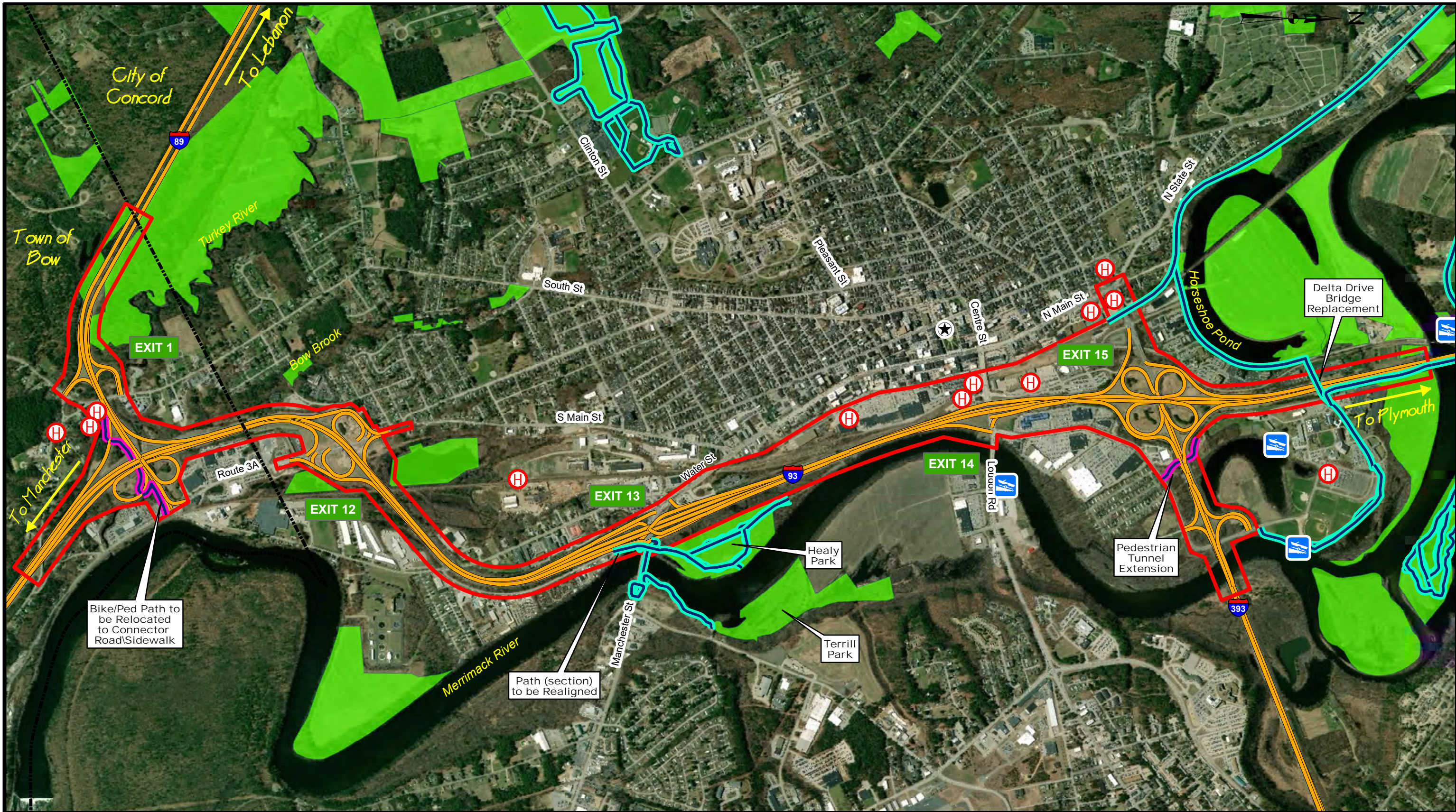
The Department has coordinated with SHPO, FHWA, Consulting Parties, and City officials to discuss alternatives and measures to minimize harm to Section 4(f) resources. To date, the project has been reviewed at seven NHDOT Cultural Resource Agency Coordination Meetings. There has also been extensive public involvement throughout the development of this project. Chapter 7 of the Environmental Assessment summarizes public involvement.

### **5.13 Concluding Statement**

To be completed in the Final 4(f) Evaluation.

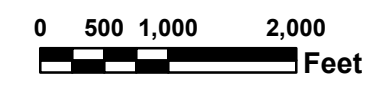


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**Legend**

- State Capital
- Public Water Access
- Bike/Ped Path
- Trails
- Study Area
- Conservation Lands
- Historic Property



U.S. Department of Transportation  
Federal Highway Administration

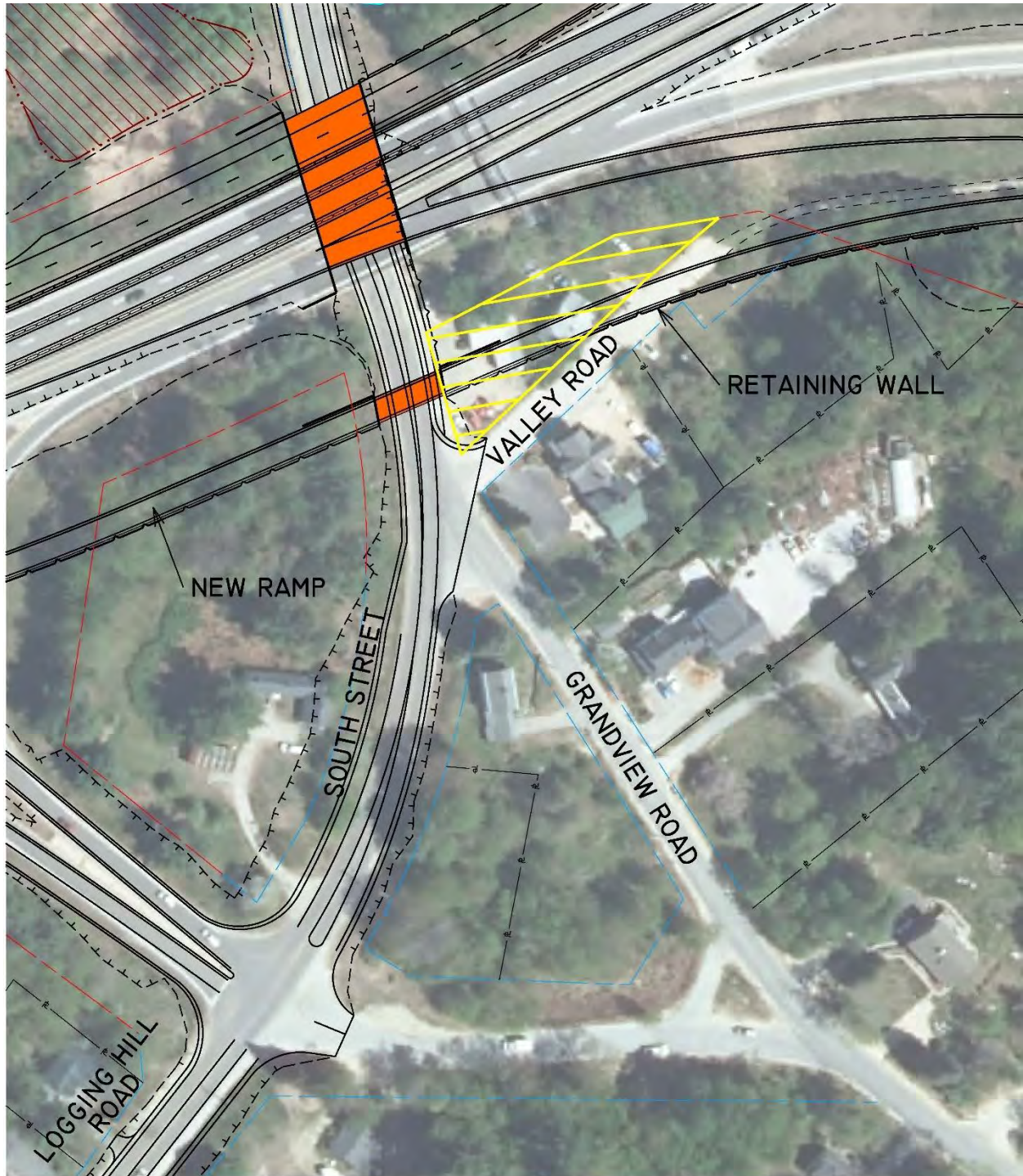
New Hampshire  
**DOT**

McFarland Johnson

<b>BOW-CONCORD I-93 IMPROVEMENTS</b>	
SECTION 4(f) RESOURCES OVERVIEW	
DATE: AUGUST 2018	SCALE: 1"=1500'
FIGURE 5.1	
Page 5.20	



Figure 5.2: Lamora's Garage and House



SECTION 4(f) RESOURCE



PROPOSED BRIDGE



Figure 5.3: Upton House and Store



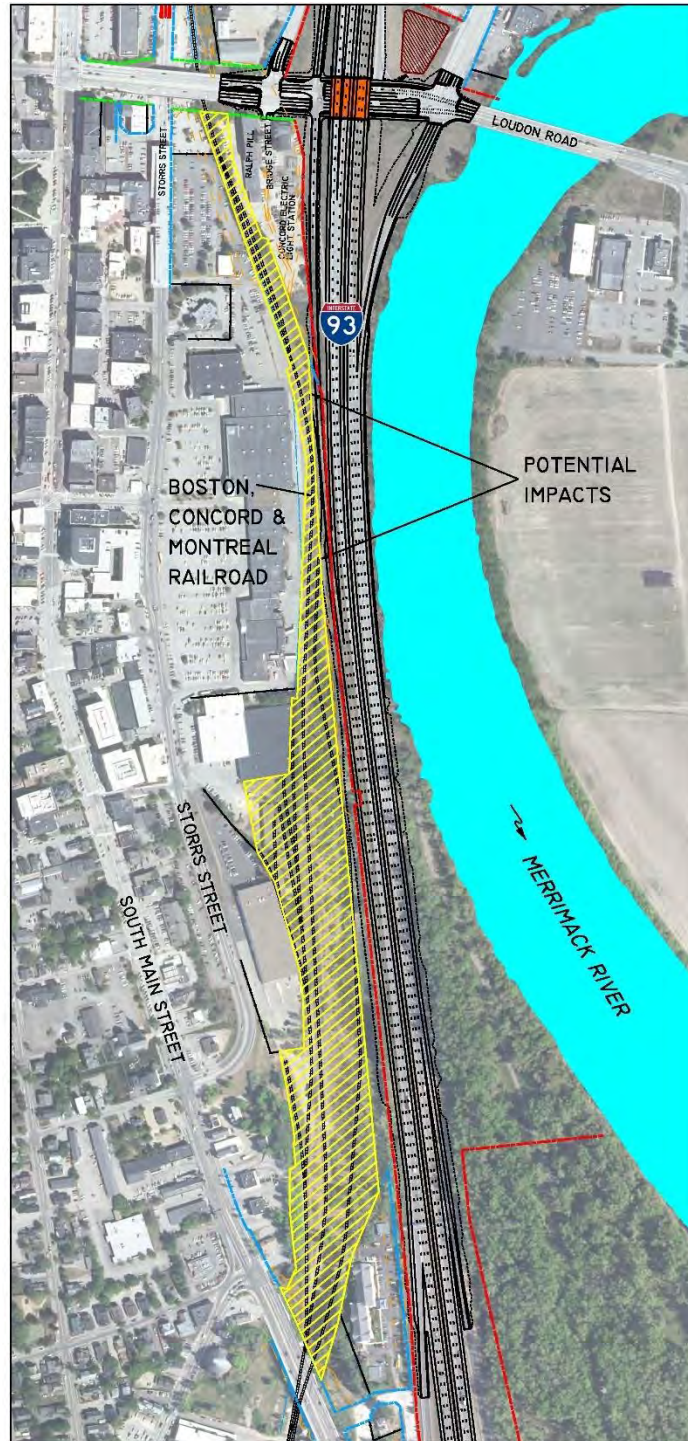
SECTION 4(f) RESOURCE



PROPOSED BRIDGE



Figure 5.4: Boston, Concord, & Montreal Railroad Historic District

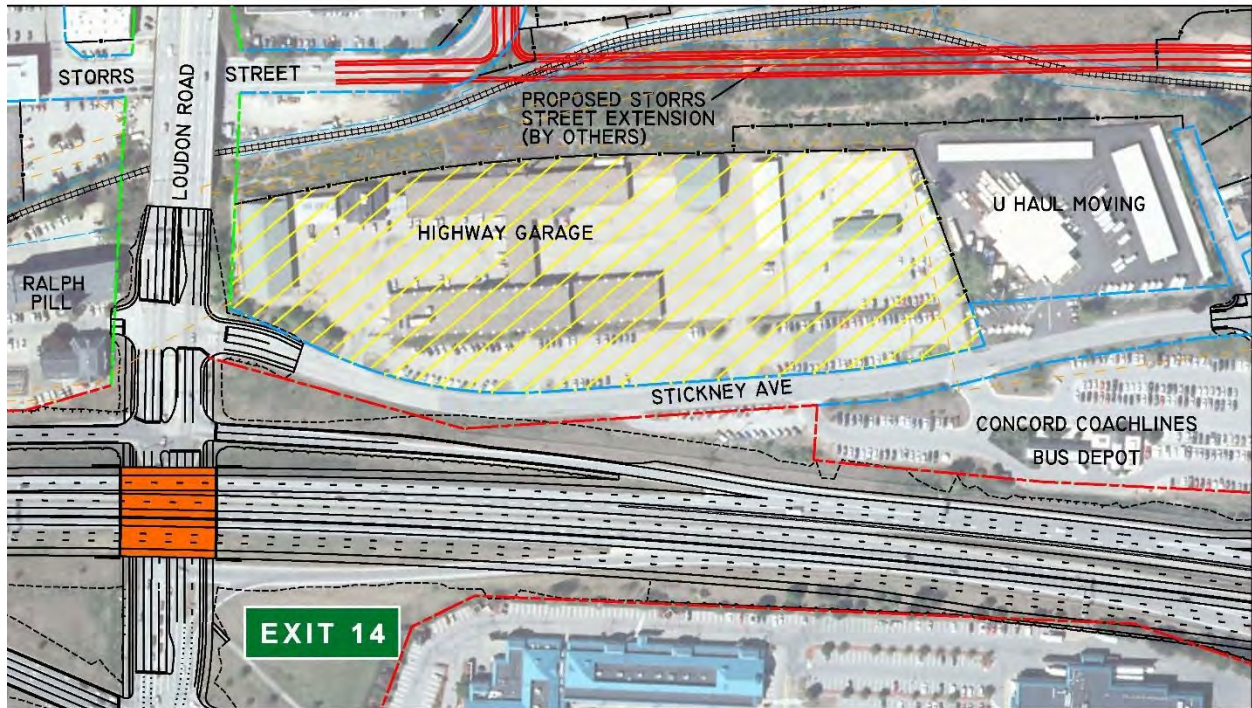


SECTION 4(f) RESOURCE



PROPOSED BRIDGE

**Figure 5.5: NH Highway Garage Complex Historic District**



SECTION 4(f) RESOURCE



PROPOSED BRIDGE



Figure 5.6: NH Technical Institute Historic District



 PROPOSED BRIDGE

Figure 5.7: Concord Shoe Company/Ralph Pill Building

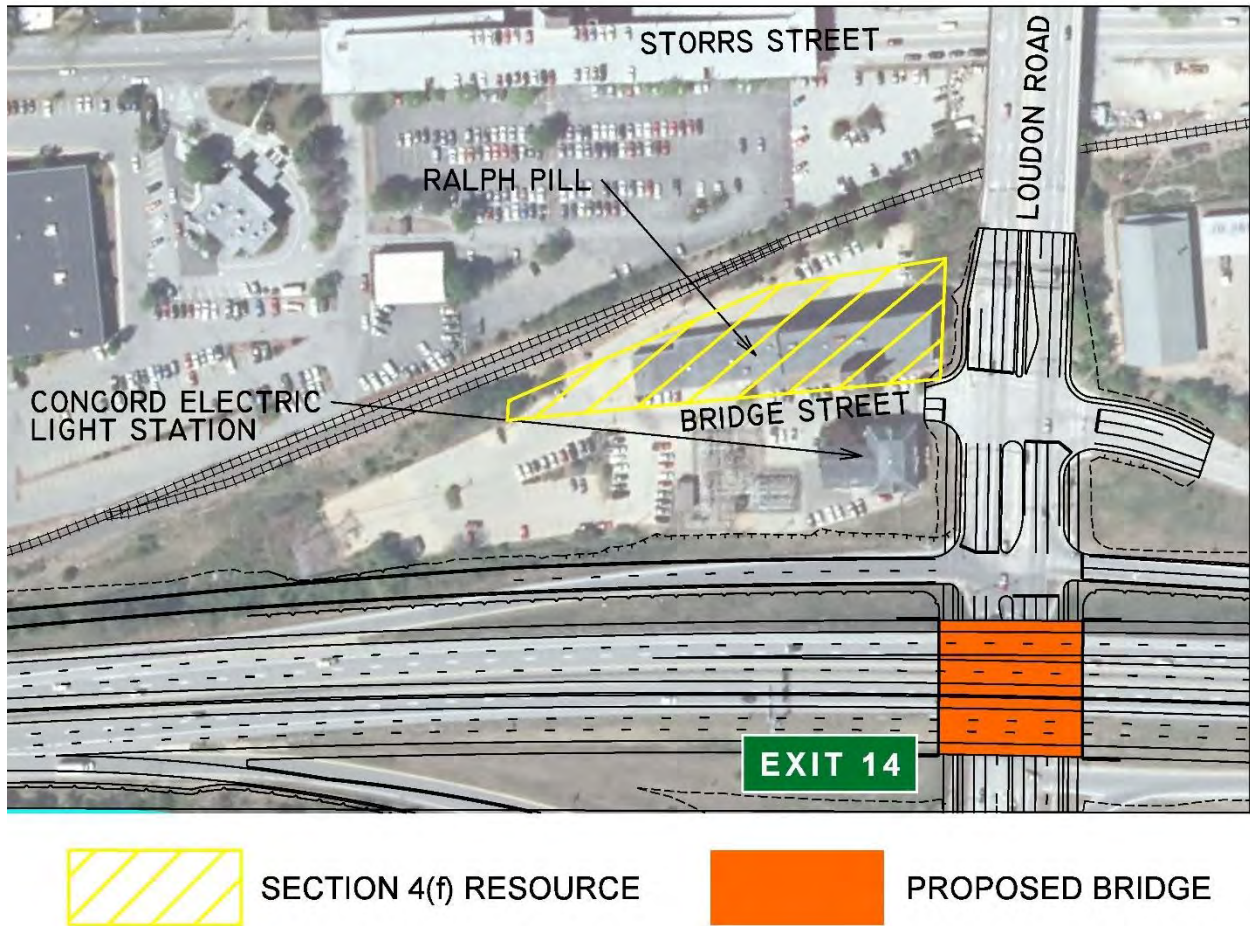




Figure 5.8: Concord Electric Light Station

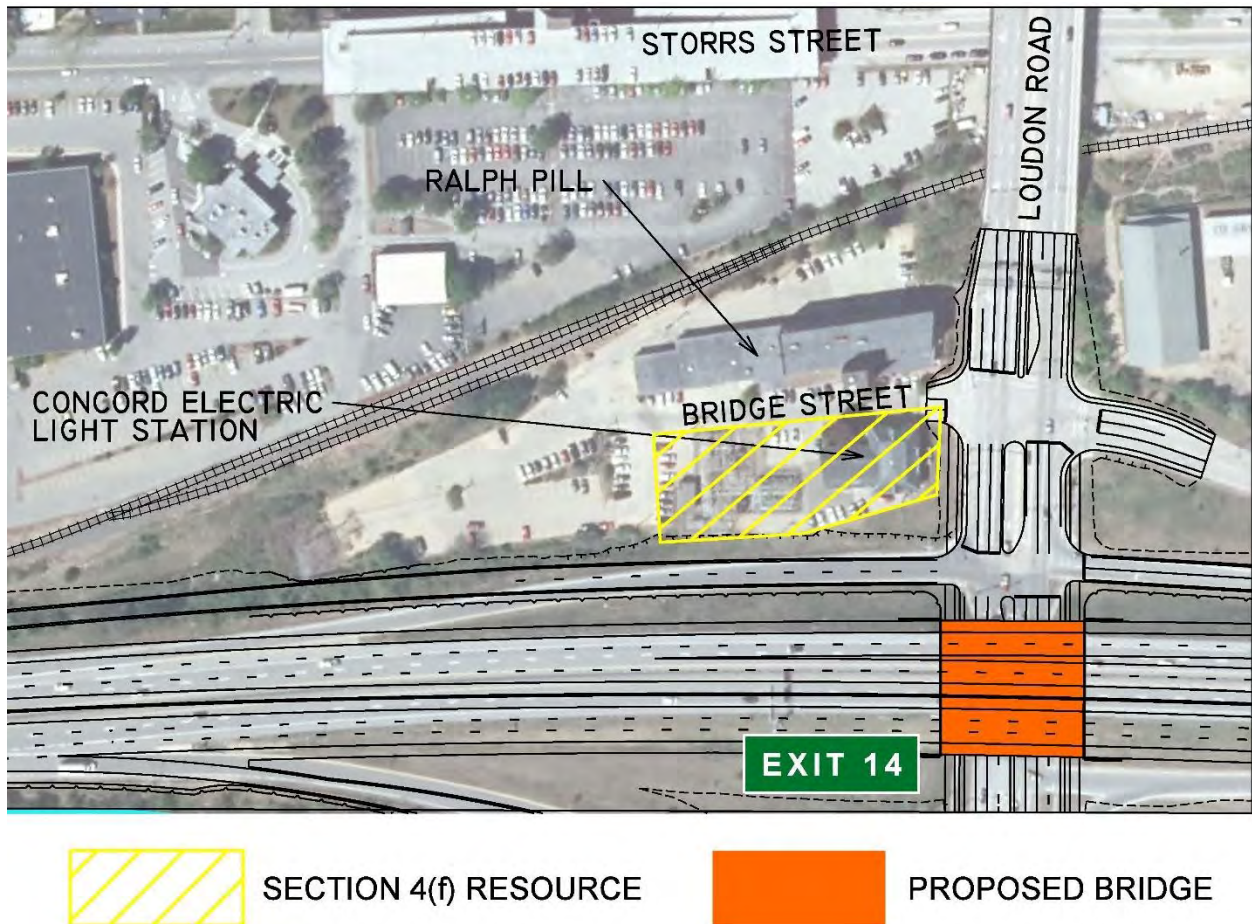


Figure 5.9: Bike/Pedestrian Path

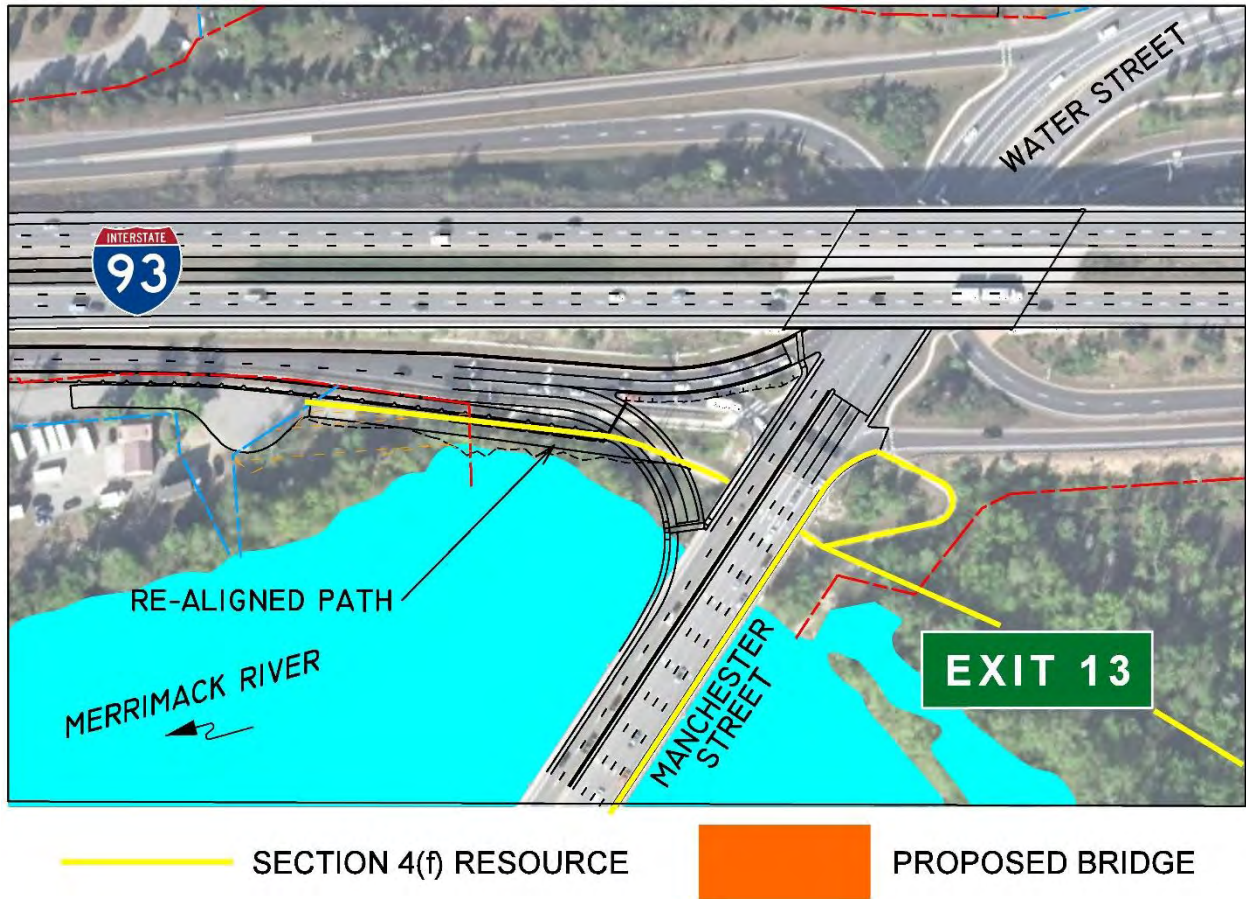
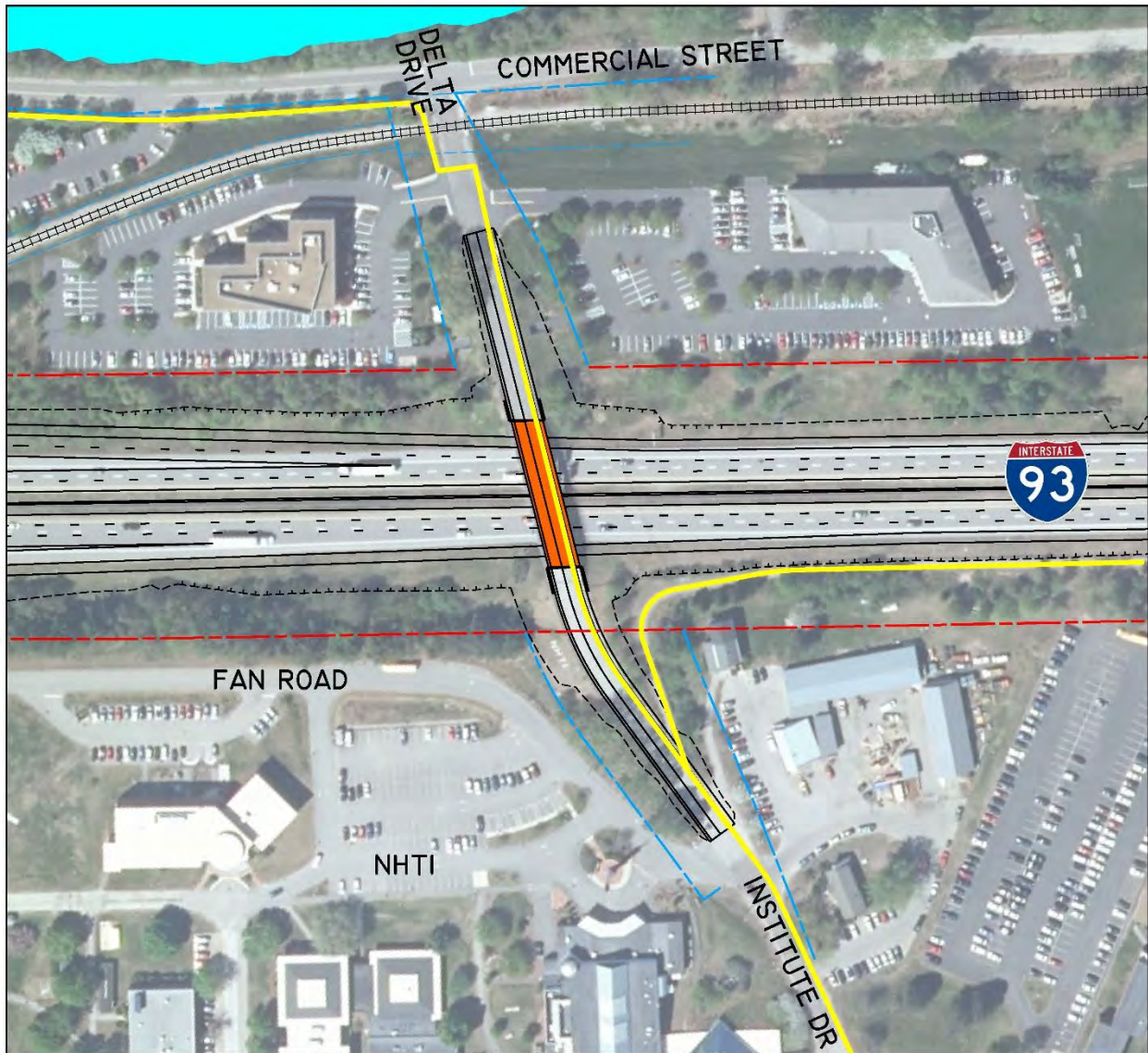




Figure 5.10: East Concord Heritage Trail



SECTION 4 (f) RESOURCE



PROPOSED BRIDGE