



TIER 1 ENVIRONMENTAL ASSESSMENT
Prepared Pursuant to the National Environmental Policy Act
(42 USC 4332) and 64 FR 28545

May 2016





Northern New England Intercity Rail Initiative

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EXECUTIVE SUMMARY

ES. 1 INTRODUCTION

The Northern New England Intercity Rail Initiative (NNEIRI) is a feasibility and planning study (NNEIRI Study) that examines the opportunities and impacts of adding more frequent and higher speed intercity passenger rail service on two major rail routes, the Inland Route and the Boston-to-Montreal Route. The Inland Route runs between Boston, Massachusetts and New Haven, Connecticut via Springfield, Massachusetts. The Boston-to-Montreal Route runs between Boston and Montreal, Quebec via Springfield. The two routes share the common trackage between Boston and Springfield, MA. The combination of these two rail routes defines the total trackage included in the study area that is collectively identified as the NNEIRI Corridor (Corridor).

The Federal Railroad Administration (FRA), Massachusetts Department of Transportation (MassDOT), and the Vermont Agency of Transportation (VTrans), in coordination with the Connecticut Department of Transportation (CTDOT) prepared this Tier 1 Environmental Assessment (EA) for passenger rail improvements in the NNEIRI Corridor. FRA is providing grant funding for the NNEIRI Study under its Next Generation High Speed Rail Program.

This EA was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, 42 U.S.C. §§ 4321 *et. seq.*; its implementing regulations, 40 Code of Federal Regulations (CFR) 1500-1508; and FRA's Procedures for Considering Environmental Impacts, 64 Federal Register (FR) 28545 (May 26, 1999) and Update to NEPA Implementing Procedures, 78 FR 2713 (January 14, 2013). This EA follows FRA's High-Speed Intercity Passenger Rail (HSIPR) NEPA guidance, 74 FR 29900 (June 23, 2009), for compliance with NEPA at the service or corridor level.¹ The EA identifies resources present in the NNEIRI Study Area (the geographic limits of the analysis for each of the resources) that the NNEIRI Build Alternative could potentially affect if advanced to the project-level; however, no findings or determinations under related environmental planning requirements are made at the Tier 1 level.

If the NNEIRI Study advances to the project level and federal funding were provided for implementation of rail improvements, future Tier 2 project proponent(s) would follow this Tier 1 EA with a Tier 2 NEPA analysis, or analyses. Tier 2 analyses may determine a project to fall into one of three categories, including an Environmental Impact Statement (EIS), EA, or Categorical Exclusion (CE), depending on the details of the project, site-specific conditions and resources present, and the significance of potential impacts to the human environment. The Tier 2 analysis would identify specific environmental impacts resulting from the analyzed alternative(s).

¹ High-Speed Intercity Passenger Rail (HSIPR) NEPA Guidance and Table.
<https://www.fra.dot.gov/Page/P0262>

ES. 1.1 NNEIRI Corridor

The Corridor is 470 miles long and is comprised of two major rail routes known as the Inland Route and the Boston-to-Montreal Route (see Figure ES-1). The Inland Route of the Corridor runs west from South Station in Boston to Springfield, Massachusetts via Worcester. From Springfield, the Route continues south to New Haven, Connecticut where it connects to Amtrak's Northeast Corridor.

The Boston-to-Montreal Route shares the segment of the Inland Route between Boston and Springfield. It then extends north through Holyoke, Northampton and Greenfield, Massachusetts. In Vermont, the Route continues north to White River Junction, northwest to Montpelier and Essex Junction, north to St. Albans, crosses the Canadian border at Alburgh, Vermont, and terminates at Central Station in Montreal, Quebec, Canada.

Ownership of the 470- mile long NNEIRI Corridor varies by segment:

- Commonwealth of Massachusetts: 44 miles between Boston and Worcester
- CSX Transportation Corporation (CSX): 55 Miles between Worcester and Springfield
- Commonwealth of Massachusetts: 49 miles between Springfield and East Northfield, Massachusetts
- New England Central Railroad (NECR): 207 miles from East Northfield, Massachusetts to three miles south of the U.S./Canada border
- Canadian National (CN) Railroad: 53 miles from three miles south of the U.S./Canada border to Montreal
- Amtrak: 62 miles from Springfield to New Haven

NNEIRI Study

The NNEIRI Study defined and evaluated alternatives that identified infrastructure and service improvements required to support train speed and frequency increases. The study efforts included consideration of ridership, revenue, capital, and operating costs. This EA evaluated the environmental effects of full implementation of potential service on the Inland Route and the Boston-to-Montreal Route as identified within the Alternative Analysis process. The Study Team also created two Service Development Plans (SDPs) - one for the Inland Route Service and one for the Boston-to-Montreal Route – to support independent implementation of each Route. Because the NNEIRI Corridor encompasses the combined area of the two SDPs, the Study Team developed one Tier 1 EA to evaluate potential environmental effects of implementation of intercity passenger rail service on the Inland Route and the Boston-to-Montreal Route.

For segments of the Corridor previously the subject of NEPA review, such as Knowledge Corridor/Restore the Vermonter project (Springfield to East Northfield, Massachusetts) and the New Haven-Hartford-Springfield (NHHS) Project (Springfield, Massachusetts to New Haven, Connecticut), the NNEIRI Study incorporates the results of those reviews by reference.

This EA does not address potential environmental impacts in Canada; such impacts will be evaluated and determined in accordance with applicable Canadian laws should the study advance to Tier 2 and projects proposed having potential environmental impacts within Canada

The NNEIRI Study Area refers to the geographic limits of the analysis conducted for each of the environmental impact areas examined in the Tier 1 EA. Figure ES-1 shows the Inland Route and Boston-to-Montreal Route and the geographic extent of each route. Table ES-3 lists the environmental impact areas examined in the Tier 1 EA.



Figure ES-1: NNEIRI Corridor

ES. 1.2 Background

Corridor History

The original federally designed alignment for a Boston-to-Montreal passenger rail service consisted of a route from Boston-to-Montreal via Concord, New Hampshire, with service continuing northwest via the current NNEIRI Corridor at White River Junction, Vermont to Montreal. In 2003, the VTrans, through a cooperative agreement with the FRA, the New Hampshire Department of Transportation (NHDOT), and the Massachusetts Executive Office of Transportation and Construction (EOTC) developed the *Boston to Montreal High-Speed Rail (BMHSR) Planning and Feasibility Study*², which performed an initial assessment of existing operations, infrastructure, and institutional issues and concluded that no fatal flaws exist for implementation of a high speed rail service in the BMHSR Corridor and that the ridership forecasts warrant a study for evaluation of operational, engineering and cost/revenue factors. At the conclusion of the 2003 study, the NHDOT withdrew from continued planning efforts to develop a Boston-to-Montreal service.

Subsequently, the Consolidated Appropriations Act, 2005 (Public Law 108-447, December 8, 2004) expanded the Northern New England High Speed Rail Corridor from Boston to Springfield, Massachusetts. As a result of the expanded Northern New England High Speed Rail Corridor, MassDOT and VTrans obtained FRA approval to modify the route for potential Boston-to-Montreal passenger rail service by using a connection from Boston-to-Montreal via Springfield to continue north of White River Junction. Thus, from White River Junction to Montreal, the corridor remains the same as proposed in the previous *2003 Boston-to-Montreal* study.

Regional Framework

In 2009, a framework known as the *New England Vision for High Speed and Intercity Passenger Rail*³ was collectively developed by the Maine Department of Transportation (MaineDOT), NHDOT, VTrans, MassDOT, RIDOT and CTDOT for improving high speed and intercity rail in New England. Currently, significant infrastructure improvements consistent with the framework are completed or underway. These improvements include the Knowledge Corridor/Restore the Vermonter project in western Massachusetts, the NHHS project in Connecticut, the improvement in Vermont that support Amtrak *Vermonter* service, and the Boston South Station Expansion (SSX) Project.

Additionally, FRA is leading a comprehensive planning process to define, evaluate, and prioritize future investments in the Northeast Corridor (NEC), from Washington, D.C. to Boston, called NEC FUTURE. The FRA launched NEC FUTURE in February 2012 to consider the role of rail passenger service in the context of current and future transportation

² Boston to Montreal High-Speed Rail Planning and Feasibility Study Phase I. Final Report. April 2003.
<https://www.nh.gov/dot/org/aerorailtransit/railandtransit/documents/BostonMontrealHSR.pdf>

³ Vision for the New England High-Speed and Intercity Rail Network. 2009.
https://www.massdot.state.ma.us/portals/20/docs/NewEngland_HSR_Vision.pdf

demand. FRA published the NEC FUTURE Tier 1 Draft Environmental Impact Statement in November 2015.

The NNEIRI Study evaluated options for improving intercity passenger rail travel in the Corridor. The study scope is consistent with the *New England Vision for High Speed and Intercity Passenger Rail*, which includes improved regional connectivity. Any future passenger rail service within the Corridor would leverage previous or planned regional rail investments.

ES. 2 PURPOSE AND NEED

ES. 2.1 Purpose

The purpose of the NNEIRI Study is to address the lack of intercity transportation choices in New England, particularly between major cities and the smaller cities and rural areas of the Corridor. The NNEIRI Study analyzes intercity passenger rail service on two major rail routes, the Inland Route and the Boston-to-Montreal Route, that comprise the study Corridor. The analysis within the study seeks to capitalize on the use of the considerable existing and pending public and private investments in the Corridor. FRA, MassDOT, and VTrans thus developed alternatives to consider options of creating a competitive rail transportation alternative to existing automobile, bus, and air travel service through more frequent and higher speed intercity passenger rail service.

ES. 2.2 Need

The need for the NNEIRI Study stems from recognizing benefits to the region's economy and livability from improved connections across and between the New England states. Many small and medium size cities and economic centers geographically dispersed across New England could be served by passenger rail service along the Corridor. Improved transportation connections between these centers would be of great benefit to its residents and employees, as well as visitors traveling within and through the region. Additionally, strong sustained increases in Amtrak ridership in New England show that demand for intercity transportation in the Corridor is trending towards alternative transportation modes, including intercity passenger rail. Between 1997 and 2012, ridership on Amtrak lines serving New England increased by 71%, with even greater increases in specific metropolitan areas.⁴ Many highways along the Corridor experience periodic congestion and capacity issues making rail travel a more attractive alternative. According to the *2015 Urban Mobility Scorecard*⁵ report, yearly delay per auto commuter⁶ in the Boston metropolitan area was 64 hours. Hartford and New Haven commuters experienced 45 and 40 hours of yearly delay per auto commuter, respectively. Improvements and expansion of intercity rail services would enhance options for the mobility and connectivity needed in the Corridor for the region to grow and prosper.

⁴ Brookings Institution, 2013.

⁵ 2015 Urban Mobility Scorecard. The Texas A&M Transportation Institute and INRIX. August 2015.

⁶ Yearly delay per auto commuter is the extra travel time during the year divided by the number of people who commute in private vehicles in the urban area.

ES. 3 ALTERNATIVES

ES. 3.1 Alternatives Development and Screening

At the beginning of the alternatives development process, the NNEIRI Study Team (comprised of transportation and environmental planners from MassDOT, VTrans, CTDOT, FRA, and a consultant team) defined 18 initial alternatives with ranges of speed, frequency, and equipment. The Study Team analyzed these alternatives to assess impacts on ridership and train performance. Data from the analysis was used to develop the three possible build alternatives and one No-Build Alternative that the Study Team further analyzed in the alternatives analysis process.

ES. 3.2 Preliminary Alternatives

Based on the results of the analysis of the 18 initial alternatives and the input provided by stakeholders and the public (see Chapter 5 for more information), the initial alternatives were screened down to three preliminary build alternatives. The three preliminary build alternatives, which are summarized below, represent the range of potential service and speed options that appeared to be the most feasible and efficient based on the analysis of the 18 initial alternatives. Each of the preliminary build alternatives would add to the physical and operational improvements of the No-Build alternative, and are intended to meet the Project Purpose and Need in a cost effective manner.

Preliminary Alternative 1 - Corridor Service: This alternative would provide local service (stopping at all stations) between Boston, Montreal and New Haven. In addition to the passenger rail services identified in the No-Build Alternative, Preliminary Alternative 1 would provide four daily round trip trains between Boston and New Haven, two daily round trip trains between Boston and Montreal, and one daily round trip train between New Haven and Montreal. Speeds on the Corridor would be improved to at least 60 mph and use standard train equipment. Infrastructure upgrades would include adding sidings and making track and bridge improvements. Preliminary Alternative 1 is the least expensive of the three alternatives, estimated between \$615-785 million, and would result in the least ridership, with an estimated 681,500 passengers annually.

Preliminary Alternative 2 - Corridor Service with Speed Improvements: This alternative would provide the passenger rail services identified in the No-Build Alternative plus eight daily round trip trains from Boston to New Haven (four express and four local), three daily round trip trains from Boston-to-Montreal (two local and one express), and two daily round trip trains from New Haven to Montreal (one express and one local). Additionally, speeds would be improved to at least 79 mph and use standard operations and train equipment. Infrastructure upgrades would include the improvements described in Preliminary Alternative 1 and a second track for all single-track segments in the Worcester to Springfield Corridor as well as additional passing sidings in Vermont. Capital costs are expected to be \$1,065-1,350 million. Estimated ridership would increase by 76% over Preliminary Alternative 1 to 1,201,200 passengers annually. Stations for non-express trains would be the same as in Preliminary Alternative 1. Preliminary Alternative 2 would include the addition of express service for certain routes.

Preliminary Alternative 3 - Corridor Service with Speed and Equipment

Improvements: This Alternative would provide the passenger rail services identified in the No-Build Alternative plus eight daily round trip trains from Boston to New Haven (four express and four local), three daily round trip trains from Boston to Montreal (two local and one express), two daily round trip trains from New Haven to Montreal (one express and one local). Preliminary Alternative 3 would also provide five additional round trip shuttle trains (local service) between Boston and Springfield to provide increased connectivity between city pairs in the Boston to Springfield segment. Additionally, speeds would be improved to at least 90 mph utilizing new tilting train sets. Capital costs for Preliminary Alternative 3 are estimated to be between \$1,255-1,590 million and ridership is expected to be 1,334,800 annual riders, approximately 96% more annual riders than Preliminary Alternative 1. Necessary infrastructure upgrades for Preliminary Alternative 3 would include improvements to the existing railroad ROW, full train signalization, and additional sidings/double tracking. Under Preliminary Alternative 3, stations for non-express trains would be the same as in Preliminary Alternative 1 and would include the addition of express service for certain routes as in Preliminary Alternative 2. Preliminary Alternative 3 would include all of the capital improvements and services indicated in Preliminary Alternative 2 with the additional infrastructure and operations changes.

There are limited locations on the NNEIRI Corridor that enable trains to operate at 90 mph due to track geometry. This significantly limits travel time savings provided by Preliminary Alternative 3 compared to Preliminary Alternative 2 and does not justify the higher cost. Additionally, ridership would be significantly less under the Preliminary Alternative 1 with a maximum speed of 60 mph as compared to Preliminary Alternative 2 with a maximum speed of 79 mph. For these reasons, the Study Team considered Preliminary Alternative 2 to be the most promising of the three preliminary alternatives due to a combination of infrastructure constraints, ridership, and costs. With some modifications described in the following section, Preliminary Alternative 2 was carried forward for further analysis in this Tier 1 EA.

A high-level, Corridor-wide environmental screening was completed during the alternatives analysis to identify any known significant impacts that would result from the proposed preliminary alternatives. The Study Team's analysis found that impacts along the Corridor are anticipated to be generally minor and moderate with some minor impacts in specific locations due to operations and infrastructure needs, however no impacts are anticipated to be significant.

Table ES-1 provides a comparison of the three preliminary build alternatives and No-Build Alternative based on preliminary capital costs, operations and maintenance costs (O&M), and ridership forecasts.

Table ES-1. Alternatives Comparison

Alternative	Capital Costs	Operating Support	Annual Riders (2035)
No-Build	No additional capital costs	No additional operating costs	79,900 riders
Preliminary Alternative 1	\$615-785 million	\$24 million	681,500 riders
Preliminary Alternative 2	\$1,065-1,350 million	\$39 million	1,201,200 riders
Preliminary Alternative 3	\$1,255-1,590 million	\$48 million	1,334,800 riders

ES. 3.3 No-Build

This alternative assumes no NNEIRI service on the Corridor. This Alternative is the baseline against which each of the preliminary build alternatives was measured. The No-Build Alternative includes recently completed, underway, and planned transportation improvements in the NNEIRI Corridor area, including improved New Haven-Hartford-Springfield rail service, Springfield Union Station improvements, South Station – Boston expansion, extension of the Amtrak Vermonter to Montreal, and improvements to the Montreal-area rail network. Train sets on the Corridor would be accommodated at layover facilities near terminal stations, which either exist today or are planned as part of other projects included in the No-Build.

ES. 3.4 Build Alternative Evaluated in this EA

The Study Team developed a single Build Alternative based on the results of the alternatives analysis, stakeholder input, public meetings, and technical review by FRA and state and local agencies (see Chapter 5, Section 5.3). The three primary factors used to determine the Build Alternative were infrastructure constraints, ridership, and cost. The Build Alternative is most similar to Preliminary Alternative 2 in terms of infrastructure with changes to the proposed service plan. Capacity constraints near Montreal as well as limited ridership on the Boston-to-Montreal Service warranted reducing the proposed service in that segment. Express Service was also eliminated from the Build Alternative due to minimal travel time savings and effect on ridership.

Service Plan: Under the Build Alternative, one new daily round trip train with local service would operate between Boston and Montreal, with trains operating to all existing stations and a new station in Palmer, Massachusetts. The Build Alternative would provide one additional local round trip service between New Haven and Montreal for a total of two round trip trains per day. Eight new daily round trips would operate daily between Boston, Massachusetts and New Haven, Connecticut, which are extensions of existing services on the Corridor between Boston, Massachusetts and New Haven, Connecticut. See Section 3.4 for the list of the stations that would be served.

Table ES-2 summarizes Build Alternative passenger rail services in comparison to existing and No-Build services.

Table ES-2. Summary of Weekday Revenue Passenger Service

Segment	Operator(s)	Existing Revenue Daily Round Trips	No-Build 2035 Revenue Daily Round Trips	Build Alternative 2035 Revenue Daily Round Trips
Boston to Worcester	MBTA	23	23	23
	Amtrak Lake Shore Limited	1	1	1
	NNEIRI Service	-	-	9*
Worcester to Springfield	Amtrak Lake Shore Limited	1	1	1
	NNEIRI Service	-	-	9*
Springfield to New Haven	Amtrak (Northeast Regional Shuttle, Northeast Regional & Vermonter)	6-8	25	25
	NNEIRI Service	-	-	9*
Springfield to St. Albans	Amtrak Vermonter	1	1	1
	NNEIRI Service	-	-	2

Note:

* *Of the total 9 daily round trip trains, 8 are extensions of the existing shuttle services that operate on the Corridor between New Haven and Springfield.*

Infrastructure Program: Under the Build Alternative, track upgrades would support a maximum speed of 79 mph where possible. A second track or passing siding would be added in certain locations to support increased passenger and freight service. Full signalization would be installed in locations where it does not currently exist. No additional layover facility is proposed under the Build Alternative. The estimated infrastructure costs (excluding trainsets) for the Build Alternative is \$648 - \$721 million.

Station improvements under the Build Alternative include the construction of an additional passenger platform at Worcester Union Station and a potential new station in Palmer, Massachusetts to accommodate new service. The exact location of the new station would be determined upon further refinement in later phase of the NNEIRI Study. No other major improvements to existing stations on the Corridor are planned as part of this project.

Ridership Forecasts: Based on the 2035 annual ridership forecasts, the Build Alternative would result in 875,000 annual riders and an annual diversion of 113,847,700 vehicle miles traveled (VMT).

ES. 4 AFFECTED ENVIRONMENT AND CONSEQUENCES

The affected environment and the environmental consequences associated with the Build Alternative, potential mitigation measures and anticipated future Tier 2 project-level analysis for each of the environmental resources are summarized in Table ES-3. No significant environmental impacts were identified at the Tier 1 level.

Table ES-3. Summary of Potential Environmental Consequences and Next Steps

Environmental Resources		Build Alternative Consequences	Next Steps	
			Potential Mitigation Measures	Tier 2 NEPA Analysis
4.1.1	Air Quality	A shift to passenger rail expected to reduce vehicle miles traveled (VMT) and improve regional air quality.	Mitigation measures not anticipated.	General Conformity analysis would be conducted by FRA or other lead federal agency during Tier 2.
4.1.2	Noise and Vibration	Potential for a total of 435 severe noise impacts, 11,827 moderate noise impacts, and 2,234 vibration annoyance impacts.* <i>*Impacts based on worst case scenario, estimates would likely decrease when a more detailed analysis is performed.</i>	Potential mitigation measures may include noise barriers, operational changes, stationary wayside horns at grade crossings, horn shrouds on locomotives, and resilient rail fasteners and ties.	Tier 2 project level analysis by FRA or another lead federal agency would more precisely determine the number of potential noise and vibration impacts that may require mitigation.
4.1.3	Flood Hazards and Floodplain Management	Minor impacts possible. Additional track construction would take place within or adjacent to mapped floodplain for approximately 28 miles. Impacts expected to be minor due to restoration of historically double tracked corridor.	If impacts are unavoidable, compensatory mitigation can be provided by constructing a detention/retention basin to handle runoff and any lost flood storage capacity.	Tier 2 project proponent(s) would attempt to avoid and minimize loss of flood storage capacity. Potential impacts to floodplains would require further assessment and agency coordination to determine whether mitigation measures are necessary.
4.1.4	Coastal Zone Management	No impacts anticipated.	Mitigation measures not anticipated.	Further analysis not anticipated.

Environmental Resources		Build Alternative Consequences	Next Steps	
			Potential Mitigation Measures	Tier 2 NEPA Analysis
4.2.1	Water Quality	Minor impacts possible. Additional track construction would take place within or adjacent to water resources in MA and VT. Impacts expected to be minor due to restoration of historically double tracked corridor.	All construction activities would comply with the applicable state's storm water quality manual. BMPs for erosion and sedimentation control would be followed.	During Tier 2, design details would be developed to avoid or reduce potential water quality impacts associated with the Build Alternative. The Tier 2 project proponent(s) would coordinate with VTDEC and Massachusetts Department of Environmental Protection (MassDEP) for final designs and permits.
4.2.2	Wetlands	Minor impacts possible. Additional track construction would take place within respective state's mapped wetland buffer area for approximately 13 miles. Impacts expected to be minor due to restoration of historically double tracked corridor.	If wetland impacts cannot be avoided, compensatory mitigation measures include restoration, creation, enhancement, and preservation of impacted wetlands.	Tier 2 project proponent(s) would attempt to avoid and minimize wetland impacts. Potential impacts to wetlands would require further assessment, and any compensatory mitigation measures would be subject to state and federal permitting requirements.
4.2.3	Ecological Systems, Threatened and Endangered Species (T&E), and Wildlife	Minor impacts possible. Additional track construction would take place within or adjacent to mapped endangered species habitat for approximately 16 miles. Impacts expected to be minor due to utilization of historically double tracked corridor.	If impacts cannot be avoided mitigation measures include but are not limited to: pre- and/or post-construction monitoring of populations, and restoration, enhancement, and conservation of impacted habitats.	During Tier 2 project level analysis the project proponent(s) would confirm records of federal- or state-listed species with the appropriate resource agencies and seek to avoid and minimize impacts. FRA or another lead federal agency would informally or formally consult, as necessary, with the US Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act.

Environmental Resources		Build Alternative Consequences	Next Steps	
			Potential Mitigation Measures	Tier 2 NEPA Analysis
4.3.1	Land Use, Existing and Planned	No impacts anticipated due to use of existing rail corridor. Palmer Station likely to have beneficial impact on economic development.	Mitigation measures not anticipated.	During Tier 2, more details relating to the location and design of a new Palmer Station would be determined. Project proponent(s) would coordinate with the affected municipalities to ensure compatibility with present and future land uses.
4.3.2	Socioeconomic and Environmental Justice	Potential beneficial impact on economic development and EJ populations near existing and proposed stations is anticipated.	Any potential mitigation measures, if required, would be determined during the Tier 2 project level analysis.	Upon completion of engineering plans, additional EJ analysis would be conducted by the project proponent(s).
4.3.3	Possible Barriers to the Elderly and Handicapped	Positive impacts to elderly and handicapped since people who cannot drive can use rail service. Does not create any additional barriers to elderly and handicapped.	Mitigation measures not anticipated.	Further analysis not anticipated.
4.3.4	Public Health and Safety	Positive impacts by diverting 113 million vehicle miles travelled per year (analysis year 2035) to rail mode, which has a low fatality rate compared to motor vehicles. Includes improvements to some signals and grade crossings resulting in a benefit to public health and safety.	Mitigation measures not anticipated.	Further analysis not anticipated.

Environmental Resources		Build Alternative Consequences	Next Steps	
			Potential Mitigation Measures	Tier 2 NEPA Analysis
4.3.5	Hazardous Materials	No impacts anticipated. No active hazardous waste sites were identified in locations where construction would take place.	If required, mitigation measures may include soil samples to determine the nature of contaminated soil, storage techniques that contain run-off, use of material within ROW, and requirements for transporting and disposing of unused contaminated materials.	If hazardous materials are encountered during construction, the project proponent(s) would coordinate with the MassDEP and the VTDEC to comply with all applicable regulations.
4.3.6	Solid Waste Disposal	No impacts anticipated.	Mitigation measures not anticipated.	Further analysis not anticipated.
4.3.7	Aesthetic and Design Quality Impacts	No impacts anticipated. There may be potential visual impacts at Palmer due to construction of a new station. Palmer Station design to be addressed during Tier 2. No impacts anticipated at Worcester Union Station since the platform would be located within the ROW in an area historically used for station platforms and the elevator and stair would be connected from tunnel below the tracks therefore, no visual effects to Worcester Union Station are anticipated.	If necessary, mitigation strategies such as landscaping to screen views of adverse impacts or use of building materials consistent with the surrounding area.	During Tier 2, more details relating to the design of a new Palmer Station and a platform at Worcester Union Station would be developed. At that time, further analysis would be conducted to determine any adverse visual impacts.

Environmental Resources		Build Alternative Consequences	Next Steps	
			Potential Mitigation Measures	Tier 2 NEPA Analysis
4.3.8	Cultural Resources and Historic Properties	Based on the nature of the improvements that would be necessary to implement NNEIRI service, direct and indirect effects to historic properties are likely. However, at the Tier 1 level, there is not enough information to be able to assess and determine effects to historic properties.	If adverse effects to NRHP eligible or listed properties are determined, measures to avoid, minimize or mitigate the effects would be developed through consultation with the appropriate State Historic Preservation Officer(s) and other consulting parties.	The Section 106 process would be followed if construction of the Build Alternative receives federal funding or permits. This would involve defining the project Area of Potential Effects (APE), further identification of historic properties, assessment of effects, and resolution of adverse effects by FRA or another lead federal agency in consultation with the MA, NH and/or VT SHPOs and other consulting parties as appropriate.
4.3.9	Use of 4(f) Protected Properties	Based on the type of improvements that would be necessary to implement NNEIRI service, there is the potential for the use of 4(f) historic properties. However, at the Tier 1 level, there is not enough information to be able to assess and determine the use of these properties.	If there is both the use of a 4(f) property and no prudent and feasible alternative, the project would include all possible planning to minimize harm.	Full Section 4(f) analysis would occur during Tier 2 project level analysis to determine impacts to publicly owned parks, recreation areas, wildlife and waterfowl refuges, public or private historic sites, historic bridges and culverts and possible archaeological sites. A 4(f) determination would be made at Tier 2.
4.3.10	Use of Section 6(f) Lands	Improvements would be limited to the existing ROW and therefore impacts to 6(f) properties are unlikely.	If a conversion of 6(f) property is required a request must be submitted to the NPS including proposal to substitute the property with another of equal or better usefulness and value.	During Tier 2, once the design has advanced, additional data may be collected regarding 6(f) properties to determine impacts.
4.3.11	Recreational Opportunities	No impacts anticipated.	Mitigation measures not anticipated.	Further analysis not anticipated.

Environmental Resources		Build Alternative Consequences	Next Steps	
			Potential Mitigation Measures	Tier 2 NEPA Analysis
4.3.12	Transportation	Given the low numbers of traffic movements anticipated at each station, significant impacts are unlikely.	Mitigation measures not anticipated.	As the design develops and more data can be collected, further traffic impact analysis around stations would be conducted during Tier 2 project level analysis.
4.3.13	Use of Energy Resources	Beneficial impact to energy resources due to overall energy reduction from diverting passenger car trips.	Mitigation measures not anticipated.	Construction impact analysis would be conducted during Tier 2 project level analysis.
4.3.14	Use of Other Natural Resources, such as Water, Minerals, or Timber	No impacts anticipated.	Mitigation measures not anticipated.	Further analysis not anticipated.
4.4	Construction Period Impacts	Construction-related impacts would be temporary at any given location along the Corridor. Track work would largely be sited within the existing rail ROW using rail-mounted equipment, and should not involve large quantities of earthwork.	Construction-phasing plans that avoid, minimize or mitigate temporary impacts would be developed in coordination with appropriate agencies. Temporarily impacted natural resources would be restored to their pre-construction conditions.	During Tier 2, the duration of construction would be better defined and appropriate mitigation measures identified. The sequence and extent of construction would be determined and staging plans developed.
4.5	Indirect and Cumulative Impacts	Indirect and cumulative impacts generally beneficial due to induced development and additional transportation mode choice.	Mitigation measures not anticipated.	During Tier 2, once the design has advanced, further evaluation of indirect and cumulative impacts would be conducted.

ES. 4.1 Coordination

The lead state agencies, MassDOT and VTrans, would need to work in tandem to ensure successful implementation of the NNEIRI service. Coordination during the planning process is essential because of the necessary involvement of five state governments and numerous local governments along the Corridor. These entities would need to coordinate and work together to define the future service in mutually agreeable terms. Agreement would be needed between Massachusetts, Vermont, New Hampshire, Connecticut and the Province of Quebec, Canada as well as with the major cities where there are station stops on the key aspects of governance, funding, and management of the proposed system and services. MassDOT and VTrans have been working together throughout development of the NNEIRI Study and the SDPs, so the additional entities would need to coordinate through these two organizations to decide on a final plan.

ES. 5 COMMENTS AND COORDINATION

ES. 5.1 Agency Outreach

An interagency scoping meeting was conducted by MassDOT, VTrans and FRA in Cambridge, Massachusetts in March 2014. Federal, state and regional agencies were invited to participate early in the development of the NNEIRI Study, prior to initiating the scoping process. The Study Team developed an overall strategy for Agency and Public Scoping in collaboration with FRA. Agency input was solicited on Purpose and Need, alternatives development, alternatives to be carried forward for environmental and operations analysis, and identification of the Build Alternative.

ES. 5.2 Stakeholder Outreach

Five Stakeholder Committee meetings were conducted by MassDOT and VTrans in Springfield, Massachusetts between December 2013 and June 2015. The Committee is comprised of key members including MassDOT, Connecticut Department of Transportation, the Vermont Agency of Transportation, Québec Ministry of Transportation, New Hampshire Department of Transportation, the Federal Railroad Administration, Amtrak, the Massachusetts Bay Transportation Authority, Metropolitan Transportation Authority Metro-North Railroad (Metro-North), CSX, New England Central Railroad, Pan Am Southern, LLC (PAS), Canadian National Railway and thirteen regional planning commissions located in the Commonwealth of Massachusetts, State of Vermont, Connecticut and New Hampshire. The Committee supported the goals and objectives of the study and provided feedback through open discussion during the Committee meetings on all study documents produced, including the Existing Conditions Assessment, Purpose and Need, Station Site Assessment and Guidelines, Alternatives Analysis Report and draft SDPs. The Study Team used feedback from the Committee to develop the Build Alternative. Consensus on the Build Alternative to carry forward for analysis in the Tier 1 EA was reached in February 2015.

ES. 5.3 Public Information Meetings

Three rounds of public information meetings were held for the NNEIRI Study to discuss the alternatives screening process and receive comments from the interested public. There were two (2) meetings in each round, except for the third and final round in which there were three (3) public meetings. The public meetings were organized in two formats: (1) in-person open house meetings held in a physical location in the Corridor and (2) on-line open house meetings where interested persons could view a presentation and submit comments to the NNEIRI Study Team. The meetings were conducted by MassDOT and VTrans in January and November of 2014 and in September of 2015. In each round, one meeting was held in the northern section of the Corridor (Vermont) and the other meeting in the southern section of the Corridor (Worcester/Springfield in Massachusetts and as well as in Boston, Massachusetts for September 2015 public meeting).

ES. 5.4 Public Comments

Twenty-seven (27) written comments have been received since the initiation of the NNEIRI Study. Several were submitted by members of the Stakeholder Committee or by attendees of the public meetings. Many of the comments reiterated themes expressed at previously held meetings such as advocacy for station stops, especially the Claremont, New Hampshire station and at Palmer, Massachusetts, and for better connections between Brattleboro, Vermont to Boston and to New York City. Several people supported the re-connection of service to Montreal.

TABLE OF CONTENTS

1	INTRODUCTION	1-1
1.1	NNEIRI Corridor	1-2
1.2	Background	1-3
1.2.1	Corridor History	1-3
1.2.2	Regional Framework	1-4
2	PURPOSE AND NEED	2-1
2.1	Purpose	2-1
2.2	Need	2-1
2.2.1	Economic Opportunity	2-2
2.2.2	Job Access	2-2
2.2.3	Education	2-3
2.2.4	Tourism	2-4
2.2.5	Population and Demographics	2-5
2.2.6	Changing Transportation Preferences	2-5
2.2.7	Accommodate Populations with High Reliance on Non-Auto/Public Transit	2-6
2.2.8	Accommodate Population and Demographics Changes	2-6
2.2.9	Travel Demand	2-7
3	ALTERNATIVES	3-1
3.1	Alternatives Development and Screening	3-1
3.2	Preliminary Alternatives	3-3
3.2.1	Preliminary Alternative 1 – Corridor Service	3-3
3.2.2	Preliminary Alternative 2 – Corridor Service with Speed Improvements	3-4
3.2.3	Preliminary Alternative 3 – Corridor Service with Speed and Equipment Improvements	3-6
3.2.4	Alternatives Comparison	3-7
3.3	No-Build Alternative	3-8
3.4	Build Alternative Evaluated in this EA	3-10
3.4.1	Service Plan	3-12
3.4.2	Infrastructure Program	3-15
3.4.3	Ridership Forecasts	3-17
4	AFFECTED ENVIRONMENT AND CONSEQUENCES	4-1
4.1	Physical Environment	4-2
4.1.1	Air Quality	4-2
4.1.2	Noise and Vibration	4-8
4.1.3	Flood Hazards and Floodplain Management	4-15

4.1.4	Coastal Zone Management.....	4-23
4.2	Biological Environment.....	4-25
4.2.1	Water Quality.....	4-25
4.2.2	Wetlands.....	4-30
4.2.3	Ecological Systems, Threatened and Endangered Species, and Wildlife .	4-38
4.3	Human Environment.....	4-48
4.3.1	Land Use, Existing and Planned.....	4-48
4.3.2	Socioeconomic and Environmental Justice.....	4-52
4.3.3	Possible Barriers to the Elderly and Handicapped.....	4-60
4.3.4	Public Health and Safety.....	4-65
4.3.5	Hazardous Materials.....	4-69
4.3.6	Solid Waste Disposal.....	4-73
4.3.7	Aesthetic and Design Quality Impacts.....	4-76
4.3.8	Cultural Resources and Historic Properties.....	4-80
4.3.9	Use of 4(f) Protected Properties.....	4-88
4.3.10	Use of Section 6(f) Lands.....	4-96
4.3.11	Recreational Opportunities.....	4-101
4.3.12	Transportation.....	4-104
4.3.13	Use of Energy Resources.....	4-116
4.3.14	Use of Other Natural Resources, Such as Water, Minerals, or Timber ...	4-119
4.4	Construction Period Impacts.....	4-121
4.5	Indirect and Cumulative Impacts.....	4-124
4.6	Next Steps.....	4-135
4.6.1	Avoidance, Minimization and Potential Mitigation Measures.....	4-135
4.6.2	NEPA Tier 2 Analysis.....	4-142
4.6.3	Coordination.....	4-144
5	COMMENTS AND COORDINATION.....	5-1
5.1	Agency Outreach.....	5-1
5.1.1	Scoping.....	5-1
5.1.2	Milestones.....	5-2
5.2	Tribal Outreach.....	5-2
5.3	Stakeholder Outreach.....	5-2
5.3.1	Outreach Tools.....	5-3
5.3.2	Stakeholder Committee.....	5-3
5.3.3	Public Information Meetings.....	5-4
5.3.4	Public Comments.....	5-6
5.4	Future Opportunities for Input.....	5-6

6	REFERENCES AND ACRONYMS.....	6-1
6.1	References	6-1
6.2	Acronyms	6-4
6.3	Glossary of Terms	6-10
6.4	List of Preparers	6-17

LIST OF TABLES

Table 2.2-1.	Number of College Students and Colleges by Metropolitan Area	2-4
Table 2.2-2.	Expenditure and Jobs from Tourism in Each State*	2-5
Table 2.2-3.	Change in Amtrak Ridership in New England Metropolitan Areas*	2-6
Table 3.2-1.	Alternatives Comparison.....	3-7
Table 3.4-1.	Preliminary Alternative 2 vs. Build Alternative	3-11
Table 3.4-2.	Summary of Weekday Revenue Passenger Service	3-14
Table 3.4-3.	2035 Annual Forecast Results.....	3-17
Table 4.1-1.	General Conformity Threshold Levels	4-3
Table 4.1-2.	Potential Air Quality Benefits / CO ₂ Reductions	4-7
Table 4.1-3.	Potential severe noise impacts	4-13
Table 4.1-4.	Potential moderate noise impacts.....	4-14
Table 4.1-5.	Potential Vibration Annoyance Impacts	4-14
Table 4.1-6.	Floodplain Impacts along Second Track – Boston to Springfield	4-19
Table 4.1-7.	Floodplain Impacts along Second Track – Springfield to Canadian Border	4-21
Table 4.2-1.	Potential Wetland Impacts along Second Track – Boston to Springfield	4-35
Table 4.2-2.	Potential Wetland Impacts along Second Track – Springfield to Canadian Border.....	4-37
Table 4.2-3.	Common Wildlife Species Likely to Occur in Habitats along the Corridor	4-42
Table 4.2-4.	Endangered Species Habitat along Second Track – Boston to Springfield	4-46
Table 4.2-5.	Endangered Species Habitat along Second Track – Springfield to Canadian Border....	4-47
Table 4.3-1.	Demographic and Socioeconomic Characteristics in the NNEIRI Study Area	4-55
Table 4.3-2.	Environmental Justice Populations in the NNEIRI Study Area	4-56
Table 4.3-3.	Demographic Characteristics - Boston-to-Springfield Segment.....	4-56
Table 4.3-4.	Socioeconomic Characteristics - Boston-to-Springfield Segment.....	4-57
Table 4.3-5.	Environmental Justice Populations - Boston to Springfield Corridor	4-57
Table 4.3-6.	Demographic Characteristics - Springfield to Canadian Border Segment	4-58
Table 4.3-7.	Socioeconomic Characteristics - Springfield to Canadian Border Segment	4-58
Table 4.3-8.	Environmental Justice Populations - Springfield to Canadian Border Segment.....	4-59
Table 4.3-9.	Existing Station Site Assessment	4-63
Table 4.3-10.	Railroad Crossing	4-67



Table 4.3-11. Summary of Release Sites, Springfield-to-Montreal4-72

Table 4.3-12. Solid Waste Landfills - Boston to Springfield4-74

Table 4.3-13. Solid Waste Landfills - Springfield to Canadian Border4-75

Table 4.3-14: National Register (NR) Properties - Boston to Springfield4-83

Table 4.3-15: National Register (NR) Properties - East Northfield, Massachusetts to Alburgh, Vermont4-84

Table 4.3-16. Section 4(f) Parks, Recreation Areas and Wildlife Refuges – Boston to Springfield4-91

Table 4.3-17. Section 4(f) Parks, Recreation Areas and Wildlife Refuges – Springfield to Canadian Border Corridor.....4-93

Table 4.3-18. Parking Spaces at Existing Stations - Boston to Springfield4-108

Table 4.3-19. Airports, Springfield-to-Canadian Border4-110

Table 4.3-20. Parking Spaces at Existing Stations - Springfield to Canadian Border4-111

Table 4.3-21. Projected NNEIRI Traffic Movements4-112

Table 4.3-22. Projected NNEIRI Parking Requirements4-114

Table 4.3-23. Diverted Vehicle Miles Traveled (VMT) and Reduction in Energy Use4-119

Table 4.5-1. Other Transportation Plans and Projects in the Corridor4-126

Table 4.5-2. Cumulative Impacts from NNEIRI and Other Projects4-132

Table 5.3-1. Stakeholder Meetings 5-4

Table 5.3-2. Public Information Meetings 5-5

Table 6.2-1. Acronyms..... 6-4

Table 6.4-1. List of Preparers and Their Study Role6-17

LIST OF FIGURES

Figure 3-1: Build Alternative Services3-12

Figure 4-1. Conceptual Cross Section of Second Track4-107

APPENDICES

- Appendix A Conceptual Rail Sections
- Appendix B Noise and Vibration Technical Report
- Appendix C Flood Zone Maps
- Appendix D Impaired Water Bodies in the Rail Corridor
- Appendix E Massachusetts and Vermont Resource Area Maps
- Appendix F Cultural Resources Technical Report
- Appendix G Section 4(f) Properties Technical Report
- Appendix H Section 6(f) Properties Technical Report

1 INTRODUCTION

The Northern New England Intercity Rail Initiative (NNEIRI) is a feasibility and planning study (NNEIRI Study, see Section 1.1) that examines the opportunities and impacts of adding more frequent and higher speed intercity passenger rail service on two major rail corridors. These corridors are known as the Inland Route and the Boston-to-Montreal Route and are collectively referred to herein as the NNEIRI Corridor or the Corridor. The Federal Railroad Administration (FRA), the Massachusetts Department of Transportation (MassDOT), and the Vermont Agency of Transportation (VTTrans) (collectively, the Study Team), in coordination with the Connecticut Department of Transportation (CTDOT), prepared this Tier 1 Environmental Assessment (EA). FRA is providing grant funding for the NNEIRI Study under its Next Generation High Speed Rail Program.

This EA was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, 42 U.S.C. §§ 4321 et. seq.; its implementing regulations, 40 Code of Federal Regulations (CFR) 1500-1508; and FRA’s Procedures for Considering Environmental Impacts, 64 Federal Register (FR) 28545 (May 26, 1999) and Update to NEPA Implementing Procedures, 78 FR 2713 (January 14, 2013). This EA follows FRA’s High-Speed Intercity Passenger Rail (HSIPR) NEPA guidance, 74 FR 29900 (June 23, 2009), for compliance with NEPA at the service- or corridor-level. Service-level NEPA “...typically addresses the broader questions relating to the type of service(s) being proposed, including cities and stations served, route alternatives, service levels, types of operations (speed, electric, or diesel powered, etc.), ridership projections, and major infrastructure components. For a major rail corridor improvement program, this type of environmental review must be completed before any substantial investments in the corridor can be made.”⁷ This Tier 1 EA identifies resources present in the NNEIRI Study Area (the geographic limits of the analysis for each of the resources) that the NNEIRI Build Alternative could potentially affect if advanced to the project-level; however, no findings or determinations under related environmental planning requirements are made at the Tier 1 level.

If the NNEIRI Study advances to the project level and federal funding were provided for implementation of rail improvements, future Tier 2 project proponent(s) would follow this Tier 1 EA with a Tier 2 NEPA analysis, or analyses. Tier 2 analyses may determine a project to fall into one of three categories, including an Environmental Impact Statement (EIS), EA, or Categorical Exclusion (CE), depending on the details of the project, site-specific conditions and resources present, and the significance of potential impacts to the human environment. The Tier 2 analysis would identify specific resource impacts of the analyzed alternative(s).

⁷ High Speed Intercity Passenger Rail (HSIPR) NEPA Guidance and Table. <https://www.fra.dot.gov/Page/P0262>

1.1 NNEIRI CORRIDOR

The NNEIRI Corridor is 470 miles long and is comprised of two major rail corridors known as the Inland Route and the Boston-to-Montreal Route (see Figure ES-1). The Inland Route of the NNEIRI Corridor runs west from South Station in Boston to Springfield, Massachusetts via Worcester. From Springfield, the Route continues south to New Haven, Connecticut where it connects to Amtrak's Northeast Corridor.

The Boston-to-Montreal Route follows the Inland Route to Springfield then runs north through Holyoke, Northampton and Greenfield, Massachusetts. In Vermont, the Route continues north to White River Junction, northwest to Montpelier and Essex Junction, north to St. Albans, crosses the Canadian border at Alburgh, Vermont, and terminates at Central Station in Montreal, Quebec, Canada.

Ownership of the 470- mile long NNEIRI Corridor varies by segment:

- Commonwealth of Massachusetts: 44 miles between Boston and Worcester
- CSX Transportation Corporation (CSX): 55 Miles between Worcester and Springfield
- Commonwealth of Massachusetts: 49 miles between Springfield and East Northfield, Massachusetts
- New England Central Railroad (NECR): 207 miles from East Northfield, Massachusetts to three miles south of the U.S./Canada border
- Canadian National (CN) Railroad: 53 miles from three miles south of the U.S./Canada border to Montreal
- Amtrak: 62 miles from Springfield to New Haven

NNEIRI Study

The Study Team developed and evaluated alternatives that include infrastructure and service improvements necessary to support train speed and frequency increases in the NNEIRI Corridor. The study efforts included consideration of ridership, revenue, capital, and operating costs. The Study Team, in coordination with the CTDOT, also developed two Service Development Plans (SDPs) - one for the Inland Route Service and one for the Boston-to-Montreal Route – to support independent implementation of each Route. The SDPs provide detailed plans for infrastructure investments needed to improve service along the Inland Route and the Boston-to-Montreal Route, and evaluate the operational, network and financial impacts of the service changes and infrastructure investment. Because the NNEIRI Corridor encompasses the combined area of the two SDPs, the Study Team developed one Tier 1 EA to evaluate potential environmental effects of implementation of intercity passenger rail service on the Inland Route and the Boston-to-Montreal Route.

For segments of the Corridor that have previously been the subject of NEPA review, such as Knowledge Corridor/Restore the Vermonter project (Springfield to East Northfield, Massachusetts) and the New Haven-Hartford-Springfield (NHHS) Project (which runs from Springfield, Massachusetts to New Haven, Connecticut), the NNEIRI Tier 1 EA Study incorporates the results of those reviews by reference.

This EA does not address potential environmental impacts in Canada; such impacts will be determined in accordance with applicable Canadian laws should the study advance to Tier 2 and projects proposed having potential environmental impacts within Canada.

The NNEIRI Study Area refers to the geographic limits of the analysis conducted for each of the environmental impact areas examined in the Tier 1 EA.

1.2 BACKGROUND

The Northern New England Corridor is one of ten federally designated high-speed rail corridors in the United States. The Boston-to-Montreal Route was designated by U.S. Transportation Secretary Rodney E. Slater on October 11, 2000 as part of the “Northern New England Corridor,” which included a hub at Boston, Massachusetts (MA) and two spokes: one to Montreal, Quebec, Canada, via Concord, New Hampshire (NH), and the other to Portland/Lewiston-Auburn, Maine (ME). The Inland Route Service (the rail line connecting Boston-Springfield, Massachusetts to New Haven, Connecticut) was added to the Northern New England Corridor designation along with the rail line between Springfield, Massachusetts and Albany, New York (NY) in the Consolidated Appropriations Act, 2005 (Public Law 108-447) on December 8, 2004.

1.2.1 Corridor History

The original federally designated alignment for the Boston-to-Montreal Route consisted of a route from Boston to Concord, New Hampshire, through to White River Junction, Vermont, continuing northwest across Vermont to the Canadian border, and then to Montreal. In April 2003, the VTrans, through a cooperative agreement with the FRA, the New Hampshire Department of Transportation (NHDOT), and the Massachusetts Executive Office of Transportation and Construction (EOTC) developed the *Boston to Montreal High-Speed Rail (BMHSR) Planning and Feasibility Study*⁸, which conducted an initial assessment of existing operations, infrastructure, and institutional issues and concluded that no fatal flaws exist for implementation of a high speed rail service in the BMHSR Corridor and that the ridership forecasts warrant a study for evaluation of operational, engineering and cost/revenue factors. FRA approved a grant for a subsequent, more detailed study effort for this alignment on September 10, 2003. However, at the conclusion of the 2003 study the NHDOT withdrew from continued planning efforts to develop a Boston-to-Montreal Route. NHDOT’s withdrawal halted further consideration of the Boston-to-Montreal Route along the originally proposed route.

Despite NHDOT’s withdrawal from planning efforts, MassDOT and VTrans remained interested in considering other alternatives to provide intercity passenger train service between Boston and Montreal. Subsequently, when the Consolidated Appropriations Act, 2005 (Public Law 108-447, December 8, 2004) expanded the Northern New England Corridor from Boston

⁸ Boston to Montreal High-Speed Rail Planning and Feasibility Study Phase I. Final Report. April 2003. <https://www.nh.gov/dot/org/aerorailtransit/railandtransit/documents/BostonMontrealHSR.pdf>

to Springfield, Massachusetts, MassDOT and VTrans suggested to FRA that a logical alternative route for Boston-to-Montreal passenger rail service could be made by using a connection from Springfield to White River Junction northward along existing rail lines. The remainder of the rail route to Montreal is as proposed in the previous *2003 Boston-to-Montreal* study.⁹

With this revised alignment for a potential Boston-to-Montreal Route, both the Inland Route Service and Boston-to-Montreal passenger rail service could use the existing rail lines of the Northern New England Corridor between Boston and Springfield. The NNEIRI Study evaluates the options for passenger rail service along these routes, treating them as a consolidated Corridor. The NNEIRI environmental analysis does not include impacts that might occur in Canada. NEPA applies to major federal actions of the U.S. government. Any environmental impacts in Canada would be evaluated through applicable Canadian laws should the Study advance to Tier 2. The NNEIRI service would use the same border crossing as the existing New England Central Railroad, and is the same border crossing that the legacy Amtrak Montrealer service used from the 1970s to 1995.

1.2.2 Regional Framework

In 2009, the New England states (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut) created a framework for improving high speed and intercity rail in New England, known as the *New England Vision for High Speed and Intercity Passenger Rail (New England Vision)*.¹⁰ The *New England Vision's* goals for all the states were to improve the railroad network connectivity within the region, develop a safe and efficient passenger rail system seamlessly linking every major city in New England with smaller cities and rural areas, and create an international connection to Montreal to provide a foundation for economic competitiveness and promote livable communities. It includes faster and more frequent rail service that promotes energy efficiency and environmental quality by providing alternative transportation choices while also enhancing the movement of rail freight throughout the region.

Currently, significant infrastructure improvements consistent with the *New England Vision* are completed or underway. The total expenditures as of July 2015 are nearly a half billion dollars and are a combination of both public and private investments.

In western Massachusetts, the Knowledge Corridor/Restore the Vermonter project improved passenger service on Amtrak's Vermonter service by restoring the route to the Connecticut River line, which is shorter and more direct. The inaugural run of the Vermonter service on the Knowledge Corridor occurred on December 22, 2014.

In Connecticut, the New Haven-Hartford-Springfield Project, headed by the CTDOT with grant funding from FRA's HSIPR Program, began construction in July 2013 and is still ongoing. The proposed capacity, reliability, and safety improvements along the NHHS corridor would

⁹ Boston to Montreal High-Speed Rail Planning and Feasibility Study Phase I. Final Report. April 2003. <https://www.nh.gov/dot/org/aerorailtransit/railandtransit/documents/BostonMontrealHSR.pdf>

¹⁰ Vision for the New England High-Speed and Intercity Rail Network. 2009. https://www.massdot.state.ma.us/portals/20/docs/NewEngland_HSR_Vision.pdf

facilitate an increase in the maximum train speed to 110 miles per hour (mph), reduce scheduled travel times, and reduce conflicts with freight trains that share the tracks.

Additionally, infrastructure improvements in Vermont that support Amtrak *Vermont* service were completed by Amtrak and the State of Vermont in October 2012 through a program of track upgrades funded through FRA's HSIPR program.¹¹ The combination of rail investments made in Vermont and Massachusetts along with those of the NHHS program would enhance operation of the current *Vermont* throughout its route from New Haven, Connecticut to St. Albans, Vermont.

In eastern Massachusetts, the Boston South Station Expansion and Layover Facility Project (SSX project) would expand terminal rail capacity and related layover capacity in order to meet current and future high-speed, intercity, and commuter rail service needs. MassDOT prepared a state-level Draft Environmental Impact Report (EIR) for the Boston SSX project and submitted it to the Massachusetts Executive Office of Energy and Environmental Affairs on October 31, 2014. That office issued a Massachusetts Environmental Policy Act (MEPA) Certificate on December 31, 2014. MassDOT received an FRA HSIPR grant to perform preliminary engineering and environmental analysis for the SSX project, and MassDOT is currently preparing a NEPA Environmental Assessment in coordination with FRA. Preparation of the EA is occurring in parallel with preparation of the Final EIR under MEPA. MassDOT has not received additional sources of federal or state funding for final engineering or construction of the SSX project.

Additionally, FRA is leading a comprehensive planning process to define, evaluate, and prioritize future investments in the Northeast Corridor (NEC), from Washington, D.C. to Boston, called NEC FUTURE. The FRA launched NEC FUTURE in February 2012 to consider the role of rail passenger service in the context of current and future transportation demand. NEC FUTURE would create a framework for the future investments needed to improve passenger rail capacity and service through 2040. Through the NEC FUTURE program, the FRA intends to determine a long-term vision and investment program for the NEC. FRA published a Tier 1 Draft Environmental Impact Statement (EIS) for NEC FUTURE in November 2015, and is scheduled to publish a Final EIS and Record of Decision (ROD) in 2016 and Service Development Plan (SDP) in 2017 in support of that vision.

The NNEIRI Study evaluated options to advance the vision of improved regional connectivity by maximizing use of regional rail investments for improvements that have been recently completed or are underway and utilizing existing rail infrastructure in the Corridor. The potential NNEIRI passenger rail service assumes much of the existing infrastructure will have already been upgraded through a series of separate improvement projects.

¹¹ VTrans. Vermont Rail Plan. Bulletin #2, March 2015.
http://rail.vermont.gov/sites/railroads/files/VTRailPlan_Bulletin2_062815.pdf

2 PURPOSE AND NEED

2.1 PURPOSE

The purpose of the NNEIRI Study is to address the lack of intercity transportation choices in New England, particularly between major cities and the smaller cities and rural areas of the northern region. A potential increase in the use of passenger rail is not being considered as a replacement for other transportation alternatives such as automobile, bus, and air. Rather, enhancing passenger rail service is being considered as a means to increase available choices for travelers in the identified travel markets, and to do so in a manner that is supportive of the environmental and economic development goals of the region. As noted in Section 1.2 above, the existing rail routes that comprise the NNEIRI Corridor are the result of stipulations contained in Congressional legislation of Public Law 108-447 in Section 154¹² and previous regional planning activities. Thus, the NNEIRI Study analyzes the additional passenger rail options in two segments of the NNEIRI Corridor (Boston to Springfield, Massachusetts segment and the Springfield, Massachusetts to Canada border segment) in a manner that seeks to capitalize on the use of the considerable existing and pending public and private investments in the NNEIRI Corridor. The alternatives developed through the Study are intended to be capable of creating a competitive rail transportation alternative to existing automobile, bus, and air travel service through more frequent and higher speed intercity passenger rail service.

2.2 NEED

The need for the NNEIRI Study stems from recognizing benefits to the region's economy and livability from improved connections across and between the New England states. Many small and medium size cities and economic centers geographically dispersed across New England could be served by passenger rail service along the Corridor. Improved transportation connections between these centers would be of great benefit to its residents and employees, as well as visitors traveling within and through the region. Additionally, strong sustained increases in Amtrak New England ridership¹³ show that demand for intercity transportation in the Corridor is trending towards alternative modes, including intercity passenger rail. Many highways along the Corridor experience periodic congestion and capacity issues making rail travel a more attractive alternative. Improvements and expansion of intercity rail services would enhance options for the mobility and connectivity needed in the Corridor for the region to grow and prosper.

¹² Public Law 108-447, Section 154 passed into law December 8, 2004 states in part that "The Northern New England High Speed Rail Corridor is expanded to include the train routes from Boston, Massachusetts, to Albany, New York, and from Springfield, Massachusetts, to New Haven Connecticut."

¹³ Szabo, Joseph. "Amtrak ridership breaks 10th record in 11 years." United States Department of Transportation, October 22, 2013, <http://www.dot.gov/fastlane/amtrak-ridership-breaks-10th-record-11-years>

2.2.1 Economic Opportunity

In the global economy, regions across the country and the world are continually searching for ways to become or remain economically strong. The New England region has many attributes that support its strong economic position that include a rich social and cultural history, many prestigious academic and research institutions, a well-educated and diverse workforce and a mix of urban, suburban and rural population centers all located in fairly close proximity to the region's major economic centers. Ensuring ready connectivity between the region's population bases and its economic centers is a critical factor in maintaining its economic strength.

The following section identifies key attributes of the Corridor that would be enhanced by improved connectivity from expanded intercity passenger rail service. These include the varied rate of employment and skill level of employees, the size and impact of the tourism sector, and the size and location of colleges and universities in the Corridor, a population that has shown a preference to travel by rail.

2.2.2 Job Access

Connectivity between job centers and specialized employment clusters is a key consideration of the NNEIRI Study. Through connectivity improvements provided by services envisioned for the NNEIRI Corridor, residents would have easy, convenient and affordable access to major job centers, which is attractive to today's workforce that often uses a combination of telecommuting with periodic travel to an office hub via intercity passenger rail.

Access to wider employment markets is especially important in New England, where unemployment rates may vary considerably between metropolitan regions. Despite six-plus years of recovery after the 2007-2009 Recession, the unemployment rate remains high in several of the metropolitan areas along the Corridor; this is especially true in New Haven, Connecticut and in Montreal, Quebec.

Highly skilled and educated employees are more likely to travel further for work for which they are already trained. In terms of educational attainment, Massachusetts, Connecticut, Vermont and New Hampshire are all ranked within the top 10 states for percentage of population 25 years or older with a bachelor's degree or higher.¹⁴ All US metropolitan areas and cities along the Corridor have higher percentage of people 25 years or older with a postsecondary degree. Boston, Massachusetts and Burlington, Vermont have the highest percent (approximately 50%) of people with a postsecondary degree while, Greenfield, Massachusetts has the lowest percent (only 38%) of people with a postsecondary degree.¹⁵ Montréal, Quebec is even lower, at 36 percent.¹⁶

¹⁴ U.S. Census Bureau, 2011.

¹⁵ American Community Survey (ACS), 2010-2012; American Community Survey 2007-2011; National Household Survey, 2011, Statistics Canada

¹⁶ National Household Survey, 2011, Statistics, Canada. Due to variances in educational standards, some Canadians listed as having a high school diploma or equivalent actually have more years of education than US students who fall into the same category.

Improved rail service would also expand the talent pool for potential employers. For example, Amtrak’s successful Downeaster service (located along a separate branch of the Northern New England Corridor) provides mobility options for residents throughout eastern New Hampshire and southern Maine to job centers in the metro-Boston area. The service is especially attractive for employment positions that require periodic but not daily travel to an office.

Additionally, the NNEIRI Corridor would provide connectivity to specialized employment clusters in New England, which include strong financial, academic, consulting, medical, and scientific communities, where collaboration and personal connections are instrumental. Boston, Worcester, Springfield, and New Haven all have large and diverse medical research and education centers. The proposed NNEIRI services would enable individuals from these institutions to physically connect at conferences, research, and employment events in a timely and cost-effective way, even during the challenging winter season when rail travel is typically less impacted by harsh weather compared to other modes. Similarly, it provides another avenue of access between those of similar professions from beyond the region to enhance productive collaboration.

2.2.3 Education

The NNEIRI Corridor is proximate to dozens of colleges and universities attended by almost 1 million students, as shown in Table 2.2-1. The majority of these students are based in the Boston, Montreal, and Hartford metropolitan areas, making travel by rail a viable, cost-efficient and timesaving option over driving or flying. Universities are also major destinations for performing arts, sporting events, conferences, research, and other events they host. Table 2.2-1 shows the number of colleges and universities within each Metropolitan area along the Corridor. Over 190 schools exist in metropolitan areas along the Corridor. Improvements to the intercity rail service would increase faculty, staff, and students’ ability to travel to/from campuses.

According to the American Public Transportation Association (APTA)/Transportation Cooperative Research Program (TCRP) report, the Millennial Generation (those born between 1982 and 2003) are multimodal and they choose the best transportation mode (driving, transit, bike or walk) based on the trip they are planning to take. Millennials consider public transportation options as the best options for digital socializing and among the most likely to connect the user with their communities. 40 percent of the 1,000 Millennials who were surveyed stated that public transit allows them to work while traveling. Millennials stated cost, convenience, exercise, living in a community with public transit, and environment as the top five reasons or motivations for preferring public transportation.¹⁷

¹⁷ American Public Transportation Association (APTA)/ Transportation Cooperative Research Program (TCRP). Millennials & Mobility: Understanding the Millennial Mindset. <http://www.apta.com/resources/reportsandpublications/Documents/APTA-Millennials-and-Mobility.pdf>

Table 2.2-1. Number of College Students and Colleges by Metropolitan Area

Metro Area	Number of College Students	Number of Colleges
Boston, MA	432,706	78
Worcester, MA	61,425	15
Springfield, MA	74,174	20
Greenfield, MA*	819	2
Brattleboro, VT*	374	6
Lebanon, NH	14,965	4
Barre, VT	4,572	5
Burlington, VT	24,659	8
Montréal, QC**	>196,076	>7
Hartford, CT	103,335	26
New Haven, CT	68,669	19
Total	>981,774	190

Sources: 2010-2012 American Community Survey (ACS) 3-Year Estimates, 2007-2011 American Community Survey (ACS) 5-Year Estimates; National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education

*Corridor cities not in metropolitan areas are identified separately.

**Sum of total students reported at seven major schools identified in the metropolitan area. No source on the number of colleges was found. A Google search was utilized to identify major colleges/universities.

2.2.4 Tourism

Tourism is an important driver of the regional economy within the NNEIRI Corridor. Tourists spend billions of dollars on tourism-related activities every year in Massachusetts, Vermont, New Hampshire, Quebec, and Connecticut as shown in Table 2.2-2. Improvements to the intercity rail service would make it easier for leisure travel within the region, particularly for senior or disabled travelers, as well as for international tourists who may be unfamiliar with American roadways but comfortable with passenger rail because it is a common travel alternative in their home countries (for example United Kingdom, China, Germany, France and Japan, which were the top five countries with the largest number of visitors to New England states in 2012¹⁸).

Tourism also supports tens of thousands of jobs in each state and the province. Tourism-related jobs along the Corridor are also important. The number of tourism-related jobs ranges from a high in Quebec of 134,600 to a low of 37,910 in Vermont. With eight to eleven percent of all

¹⁸ Discover New England. International Travel & Tourism. DNE Summit 101. 2012.
<http://discovernewengland.org/sites/default/files/Learn-to-Summit.pdf>

jobs in the region’s metropolitan areas directly or indirectly linked to this industry, encouraging more people to travel within the region is vital to maintaining and increasing these jobs.

Table 2.2-2. Expenditure and Jobs from Tourism in Each State*

State/ Province	Expenditure (billions)	Tourism Jobs
Massachusetts	15.5	121,700
Vermont	1.7	37,910
New Hampshire	4.2	61,821
Quebec	6.6	134,600
Connecticut	8.0	110,000

Source: Connecticut Commission on Culture & Tourism; Massachusetts Office of Travel and Tourism 2011 Annual Report; Vermont Tourism Industry Fact Sheet – 2011; Economic Impact, Tourism, Portrait of Québec

** Connecticut data is from FY2008, Quebec data is from CY2009, Massachusetts data is from CY2010 and New Hampshire and Vermont data are from FY2011.*

2.2.5 Population and Demographics

In the 2000s, the population of the New England region increased at a rate significantly slower than the rest of the United States, increasing 3.8% between 2000 and 2010. However, in a similar timeframe, 1997 to 2012, ridership on Amtrak lines serving New England increased by 71%, with even greater increases in specific metropolitan areas. Metropolitan Boston, for example, saw a 211% increase in Amtrak ridership from 1997 to 2012. Amtrak’s robust growth in New England is largely the result of changing transportation preferences coupled with significant service improvements and expansion in the region.

2.2.6 Changing Transportation Preferences

Nationally, Amtrak ridership increased from 20.5 million in Fiscal Year (FY) 2000 to 31.6 million in FY 2013, a growth rate of 50% and a faster rate than any other travel mode during the same period.¹⁹ In New England, rail ridership outpaced national averages. For example, ridership on the Downeaster service between Boston, Massachusetts and Portland, Maine, grew 123% between 2005 and 2013.²⁰ Despite relatively slow population growth, New Englanders have increasingly utilized intercity rail transportation. Table 2.2-3 details the change in Amtrak ridership between 1997 and 2012 in New England’s largest metropolitan areas.

¹⁹ Szabo, Joseph. “Amtrak ridership breaks 10th record in 11 years.” United States Department of Transportation, October 22, 2013, <http://www.dot.gov/fastlane/amtrak-ridership-breaks-10th-record-11-years>

²⁰ Ibid.

Table 2.2-3. Change in Amtrak Ridership in New England Metropolitan Areas*

Census Defined Metropolitan Area	1997 Ridership	2012 Ridership	Percent Change
Bridgeport-Stamford-Norwalk, CT	232,447	478,149	+106%
Boston-Cambridge-Quincy, MA-NH	1,018,297	3,167,716	+211%
Hartford-West Hartford-East Hartford, CT	236,047	299,163	+27%
New Haven-Milford, CT	276,021	808,300	+193%
Providence-New Bedford-Fall River, RI-MA	368,117	874,436	+138%
Springfield, MA	134,766	156,550	+16%
Worcester, MA**	15,667	8,900	- 43%
Total Ridership	2,281,362	5,793,214	+154%

Source: Brookings Institution, 2013

*Data for Ridership in other New England Metro Areas not available

**Worcester ridership decline is likely due to the introduction and improvement of the MBTA Commuter Rail Service between Worcester and Boston

2.2.7 Accommodate Populations with High Reliance on Non-Auto/Public Transit

Communities on or in close proximity to the NNEIRI Corridor have significant populations that do not own personal vehicles. Households without personal vehicles are likely to be reliant on transit, intercity rail and bus, walking, and biking for transportation. Thus, in communities with high-percentages of households without personal vehicles, improved rail is imperative for mobility and economic competitiveness.

2.2.8 Accommodate Population and Demographics Changes

Despite being a slow growing region generally, New England has certain regions and demographic segments that are changing quickly. Demographic groups that are seeing significant change include fast growing urban populations and the elderly, both of whom are more likely to need alternatives to cars.

Key cities and urban centers in the Corridor are rapidly growing, as preferences for urban living increases. The City of Boston, for example, grew by an estimated 3% between 2010 and 2012, or a 15% ten-year growth rate.²¹ Similarly, Cambridge, Newton, Worcester, Springfield, Hartford, and New Haven saw positive growth rates during this period. With housing and employment location preferences changing to favor cities and urban living, growth in areas with existing public transit, walkable streets, and density is likely to continue. Thus, reliance on public transit would also necessitate better intercity rail connections between cities.

²¹ U.S. Census 2012 Estimate.

By 2030, the Census Bureau projects that the New England states would see a dramatic change in the general age of its population with the percent of residents over 65 rising significantly. While population aging is occurring across the country and around the world, New England's average population is older than, and aging more rapidly than, the U.S. average. An older population would experience a decrease in mobility and have a higher reliance on alternative means of transportation.

Between 2000 and 2030, the population of individuals aged 65 years and over in Massachusetts, Vermont, New Hampshire, and Connecticut is projected to increase by 79 percent during the 30-year period.²²

2.2.9 Travel Demand

The New England region has a relatively diverse intercity transportation network, with extensive rail, expressway, bus, and air connections between major cities. However, most modes are already at or near capacity at critical points, with congestion projected to steadily increase.²³

Historically, robust passenger rail options existed throughout New England; however, with the exception of the Springfield to New Haven segment, only one train per day provides intercity service on the NNEIRI Corridor. The decline in passenger rail began in the 1920s with the arrival of the automobile and was exacerbated by the construction of the Interstate Highway System in the mid-20th Century. In the early 21st Century, intercity rail ridership is seeing a resurgence, as changing travel preferences among large segments of the population redefine travel in the United States and Amtrak, in partnership with States, expands and improves regional passenger rail services.

Introducing additional intercity passenger rail service that connects major urban centers with smaller cities and towns in the region would provide a competitive modal option for travel in the Corridor. The travelling public selects travel modes based on a combination of trip time, cost, and convenience, and travelers are opting for rail where reliable and frequent rail service is available, as opposed to facing the increased congestion and delays of the New England region's highways and airports.

Travel modes available to the public along the Corridor include automobile, air, bus, and relatively low-speed, low frequency, long-distance passenger rail. The predominant mode of travel in the region remains the automobile. Intercity highway access in the region is provided through Interstates 84, 89, 90, 91, 93, 95, and Canadian AutoRoute 35, as well as a number of state highways. Interstate 90 in Massachusetts and segments of Interstate 93 in New Hampshire are toll roads.

In addition to the costs and travel time of automobiles, Interstates in metropolitan Boston, Hartford, New Haven, and Montreal have peak-period congestion and capacity issues.

²² Population Pyramids and Demographic Summary Indicators for States, retrieved on Nov. 11, 2013. <http://www.census.gov/population/projections/data/statepyramid.html>

²³ New England Futures: New Century, New Game. Road, Rail, Air, Water: Separate Worlds or One System? <http://newenglandfutures.org/issues/connections/article/>. Originally published in February 2006.

According to the *2015 Urban Mobility Scorecard*²⁴ report, yearly delay per auto commuter²⁵ in the Boston metropolitan area was 64 hours. Hartford and New Haven commuters experienced 45 and 40 hours of yearly delay per auto commuter, respectively. The remainder of the Corridor experiences intermittent traffic congestion. Due to environmental concerns, cost, and community resistance, it is highly unlikely that significant roadway capacity would be added in the New England region in the foreseeable future.

Air service is currently available between certain major city pairs in the NNEIRI Corridor. Extensive commercial air service is provided in Boston (Logan International Airport), Hartford (Bradley International), Burlington, and Montreal (Dorval International). Air Canada provides direct flights between Boston and Montreal and Hartford and Montreal. Scheduled flight times range from 72-82 minutes; however, most airlines require passengers to arrive two hours early for international flights. Tickets purchased with two weeks advance notice typically cost over \$600 for direct flights; however, indirect flights were cheaper, costing \$361 if purchased in advance, but also increase the journey up to four hours due to layover time. Major airports in the region are experiencing ground transportation related congestion, with anticipated passenger demand expected to further strain capacity. Logan International Airport, for example, is anticipated to grow from 29 million passengers per year in 2012 to 40 million in 2030.

Intercity bus service is available between a majority of mid-to-large sized cities, with intermittent service in smaller towns. Numerous public and private bus companies operate along the Corridor. Greyhound provides service through much of the Boston-to-Montreal segment of the Corridor with service as frequent as four trips per day between White River Junction and Montreal. Megabus.com, a subsidiary of Coach USA, is a low-fare express bus service with stops in Boston, Burlington, Montpelier, Hartford, and New Haven. In addition, Peter Pan Bus Lines, Concord Coach, Dartmouth Coach and others provide intercity bus service to and between cities on the Corridor. Megabus.com provides one round trip per day between Boston and Hartford, for example, at 9:15 PM, which has a scheduled time of 110 minutes and costs \$22 if purchased in advance. In addition to low fares, Megabus.com offers competitive amenities including Wi-Fi service, power ports at each seat, and on-board restrooms. However, Megabus and similar companies such as Bolt Bus and Greyhound are subject to the same delays as automobiles on New England's congested Interstates and have travel times that are typically incompatible with business traveler's demands.

Intercity rail service from Boston to Springfield and from New Haven to St. Albans is part of Amtrak's existing network. There is one round trip per day east-west via the Lakeshore Limited and one round trip per day north and south on the Vermonter. Travel time from Boston to Springfield on the current Amtrak service is approximately two hours and 28 minutes and travel time from New Haven to St. Albans is approximately 7 hours and 32 minutes.²⁶ The

²⁴ 2015 Urban Mobility Scorecard. The Texas A&M Transportation Institute and INRIX. August 2015.

²⁵ Yearly delay per auto commuter is the extra travel time during the year divided by the number of people who commute in private vehicles in the urban area.

²⁶ Amtrak Timetable, April 6, 2015 for the Lake Shore Limited and December 29, 2014 for the Vermonter (this will be reduced with re-routing of service slated to begin in late 2014/early 2015)



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typical ticket price for travel from Boston to Springfield is \$21, and from New Haven to St. Albans is \$56. There is currently no service between St. Albans and Montreal, which was largely due to the challenges associated with cross-border security clearances. However, in March 2015 the United States and Canada signed a pre-clearance agreement (as part of the two countries' Beyond the Border Initiative) to allow screening of travelers away from the border and ease congestion at ports of entry, thereby significantly reducing the time required to cross the border and making international travel easier and more desirable.

3 ALTERNATIVES

This chapter summarizes the NNEIRI Study’s alternatives development and analysis process and describes the Build Alternative and No-Build Alternative for increased intercity passenger rail service the NNEIRI Corridor. Early on, the NNEIRI Study Team developed three preliminary build alternatives from a range of 18 initial alternatives. The Study Team then conducted an alternatives analysis to define a single Build Alternative to carry forward for analysis in the Tier 1 EA, based on a combination of elements from the three preliminary alternatives that best addresses the Project Purpose and Need while balancing feasibility and cost effectiveness. A more detailed description of the alternatives screening and evaluation process is included in the *NNEIRI Alternatives Analysis Report*.²⁷

3.1 ALTERNATIVES DEVELOPMENT AND SCREENING

At the beginning of the alternatives development process, the Study Team defined 18 initial alternatives with ranges of speed, frequency, and equipment. The Study Team analyzed these alternatives to assess impacts on ridership and train performance. Data from the analysis was used to develop the three preliminary build alternatives and one No-Build Alternative that the Study Team further analyzed in the alternatives analysis process.

Preliminary Service Options

The Study Team developed 18 initial alternatives for consideration and analysis by identifying train operating characteristics potentially feasible along the NNEIRI Corridor. NNEIRI Service in the segment between Springfield and New Haven would utilize the CTDOT plan for the NHHS service, and therefore was not modeled by the Study Team to determine speed, equipment, and engineering parameters. The Study Team developed the 18 initial alternatives based on consideration of the following criteria:

- **Speed:** Top speeds of 60, 79, 90, 110, 125 mph
- **Equipment:** Tilt and non-tilt train equipment
- **Engineering Specifications:** Track engineering specification modifications that include:
 - Super-elevation
 - Unbalance
- **Number of Locomotives:** Use of more than one locomotive for each trainset
- **Station Stops:** Local Service (14 intermediate stations) and express service (5 intermediate stations)

²⁷ Northern New England Intercity Rail Initiative. Alternatives Analysis Report. January 2015.

Performance Results

The Study Team estimated travel time for the 18 initial alternatives using the Train Performance Calculator (TPC) train simulation model within the Berkeley Simulation Software, LLC's Rail Traffic Controller (RTC) software package. The TPC model calculates the best possible train running time over a given route using specific route characteristics. The Study Team drew the following conclusions from the analysis:

- Eliminate use of more than one locomotive from further evaluation due to limited travel time savings;
- Eliminate top speeds of 110 or 125 mph due to the limited areas of feasibility and significantly higher capital and operating and maintenance costs; and
- Use of tilt equipment in conjunction with a 90 mph maximum allowable speed provides largest estimated time savings.

Preliminary Service Plans

Based on the results of the TPC developed travel time estimates, a number of service plans were advanced into the preliminary ridership-estimating phase to develop the three preliminary build alternatives. The information required to develop preliminary ridership estimates included:

- Train service times;
- Daily frequencies; and
- Station stops.

The Study Team developed a set of daily train frequencies options for preliminary ridership analysis. The Study Team analyzed alternatives with 8, 12, and 16 daily round trip trains for the Boston-to-Springfield segment, and alternatives with 4, 7, and 12 daily round trip trains for the Springfield-to-Montreal segment. The Study Team utilized the schedule developed for the NHHS program for NNEIRI services operating between Springfield and New Haven. The preliminary service plans include a mixture of local and express service.

Preliminary Ridership Results

The Study Team developed ridership estimates for the preliminary service plans to further develop the alternatives. The initial ridership analysis evaluated speed, number of station stops, frequency of service, and other factors that affect ridership for the Corridor. The Study Team reached the following conclusions based on the preliminary ridership results:

- Ridership on the Boston to Springfield segment of the Corridor is more influenced by travel time; and
- The Springfield to Montreal segment is more influenced by alternatives that maximize station stops.

The conclusions of the analysis were factored into development of the three preliminary build alternatives.

3.2 PRELIMINARY ALTERNATIVES

The Study Team cut the 18 initial alternatives down to three possible build alternatives based on the consideration of the screening criteria, which included speed, equipment, engineering specifications, number of locomotives, and station stops, and the input provided by stakeholders and the public (see Chapter 5 for more information). The three preliminary build alternatives, which are detailed in the following sections, represent the range of potential service and speed options that appeared to be the most feasible and efficient based on the analysis of the initial alternatives. Each of the preliminary build alternatives would add to the physical and operational improvements of the No-Build alternative, and are intended to meet the Project Purpose and Need in a cost effective manner.

3.2.1 Preliminary Alternative 1 – Corridor Service

Preliminary Alternative 1 would provide improved passenger rail service on the Corridor with infrastructure upgrades to improve speeds to 60 mph where possible and accommodate the Preliminary Alternative 1 Service Plan, described below. Infrastructure upgrades would include additional sidings, and track and bridge improvements. The Preliminary Alternative 1 service would provide local service between Boston, Montreal, and New Haven. Alternative 1 would include the improvements and operational changes identified in the No-Build Alternative and infrastructure and operations improvements noted below.

Preliminary Alternative 1 Service Plan

Preliminary Alternative 1 would provide new passenger service (local service stopping at all stations) with four daily round trip trains between Boston and New Haven, two daily round trip trains between Boston and Montreal, and one daily round trip train between New Haven and Montreal.

In addition to the passenger rail services in the Corridor identified in the No-Build Alternative, Preliminary Alternative 1 would include six additional daily round trips between Boston and Springfield. Four of the six additional trains would be extensions of existing services that currently operate between New Haven and Springfield. Under Preliminary Alternative 1, these four existing services would be extended to Boston to operate between New Haven, Springfield and Boston. Two of the six additional round trip trains proposed to operate between Boston and Springfield would be through trains that would continue north from Springfield to Montreal. In addition to the Amtrak Vermonter service that currently operates one round trip train between New Haven and Montreal, Preliminary Alternative 1 would provide one additional round trip train that would operate between New Haven and Montreal via Springfield.

Preliminary Alternative 1 Infrastructure Program

Preliminary Alternative 1 would require infrastructure upgrades at some locations on the Corridor to accommodate the additional passenger rail service. Speeds on the Corridor would be increased to at least 60 mph where possible and infrastructure would be upgraded to serve proposed train operations. Maximum operating speeds would be 79 mph where it currently exists.

Layover Facilities

Train sets on the Corridor would access at layover facilities near terminal stations. No additional layover facilities from those identified in the No-Build Alternative are anticipated as part of Preliminary Alternative 1.

Right-of-Way (ROW)

Preliminary Alternative 1 does not propose any alignment changes to the ROW and all track work would take place within the existing ROW. However, potential improvements for certain segments of the ROW are anticipated.

In multiple segments of the Corridor, only a single track exists or is currently in operation. Single-track segments constrain the number of trains that can operate on a segment for both freight and passenger railroads. Preliminary Alternative 1 includes adding a second track for switching between Spencer and Brimfield, Massachusetts on CSX and additional sidings between East Northfield and St. Albans on NECR to enable freight and passenger rail to operate more efficiently.

Signal Systems

The Corridor currently has train control signal systems between Boston and Springfield, Springfield and New Haven, Springfield to East Northfield, sections of the NECR in Vermont, near Montreal, and other select locations on the ROW. Due to the additional trains proposed in Preliminary Alternative 1, an extensive train control signal system and positive train control (PTC) systems would be needed in certain parts of the Corridor. Signal systems would include improvements to warning devices at highway-rail grade crossings. Consideration would be given to needed improvements based on increased train frequency, higher operating speeds, or both.

Station Infrastructure

No major improvements to existing stations on the Corridor are planned as part of this project. However, upon further review minor station improvements may be necessary to provide key passenger amenities and meet operational requirements.

Worcester Union Station requires additional platform and track capacity to accommodate any additional intercity services. Preliminary Alternative 1 service would be accommodated through the addition of a center island platform within the existing ROW envelope. Additionally, for a station stop in Palmer, Massachusetts it is assumed that new station facilities would be necessary. Despite the existence of a historic headhouse and station platforms in Palmer, the configuration of the historic station precludes the installation of high level platforms and double main tracks. Reuse of the existing station may be possible for Alternative 1, but it would not support service projected in Alternatives 2 and 3.

3.2.2 Preliminary Alternative 2 – Corridor Service with Speed Improvements

Preliminary Alternative 2 Service Plan would provide passenger rail services identified in the No-Build Alternative plus eight round trip trains from Boston to New Haven (four express and four local), three round trip trains from Boston-to-Montreal (two local and one express), and two round trip trains from New Haven to Montreal (one express and one local).

Stations for non-express trains would be the same as in Preliminary Alternative 1. Preliminary Alternative 2 would include the addition of express service for certain routes. Ridership data was utilized to determine the stations with the highest ridership potential for express service. Generally, express trains would stop at larger metropolitan centers and other strategic station locations.

Preliminary Alternative 2 Service Plan

Preliminary Alternative 2 Service Plan would provide passenger rail services of the No-Build Alternative plus eight round trip trains from Boston to New Haven (four express and four local), three round trip trains from Boston-to-Montreal (two local and one express), and two round trip trains from New Haven to Montreal (one express and one local).

Stations for non-express trains would be the same as in Preliminary Alternative 1. Preliminary Alternative 2 would include the addition of express service for certain routes. Ridership data was utilized to determine the stations with the highest ridership potential for express service. Generally, express trains would stop at larger metropolitan centers and other strategic station locations.

Preliminary Alternative 2 Infrastructure Program

Preliminary Alternative 2 would utilize existing infrastructure and improved infrastructure that increases capacity and speeds to meet demands of the Preliminary Alternative 2 Service Plan and would improve speeds to 79 mph where possible.

Layover Facilities

Train sets on the Corridor would be accommodated at layover facilities near terminal stations. No additional layover facilities from those identified in the No-Build Alternative are anticipated to be needed as part of Preliminary Alternative 2.

Right-of-Way (ROW)

Preliminary Alternative 2 does not propose any alignment changes to the ROW and all track work would take place within the existing ROW. Speed improvement areas are the same as identified in the Preliminary Alternative 1 ROW analysis.

Preliminary Alternative 2 would include infrastructure to provide additional capacity on the Corridor with the goal to enable freight and passenger rail to operate efficiently. In addition to capacity improvements identified in Preliminary Alternative 1, Preliminary Alternative 2 proposes second track for all single track segments in the Worcester to Springfield Corridor as well as additional passing sidings in Vermont.

Signal Systems

The Corridor currently has train control signal systems between Boston and Springfield, Springfield and New Haven, sections of Vermont in the vicinity of Montreal, and other select locations on the ROW, such as the approach to Springfield from the east. Due to the additional level of service (LOS), a full train control signal system is included in Alternative 2 on the full length of the ROW.

Signal systems improvements would include upgrades to warning devices at highway-rail grade crossings. Specific improvements at individual crossings would be based on increased train frequency, higher operating speeds, or both.

Station Infrastructure

Station improvements on the Corridor would be the same as outlined in Preliminary Alternative 1.

3.2.3 Preliminary Alternative 3 – Corridor Service with Speed and Equipment Improvements

Preliminary Alternative 3 would provide service with a maximum operating speed of 90 mph and would use tilt train equipment. Necessary infrastructure upgrades would include improvements to the existing railroad ROW, full train signalization, and additional sidings/double tracking. Preliminary Alternative 3 would include all of the capital improvements and services indicated in Preliminary Alternative 2 with the additional infrastructure and operations changes noted in the following sections.

Preliminary Alternative 3 Service Plan

Preliminary Alternative 3 Service Plan would provide service above the No-Build condition consisting of the following: eight round trip trains from Boston to New Haven (four express and four local), three round trip trains from Boston-to-Montreal (two local and one express), two round trip trains from New Haven to Montreal (one express and one local), and five round trip shuttle trains (local service) from Boston to Springfield. Stations for non-express trains would be the same as identified in Preliminary Alternative 1 and the stations for express service trains would be the same as identified in Preliminary Alternative 2.

Preliminary Alternative 3 Infrastructure Program

Layover Facilities

Train sets on the Corridor would be accommodated at layover facilities near terminal stations. No additional layover facilities from those identified in the No-Build Alternative are anticipated as part of Preliminary Alternative 3.

Right-of-Way (ROW)

Preliminary Alternative 3 does not propose any alignment changes to the ROW and all track work would take place within the existing ROW. However, certain segments of the ROW would be improved to support operations and speed. Areas where improvements are proposed are the same as in Preliminary Alternative 2.

Signal Systems

As in Preliminary Alternative 2, Preliminary Alternative 3 would add significantly more trains to the Corridor, necessitating full signalization and positive train control. Signal systems would include improvements to warning devices at highway-rail grade crossings.

Stations

Station improvements on the Corridor would be the same as outlined in Preliminary Alternative 1.

3.2.4 Alternatives Comparison

The Study Team prepared a separate Alternative Analysis report that provides a detailed comparison of the three preliminary build alternatives and No-Build Alternative based on preliminary service plans, ridership forecasts, capital costs, and operations and maintenance costs (O&M). Table 3-2.1 summarizes the capital costs, operating costs and annual ridership for each of the preliminary alternatives and the No-Build Alternative.

A high-level, Corridor-wide environmental screening was completed during the alternatives analysis to identify any known significant impacts that would result from the proposed alternatives. The analysis found that impacts along the Corridor are anticipated to be generally minor and moderate with some minor impacts in specific locations due to operations and infrastructure needs, however no impacts are anticipated to be significant.

Table 3.2-1. Alternatives Comparison

Alternative	Capital Costs	Operating Support	Annual Riders (2035)
No-Build	No additional capital costs	No additional operating costs	79,900 riders
Preliminary Alternative 1	\$615-785 million	\$24 million	681,500 riders
Preliminary Alternative 2	\$1,065-1,350 million	\$39 million	1,201,200 riders
Preliminary Alternative 3	\$1,255-1,590 million	\$48 million	1,334,800 riders

No-Build Alternative: This alternative assumes no NNEIRI service on the Corridor. This alternative is the baseline against which each of the preliminary build alternatives was measured. The No-Build Alternative includes recently completed, underway, and planned transportation improvements in the NNEIRI Corridor area, including improved New Haven-Hartford-Springfield rail service, Springfield Union Station improvements, South Station – Boston expansion, extension of the Amtrak Vermonter to Montreal, and improvements to the Montreal-area rail network.

Preliminary Alternative 1 - Corridor Service: This alternative would provide local service (stopping at all stations) on the Corridor. In addition to the passenger rail services identified in the No-Build Alternative, Preliminary Alternative 1 would provide four round trip trains between Boston and New Haven, two round trip trains from Boston to Montreal, and one round trip train between New Haven and Montreal. Speeds on the Corridor would be improved to at least 60 mph and standard train equipment would be used. Infrastructure upgrades would include adding sidings and making track and bridge improvements. Preliminary Alternative 1 is the least expensive of the three alternatives, estimated between \$615-785 million, and would have the least ridership, with an estimated 681,500 passengers annually.

Preliminary Alternative 2 - Corridor Service with Speed Improvements: This alternative would build on Preliminary Alternative 1 with the addition of four round trip express trains between Boston and New Haven, one round trip express train from Boston to Montreal, and one round trip express train from New Haven to Montreal. Additionally, speeds would be improved to at least 79 mph and operations and standard train equipment would be used. Infrastructure upgrades would include the improvements described in Preliminary Alternative 1 and a second track for all single track segments in the Worcester to Springfield Corridor as well as additional passing sidings in Vermont. Capital costs are expected to be \$1,065-1,350 million. Estimated ridership would increase by 76% over Preliminary Alternative 1 to 1,201,200 annually.

Preliminary Alternative 3 - Corridor Service with Speed and Equipment Improvements: In addition to service in Preliminary Alternatives 1 and 2, Preliminary Alternative 3 would add five local round trip trains between Boston and Springfield. Additionally, speeds would be improved to at least 90 mph and tilting train sets would be utilized. Necessary infrastructure upgrades for Preliminary Alternative 3 would include improvements to the existing railroad right-of-way (ROW), full train signalization, and additional sidings/double tracking. Under Preliminary Alternative 3, stations for non-express trains would be the same as in Preliminary Alternative 1 and would include the addition of express service for certain routes as in Preliminary Alternative 2. Preliminary Alternative 3 would include all of the capital improvements and services indicated in Preliminary Alternative 2 with the additional infrastructure and operations changes. Capital costs for Alternative 3 are estimated to be between \$1,255-1,590 million and ridership is expected to be 1,334,800 annual riders, approximately 96% more annual riders than Preliminary Alternative 1.

There are limited locations on the NNEIRI Corridor that enable trains to operate at 90 mph due to track geometry. This significantly limits travel time savings provided by Preliminary Alternative 3 compared to Preliminary Alternative 2 and does not justify the higher cost. Additionally, ridership would be significantly less for the Preliminary Alternative 1 with a maximum speed of 60 mph as compared to Preliminary Alternative 2 with a maximum speed of 79 mph. For these reasons, the Study Team considered Preliminary Alternative 2 to be the most promising of three preliminary alternatives due to a combination of infrastructure constraints, ridership, and costs. With some modifications described in the following section, Preliminary Alternative 2 was carried forward for analysis in this Tier 1 EA.

3.3 NO-BUILD ALTERNATIVE

Inclusion of the No-Build Alternative is required under NEPA as the benchmark against which the impacts of the Build Alternative are compared. The No-Build Alternative includes all recently completed, ongoing, and planned improvements to the Corridor through future year 2035. The Study Team chose an analysis year of 2035 to assess the full impacts of NNEIRI

service implementation. Additionally, the 20-year time horizon is a standard FRA requirement for long-range rail planning.²⁸

Existing and Proposed Passenger Service

The No-Build Alternative assumes the continuation of the passenger rail services that currently operate on the Corridor, including:

- MBTA Southside Commuter Rail Services (Boston South Station – Back Bay Station);
- MBTA Worcester Line Service (Boston to Worcester);
- Amtrak Lakeshore Limited Service (Boston to Chicago via Springfield and Albany);
- Amtrak Vermonter Service (Washington, D.C to St. Albans via New Haven, Springfield, and White River Junction); and
- Amtrak Northeast Regional Shuttle and Northeast Regional Service (New Haven to Springfield).

In addition, new and improved passenger rail operations are anticipated for:

- MassDOT Knowledge Corridor/Restore Vermonter Project service changes between Springfield and East Northfield, Massachusetts;
- CTDOT New Haven-Hartford-Springfield Rail Service between New Haven, Connecticut and Springfield, Massachusetts; and
- Amtrak Vermonter extension from St. Albans, Vermont to Montreal, Quebec on the NECR and CN Lines.

Existing passenger rail service along the Corridor varies significantly by segment, ranging from 24 daily round trips between Boston and Worcester segment to one round trip each between Springfield and St. Albans, and Springfield and Worcester segments.

Current and Planned Infrastructure Upgrades

The No-Build Alternative assumes known capacity and speed upgrades to the ROW that are currently in progress or planned to occur. These completed or underway improvements include:

- As part of the Knowledge Corridor/Restoration of the Vermonter project, Amtrak Vermonter service has been reestablished along the Connecticut River Line between Springfield and East Northfield, Massachusetts. The service on this track segment began in December 2014 and all related project work will be completed in fall 2016.
- CTDOT infrastructure improvements on the NHHS rail line are underway, including double tracking and station improvements between New Haven, Hartford, and Springfield;
- Construction is underway for restoration of Springfield Union Station that includes installation of a high level station platform.

²⁸ “State Rail Plan Guidance,” Federal Register, September 2013, <https://www.federalregister.gov/articles/2013/09/18/2013-22679/state-rail-plan-guidance>

Planned improvements include:

- Expansion of Boston South Station to accommodate additional track capacity, train storage space, and provide additional station platforms;
- Construction of a new U.S. Customs and Immigration Services and Canada Border Services Agency station at Montreal Central Station Customs Checkpoint to allow faster travel in and out of Canada for passenger trains; and
- Improvements to infrastructure between the U.S. border and Montreal, Quebec identified in the Quebec Ministry of Transportation study, *Study Of CN And CP's Rail Networks Between Montréal And The U.S. Border* released in 2014.

The NNEIRI service would use the same border crossing as the existing New England Central Railroad, and is the same border crossing that was used by the legacy Amtrak Montrealer service.

Layover Facilities

Adequate layover facilities for trains are a significant element of infrastructure that is needed to support railroad operations. Train sets on the Corridor would be accommodated at layover facilities near terminal stations that either exist today or are planned as part of other projects included in the No-Build. Layover facilities would primarily serve as points to store, restock, and perform light maintenance on rail equipment. Additionally, layover facilities would provide crew quarters, including briefing rooms, locker rooms, and break rooms.

Locations of existing or proposed layover facilities include:

- Southampton Street Yard, Boston, Massachusetts (Amtrak);
- Additional layover facility to be included in South Station Expansion Project;
- Proposed Springfield Union Station Layover and Maintenance Facility, Springfield, Massachusetts;
- Springfield Station Sweeny Yard (Amtrak);
- New Haven Yard, New Haven, Connecticut (Amtrak);
- St. Albans Yard, St. Albans, Vermont (NECR); and
- Montreal Area – Assumed to be included in improvements to infrastructure between the U.S. border and Montreal, Quebec identified in the Quebec Ministry of Transportation study released in 2014. The existing VIA Rail Canada Montreal Maintenance Center (MMC) facility would be used.

3.4 BUILD ALTERNATIVE EVALUATED IN THIS EA

Based on the results of the alternatives analysis, stakeholder input, public meetings, and technical review by public agencies (see Chapter 5, Section 5.3), the Study Team developed a single Build Alternative. The Study Team developed the Build Alternative based on a combination of elements from the three preliminary alternatives that best addressed the NNEIRI Study purpose and need while balancing feasibility and cost effectiveness. The three primary factors used to determine the Build Alternative were infrastructure constraints, ridership, and cost. The Build Alternative is most similar to Preliminary Alternative 2 in terms

of infrastructure with changes to the proposed service plan. Capacity constraints near Montreal as well as anticipated limited ridership based on ridership forecasting on the Boston-to-Montreal Service warranted reducing the proposed service in that segment. Express Service was also eliminated from the Build Alternative due to it resulting in only minimal travel time savings and effect on ridership. Table 3.4-1 compares the Build Alternative to Preliminary Alternative 2 in terms of infrastructure upgrades and proposed service.

Table 3.4-1. Preliminary Alternative 2 vs. Build Alternative

	Preliminary Alternative 2	Build Alternative
Top Speed	79 MPH	79 MPH
Express Service	Yes	No
BOS to NHV Roundtrips	8	8
BOS to MTL Roundtrips	3	1
NHV to MTL Roundtrips (Including Vermonter)	3	2
Worcester to Springfield Double Track	Yes	Yes
Additional Vermont Sidings	Yes	Yes
Infrastructure Costs (Excluding Trainsets)	\$610-760M	\$648-721M
Annual Ridership (2035)	1,201,200	875,000

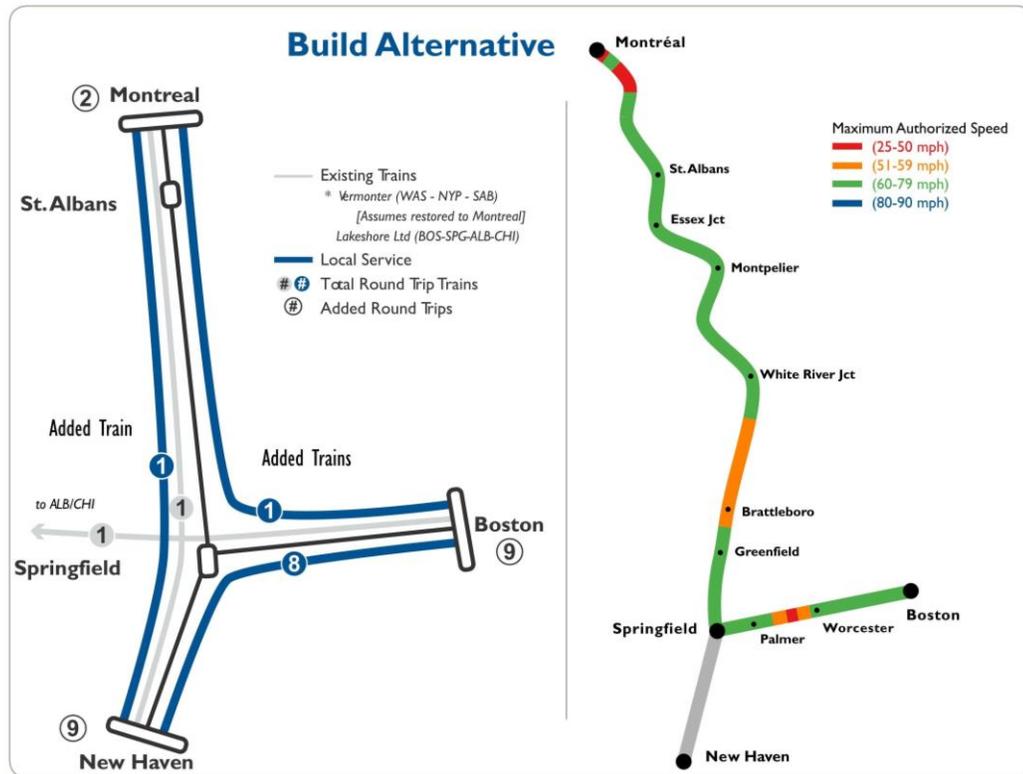


Figure 3-1: Build Alternative Services

3.4.1 Service Plan

Boston to Montreal

Under the Build Alternative, one new round trip local service train would operate daily between Boston and Montreal, with trains serving all existing stations and a new station in Palmer, Massachusetts. The frequency of service is considered optimal due to the level of demand anticipated in the Study Team’s ridership forecasting. Station stops would include:

- Boston (South Station and Back Bay)
- Framingham
- Worcester
- Palmer
- Springfield*
- Holyoke*
- Northampton*
- Greenfield*
- Brattleboro
- Bellows Falls
- Claremont
- Windsor (Vermont)

- White River Junction
- Randolph
- Montpelier
- Waterbury
- Burlington (Essex Junction)
- St. Albans
- Montreal (Central Station)

Note: () impacts previously reviewed in NHHS and Knowledge Corridor/Restore Vermonter EAs.*

New Haven to Montreal

The Build Alternative would provide one additional local round trip service between New Haven and Montreal, for a total of two round trip trains per day, with similar characteristics to Amtrak Vermonter service. The additional service would complement the Vermonter and provide additional services to meet demand anticipated by ridership studies. Station stops would include:

- New Haven*
- Wallingford*
- Meriden*
- Berlin*
- Hartford*
- Windsor (Connecticut)*
- Windsor Locks*
- Springfield*
- Holyoke*
- Northampton*
- Greenfield*
- Brattleboro
- Bellows Falls
- Claremont
- Windsor (Vermont)
- White River Junction
- Randolph
- Montpelier
- Waterbury
- Burlington (Essex Junction)
- St. Albans
- Montreal (Central Station)

Note: () impacts previously reviewed in NHHS and Knowledge Corridor/Restore Vermonter EAs.*

Boston to New Haven

Under the Build Alternative, eight new round trip trains would operate daily between Boston, Massachusetts and New Haven, Connecticut. These services would be extensions of existing

services operating on the Corridor between New Haven, Connecticut and Springfield, Massachusetts. The ultimate destination of each train (i.e. New Haven, New York, or Washington, DC) would be determined through discussions with Amtrak and coordination with other services operating along the Northeast Corridor at the time of service implementation. The service would make station stops at:

- Boston (South Station and Back Bay)
- Framingham
- Worcester
- Palmer
- Springfield*
- Windsor Locks*
- Windsor (Connecticut)*
- Hartford*
- Berlin*
- Meriden*
- Wallingford*
- New Haven*

Note: () impacts previously reviewed in NHHS EA.*

A comparison of the Build Alternative passenger rail service with the existing weekday passenger rail service and No-Build planned service that is committed for implementation through other initiatives is summarized by segment in Table 3.4-2.

Table 3.4-2. Summary of Weekday Revenue Passenger Service

Segment	Operator(s)	Existing Revenue Daily Round trips	No-Build 2035 Revenue Daily Round Trips	Build Alternative 2035 Revenue Daily Round Trips
Boston to Worcester	MBTA	23	23	23
	Amtrak Lake Shore Limited	1	1	1
	NNEIRI Service	-	-	9*
Worcester to Springfield	Amtrak Lake Shore Limited	1	1	1
	NNEIRI Service	-	-	9*
Springfield to New Haven	Amtrak (Northeast Regional Shuttle, Northeast Regional & Vermonter)	6-8	25	25
	NNEIRI Service	-	-	9*
Springfield to St. Albans	Amtrak Vermonter	1	1	1
	NNEIRI Service	-	-	2

Note:

* *Of the total 9 daily round trip trains, 8 are extensions of the existing shuttle services that operate on the Corridor between New Haven and Springfield.*

3.4.2 Infrastructure Program

The Build Alternative would require infrastructure upgrades at some locations on the Corridor to provide additional capacity and support increased speed. Track upgrades would support a maximum speed of 79 mph where possible. A second track or passing siding would be added in certain locations to support increased passenger and freight service. Full signalization would be installed in locations where it does not currently exist.

Layover Facilities

The Build Alternative does not propose additional layover facilities from those identified in the No-Build Alternative. Train sets on the Corridor would access layover facilities near terminal stations. Layover facilities would primarily serve as points to store, restock, and perform light maintenance on rail equipment. Additionally, layover facilities would provide crew quarters, including briefing rooms, locker rooms, and break rooms.

Right-of-Way (ROW)

The Build Alternative does not propose any changes to the track alignment and all track work would take place within the existing ROW. However, certain segments of the right-of-way would require improvements to accommodate increased speed and capacity. The following describes these improvements by segment.

Boston to Springfield Segment

NNEIRI services would not necessitate significant changes on the line between Boston and Worcester. Beginning in Worcester, the following upgrades would be necessary to accommodate passenger operations and existing freight traffic.

- **Track Improvements:** Tracks upgrades would allow for FRA Class 4 train operations between Worcester and Springfield, allowing passenger trains to operate up to 79 mph where track geometry allows. The Build Alternative includes two miles of new track, three new turnouts, and one railroad crossing upgrade.
- **Track Capacity Upgrades:** The ROW between Worcester and Springfield was historically a double track corridor. However, most of the second track was removed in the mid- 20th century. The additional NNEIRI services would require the reconstruction of the second track between Worcester and Springfield in all locations where it existed historically, but is currently single tracked. These locations are:
 - Auburn to Charlton (Mileposts 48.3-57.7);
 - East Brookfield to Brimfield (Mileposts 64.0-79.4); and
 - Palmer to Wilbraham (Mileposts 83.6-92.0).

In addition, one double track location in this segment would require an additional siding to accommodate NNEIRI services. The location is Spencer to East Brookfield (Milepost 59.3-63.3).

- **Bridge Work:** Existing bridges would be used in the Build Alternative and improvements would be made where necessary in order to accommodate the proposed service. Bridge work includes approximately 2,135 feet of bridge rehabilitation as well as 1,805 feet of

bridge redecking. Bridge work is necessary for the restoration of the second track between Boston and Springfield and would take place on the CSX-owned track sections.

Springfield to the Canadian Border Segment

The following upgrades would be necessary to accommodate passenger operations and existing freight traffic.

- **Track Improvements:** Track upgrades would allow for Class 4 train operations between Springfield and the Canadian Border, allowing passenger trains to operate up to 79 mph where track geometry allows. The Build Alternative includes 40 miles of new track, 45 new turnouts, and 18 railroad crossing upgrades.
- **Track Capacity Upgrades:** To accommodate increased passenger service in this segment, a second track or passing siding would be added at:
 - East Northfield, Massachusetts to Vernon, Vermont (Mileposts 110.5-111.8);
 - Downtown Brattleboro, Vermont (Mileposts 120.5-122.0);
 - Brattleboro to Bellows Falls, Vermont (Mileposts 123.5-144.0);
 - Randolph, Vermont (Mileposts 44.5-45.5);
 - Roxbury, Vermont (Mileposts 61.2-61.7); and
 - St. Albans to Swanton, Vermont (Mileposts 1.5-8.5).
- **Bridge Work:** The Build Alternative would utilize existing bridges and improve them, where necessary, in order to accommodate the proposed service. This includes approximately 350 feet of bridge replacement. The bridge replacements would occur in Walpole, New Hampshire and East Alburgh, Vermont.

Signal Systems

The Corridor currently has train control signal systems between Boston and Springfield. Due to the additional level of service, a full train control signal system is proposed along the full length of the ROW. Modernization of signals and grade crossings in this segment would be provided as part of the Build Alternative.

Centralized Traffic Control (CTC) would be added over the areas of the NECR that are currently under Track Warrant Control (TWC) and compatible with PTC regulatory requirements. This includes the section from East Northfield, Massachusetts to West River (located in Brattleboro, Vermont), and from White River Junction, Vermont to the Canadian border at Alburgh, Vermont. To upgrade to CTC in these Vermont areas, 57 intermediate signals would be installed approximately every two miles along the line and interlocking signals would be added at both ends of key existing passing sidings intended for use in this area. These sidings are located at St. Albans, Oakland (Georgia), Berlin, Roxbury, Bethel, S. Royalton, Hartland, Swanton, Fonda Junction (Swanton), Bolton, Randolph, and Brattleboro.

Station Infrastructure

Station improvements under the Build Alternative include the construction of an additional passenger platform at Worcester Union Station to accommodate NNEIRI services and a

potential new station in Palmer, Massachusetts. The new Worcester Union Station platform would be provided in the center of the existing ROW. Connection to Worcester Union Station would be provided via new vertical access to an existing pedestrian tunnel that was historically used to connect passengers to center island platforms. Tracks would be re-configured to accommodate the new platform, including the addition of new interlockings. Additionally, a controlled siding in Worcester would be taken out of service to accommodate the new platform and track configuration.

Potential service to Palmer, Massachusetts would require construction of a new station in the town. Despite the existence of a historic headhouse and station platforms, the configuration of the historic station in Palmer precludes the installation of high level platforms and double main tracks that are included in the Build Alternative. The exact location of the new station would be determined upon further refinement in a later phase of the NNEIRI Study.

3.4.3 Ridership Forecasts

Based on the 2035 annual ridership forecasts, the Build Alternative would result in a total of 875,000 annual riders (an increase of 795,100 riders over Baseline condition) and an annual diversion of 113,847,700 vehicle miles traveled (VMT). Table 3.4-3 summarizes the 2035 annual forecast results.

Table 3.4-3. 2035 Annual Forecast Results

Service	Point of Origin	Point of Destination	Annual Ridership
Inland Route Service	Station along Boston-Springfield Segment	Station in Connecticut	201,000
Inland Route Service	Station along Boston-Springfield Segment	New York Penn Station	183,000
Inland Route Service	Station along Boston-Springfield Segment	Station along Boston-Springfield Segment	44,000
Boston-to-Montreal Route Service	Station along Boston-Springfield Segment	Station along Boston-Springfield Segment	6,000
Boston-to-Montreal Route Service	Station along Montreal-Springfield Segment	Station in Connecticut or points south	268,000
Boston-to-Montreal Route Service	Station along Montreal-Springfield Segment	Station along the Boston-Springfield Segment	24,000
Boston-to-Montreal Route Service	Station along Montreal -Springfield Segment*	Station along Montreal -Springfield Segment*	149,000
Total Ridership on Boston-to-Montreal Route Service			447,000
Total Ridership on Inland Route Service			428,000
Total Ridership on NNEIRI Services			875,000

Note: Ridership is based on boardings with origins and/or destinations in the NNEIRI Corridor. Ridership does not include trips in the NHHS Corridor, including between Springfield, New Haven, and New York/NEC.

4 AFFECTED ENVIRONMENT AND CONSEQUENCES

The environmental impacts of the Build Alternative are primarily the result of increased train traffic and speeds in the Corridor and potential impacts in the locations where second track would be installed and where the new Palmer station would be constructed. The objective during the Tier 1 evaluation is to inventory or identify the locations of each environmental resource from readily available federal and state Geographic Information System (GIS data), and to assess the potential for impacts based on conceptual plans for the Build Alternative. Because NNEIRI is a program rather than a specific project, this analysis is limited to identifying the potential for effects. As the design of the alternative is advanced and more detailed information becomes available, the Study Team would determine the nature or extent of the effects on each resource as part of a Tier 2 analysis.

The NNEIRI service would add eight new daily round trip trains between Boston to New Haven, one new daily round trip between Boston to Montreal, and one additional daily round trip (for a total of two round trip trains per day) between Montreal and New Haven. The Boston to New Haven services would be extensions of existing services operating on the Corridor between New Haven and Springfield. The ultimate destination of each train (i.e., New Haven, New York City, or Washington, D.C.) would be determined through discussions with Amtrak and coordination with other services operating along the NEC at the time of service implementation. The Montreal to New Haven service would operate with similar characteristics to Amtrak's Vermonter service.

The NNEIRI Build Alternative utilizes existing rail corridor and existing stations except at Palmer, Massachusetts, where a new station is proposed, and at Worcester Station where an additional passenger platform is proposed. The Build Alternative proposes the addition of a second track in all locations between Springfield and Worcester in Massachusetts where second track existed historically, but is currently single tracked and between Brattleboro and Bellows Falls, and St. Albans and Swanton in Vermont where single track currently exists. A new third track is proposed between Spencer and East Brookfield in Massachusetts where double tracks currently exist. The Build Alternative proposes to extend passing sidings at East Northfield, Massachusetts to Vernon, Vermont and at Randolph and Roxbury, Vermont. Since the proposed second track would be provided in the existing track alignment within the existing ROW in areas that were historically double tracked, and the passing sidings would be provided within the existing rail ROW, it does not require the acquisition of new ROW therefore major impacts on environmental resources are not anticipated.

The Build Alternative consequences do not include sections of the NNEIRI Corridor that have been the subject of previous environmental analysis. FRA evaluated the Knowledge Corridor Project in an EA and issued a Finding of No Significant Impact (FONSI). The Knowledge Corridor Project covers all areas between Springfield and Northfield, Massachusetts. The NHHS project includes all areas between New Haven and Springfield including the proposed layover facility adjacent to Springfield Union Station. As outlined in the NHHS FONSI, Phases 1, 2 and 3A of the project, which address improvements between New Haven and Windsor underwent Tier 2 level analysis. A Section 106 Memorandum of Agreement was executed and

a Section 4(f) determination was made for this portion of the corridor. Tier 2 NEPA evaluation, documentation, and required determinations for the portion of the NHHS corridor between Windsor and Springfield (Phase 3B) will be completed before construction begins in this segment of the corridor. Similarly, site-specific documentation and compliance will be undertaken for four planned stations along the corridor.

Additionally, FRA is leading a comprehensive planning process to define, evaluate, and prioritize future investments in the Northeast Corridor (NEC), from Washington, D.C. to Boston, called NEC FUTURE. The NEC FUTURE would create a framework for the future investments needed to improve passenger rail capacity and service through 2040. According to the NEC FUTURE Tier 1 Draft EIS²⁹, proposed Action Alternatives 2 and 3 (which provide direct service to Hartford, CT) of the NEC FUTURE provide the opportunity for improved intercity service connections from Hartford to Massachusetts (Springfield and the Knowledge Corridor) and Vermont. Additional services on the NHHS as well as the proposed Springfield to Vermont segment of NNEIRI would allow travelers from Massachusetts and Vermont to connect at Hartford for service to Boston along a new NEC spine proposed in Alternatives 2 and 3. A Preferred Alternative for NEC FUTURE will be selected in the Tier 1 Final EIS.

The following sections describe the methodology and relevant regulatory requirements for the affected environment resources, existing conditions of each segment of the Corridor, and the environmental consequences associated with the No-Build and Build Alternatives. A more detailed description of the existing environmental resources is included on the *Existing Conditions Assessment Report (dated January 2014)*.³⁰

4.1 PHYSICAL ENVIRONMENT

4.1.1 Air Quality

This section discusses the affected environment for air quality and the environmental consequences associated with the No-Build and Build Alternative.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to air quality and the relevant regulatory requirements.

Regulatory Requirements

The United States Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six commonly found air pollutants (criteria pollutants) in the Clean Air Act (CAA) and 1990 Clean Air Act Amendments (CAAA). These pollutants are carbon monoxide (CO), ozone, particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂) and lead (Pb). The CAA defines nonattainment areas as geographic regions that EPA has

²⁹ NEC FUTURE. Tier 1 Draft EIS. Chapter 4. November 2015.

http://www.necfuture.com/pdfs/tier1_deis/c04.pdf

³⁰ Northern New England Intercity Rail Initiative. Existing Conditions Assessment Report. January 2014.

designated as not meeting one or more of the NAAQS; it requires that a state prepare a State Implementation Plan (SIP) for each nonattainment area and a maintenance plan for each former nonattainment area that for which the state subsequently demonstrated compliance with the standards.

EPA’s Conformity Rule (40 CFR Part 93 Subpart A) requires the lead federal agency to make a “conformity determination” for transportation plans, programs, and projects – that is, a determination that the proposed transportation plan, program, or project conforms with the relevant SIP - before the lead federal agency approves or adopts the proposed project. The Conformity Rule also establishes the process by which federal agencies determine the conformance of proposed projects. Federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations or interfere with timely attainment or required interim emissions reductions toward attainment.

EPA’s General Conformity Rule (40 CFR Part 93 Subpart B) ensures that federal actions comply with the NAAQS and requires the lead federal agency to demonstrate that every action it undertakes, approves, permits or supports conforms to the appropriate SIP. Under the General Conformity Rule, determinations are made on a project-by-project basis. Table 4.1-1 below presents the General Conformity *de minimis* threshold levels for criteria pollutants for nonattainment areas and maintenance areas. 40 CFR 93 § 153 defines *de minimis* levels as the minimum threshold for which a conformity determination must be performed, for various criteria pollutants in various areas.³¹

Table 4.1-1. General Conformity Threshold Levels

Non-Attainment Area and Pollutants	Tons/year
Ozone, other non-attainment areas inside an ozone transport region-	
VOC	50
NO _x	100
CO, maintenance areas	100
PM ₁₀ , Moderate non-attainment areas	100
PM _{2.5} , any non-attainment area	
Direct emissions	100
SO ₂	100
NO _x	100

Sources: 40 CFR 93.153(b)

The General Conformity Rule applies to all federal actions that are taken in designated nonattainment or maintenance areas, except for the following:

- Actions where the total of direct and indirect emissions are below the *de minimis* emission levels shown above;
- Actions which occur in an attainment area;

³¹ United States Environmental Protection Agency (EPA). General Conformity. <https://www3.epa.gov/airquality/genconform/deminimis.html>; 40 CFR Part 93 § 153 http://www.ecfr.gov/cgi-bin/text-id.x?SID=1f7cb5e67642afd848cc9f144f3ad9ee&pid=20160129&node=se40.20.93_1153&rgn=div8

- Actions that are covered by transportation conformity – that is, actions that are related to transportation plans, programs, and projects developed, funded, or approved under Title 23 of the U.S. Code or the Federal Transit Act (49 U.S.C. § 1601); or
- Actions that qualify for exemptions established at 40 CFR Part 93.153.

Principal applicable state laws are as follows:

Massachusetts

- Massachusetts Clean Air Act (Massachusetts General Laws (M.G.L.) Chapter 111, Sections 142A-142J: Massachusetts Clean Air Act)

New Hampshire

- New Hampshire Revised Statutes Annotated (RSAs), Title 10: Public Health, Chapter 125-C: Air Pollution Control)
- New Hampshire Air Program Rules (Env-A 100-4800 Rules Governing the Control of Air Pollution)

Vermont

- Vermont Air Pollution Control Laws (Title 10 Conservation and Development, Chapter 23. Air Pollution Control)

Methodology

The Study Team screened the Corridor for compliance with NAAQS. All Corridor counties in Massachusetts and Vermont and Cheshire County in New Hampshire are currently classified as in attainment for the 2008 (8-hour) Ozone Standard. The Corridor is also in attainment for all other air quality standards. Because the NNEIRI Study Area is in attainment areas, the general conformity requirements do not apply to this project.

On a local scale, the potential effect of the Build Alternative on air quality is limited to increases in locomotive emissions associated with the increased frequency of passenger train service, and both increases and decreases in on-road emissions associated with station access and mode shift, respectively. Decreases in on-road emissions could have a beneficial impact on local air quality if large numbers of vehicle trips are shifted to passenger rail, occurring along highway corridors where those trips would otherwise occur.

The Study Team estimated change in regional vehicle-miles-traveled (VMT) for the Build and No-Build Alternatives and compared at the segment (Boston-Springfield and Springfield-Montreal) using best available outputs from the Corridor travel demand forecasting model that the Study Team used for forecasting ridership. Using change in VMT as a surrogate for specific air quality modeling enabled potential air quality issues to be identified to determine whether further data collection and analysis would be required in a Tier 2 analysis.

At a local level, the Study Team reviewed ridership increases by station to qualitatively determine the extent to which passenger-vehicle trips could create increased congestion on roadways adjacent to station areas. The Study Team used the results of this review to determine whether further data collection and analysis would be required in a Tier 2 analysis.

Similarly, the Study Team identified potential railroad siding or idling areas for passenger trains and compared with mapping of sensitive receptors (hospitals, schools, recreation areas) conducted during existing conditions / screening analysis activities to determine whether further data collection and analysis would be required in a Tier 2 analysis.

Existing Conditions

The section discusses attainment status for each of the areas within the NNEIRI Study Area relative to general conformity as required by FRA.

Boston to Springfield

The analysis of existing air quality of the NNEIRI Study Area focused on regulated air pollutants contained in the NAAQS including SO₂, CO, NO₂, O₃, PM₁₀ and PM_{2.5} and on monitoring data and stations within or near the NNEIRI Study Area.

The NNEIRI Study Area in the Boston to Springfield segment is in Hampden, Middlesex, Norfolk, Suffolk, and Worcester Counties. All the Corridor counties in this segment are in attainment for SO₂, NO₂ (2010 1-hour standard), CO, PM_{2.5}, Pb and 2008 O₃ standard.

Springfield to Canadian Border

The NNEIRI Study Area in the Springfield to Canadian Border segment is in Hampden and Hampshire Counties in Massachusetts, Sullivan and Cheshire Counties in New Hampshire, and Addison, Chittenden, Franklin, Grand Isle, Orange, Washington, Windham, and Windsor Counties in Vermont. All Corridor counties in Massachusetts and Vermont and Cheshire County in New Hampshire are currently classified as in attainment for the 2008 (8-hour) Ozone Standard. The Corridor segment is also in attainment for all other air quality standards.

No-Build Alternative Consequences

Under the No-Build Alternative, intercity passenger rail travel options in the Corridor would remain very limited, with low frequency, low speeds, and multiple transfers needed in the Boston-Montreal, New Haven-Montreal, and Boston-New Haven markets. Therefore, travelers would continue to have no realistic alternative to automobile and airplane modes and the benefits of reduced VMT and associated emissions resulting from the mode shift to passenger rail would not be realized.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor – Restore Vermonter EA identified no adverse air quality impacts resulting from that project. The Knowledge Corridor project would have beneficial effects on air quality as it would result in a decrease in air emissions due to the shorter distance of the proposed rail line (as compared to the existing rail line) and the increased train speed. The combination of the shorter distance of the proposed rail line and increased speed of the train would result in a significantly shorter time that the locomotives would be in use, resulting in a decrease in air emissions. According to the Knowledge Corridor – Restore Vermonter EA,

overall emissions from air pollutants (NO_x, CO and other air pollutants) are expected to decrease approximately 28% due to the changes in train speed and railroad distance.

The NHHS EA identified no short-term or long-term adverse air quality impacts as a result of the proposed project, therefore no air quality mitigation measures are proposed. With the shift to public transportation, the project anticipates to reduce vehicle miles traveled and improve air quality. At the time of this writing, the NHHS project was in final permitting and construction.

Air quality impacts of the SSX project are associated with emissions generated by locomotives entering and leaving the Boston South Station terminal and layover facilities, intercity buses from Boston South Station terminal, and vehicular traffic. According to the DEIR, the SSX project would result in very small increases in pollutant emissions, which would not lead to the exceedances of the NAAQS.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The ridership summary in Table 3.4-3 includes the total annual VMT diverted from passenger vehicle use as a result of mode shift to NNEIRI service. This information is the basis for characterization of potential air quality benefits through reduction in fuel use and associated carbon dioxide (CO₂) emissions. The Study Team used conversion factors from the May 2014, EPA fact sheet “*Greenhouse Gas (GHG) Emissions from a Typical Passenger Vehicle*”³² to determine the annual metric tons of CO₂ reduced as a result of the projected reduction in VMT. Table 4.1-2 summarizes the calculations based upon an emissions factor of 411 grams CO₂/mile. The reduction of CO₂ in annual metric ton was then obtained by dividing the total reduction in grams with one million.

Implementation of the Build Alternative would result in an annual reduction of nearly 46,800 metric tons of CO₂ associated with projected reductions in passenger vehicle VMT. This value includes VMT reductions associated with NNEIRI services from Boston and Montreal that continue via Springfield to New Haven and that previous environmental documents for the New Haven to Springfield segment acknowledged (but did not quantify).

The Study Team also calculated CO₂ emissions from additional train miles for NNEIRI services (8 daily round trip trains from Boston to New Haven, 1 daily round trip train from Boston to Montreal, and 1 daily round trip train from New Haven to Montreal) based on EPA guidelines.³³ The Build Alternative would result in an emission of 101 annual metric tons of CO₂ due to additional train operations in comparison to the annual reduction of nearly 46,800

³² Greenhouse Gas Emissions from a Typical Passenger Vehicle. Office of Transportation and Air Quality EPA -420-F-14-040a. May 2014. <http://www.epa.gov/otaq/climate/documents/420f14040a.pdf>

³³ EPA Publication EPA420-R-08-001, March 2008

metric tons of CO₂ associated with projected reductions in passenger vehicle VMT. While there would be increased emissions from additional train operations and idling, the reductions associated with passenger vehicle VMT are expected to more than offset the additional train emissions.

Table 4.1-2. Potential Air Quality Benefits / CO₂ Reductions

Segment	Annual VMT Diverted (2035 Build Alternative)	Annual Metric Tons of CO ₂
Boston to Springfield		
Within Boston-Springfield Segment	2,543,477	1,045 tons/year
Between Boston-Springfield Segment and Springfield-New Haven/NEC Segment (thru, not including SPG)	42,901,399	17,632 tons/year
Springfield to Montreal		
Within Montreal-Springfield Segment	18,634,543	7,659 tons/year
Between Springfield-Montreal Segment and Boston-SPG Segment (thru, not including SPG)	2,376,380	977 tons/year
Between Springfield-Montreal Segment and Springfield-New Haven/NEC Segment (thru, not including SPG)	47,391,902	19,478 tons/year
Corridor Total	113,847,700	46,791 tons/year

Projected warming and increased precipitation trends for the region due to climate change, resulting in greater frequency of extreme heat and flooding events, have the potential to impact the reliability and design life of transportation infrastructure. Evaluation of climate change resiliency for NNEIRI service is consistent with key transportation infrastructure strategies outlined in policies, guidance, and orders that have been issued by USDOT, CEQ, MassDOT, VTrans and NHDOT.

As design proceeds, it would be important to establish hazard information related to temperature and precipitation. With respect to precipitation, the current 100-year (1%-annual-chance) flood elevation for the project site would be evaluated. Additionally, to comply with Executive Order (EO) 13690,³⁴ “The Federal Flood Risk Management Standard”, it would be necessary to coordinate with Federal and State agencies to select the preferred approach for establishing the flood elevation and hazard area to be used for siting, design, and construction considerations. Per E.O. 13690, the three approaches to be considered include:

³⁴ Executive Order 13690, “Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input”, President of the United States, January 30, 2015.

- Use data and methods informed by best-available, actionable climate science;
- Build two feet above the 100-year (1%-annual-chance) flood elevation for standard projects, and three feet above for critical buildings like hospitals and evacuation centers; or
- Build to the 500-year (0.2%-annual-chance) flood elevation.

4.1.2 Noise and Vibration

The Study Team performed noise and vibration analyses for the Boston to Springfield and East Northfield to Canadian border segments of the NNEIRI Corridor. FRA performed noise and vibration analyses for the New Haven to East Northfield segment as part of the EA for the NHHS project and the Knowledge Corridor/Restore Vermonter EA. FRA based the Knowledge Corridor noise and vibration analyses on a proposed service with fewer trains and lower speeds than the NNEIRI, so this segment of the NNEIRI Corridor will need to be evaluated further during Tier 2 analysis. The NNEIRI Study Area for noise and vibration covers 309 miles of existing rail line traversing urban, suburban, and rural areas of Massachusetts and Vermont. The Study Team evaluated potential noise and vibration impacts based on relevant methodologies and criteria as summarized below.

Methodology and Regulatory Requirements

Regulatory Requirements

Local regulations typically defer to federal regulations and criteria for interstate rail projects. Criteria relevant to this project are those published by FRA and Federal Transit Administration (FTA). FRA published its latest noise and vibration guidelines in 2012 (entitled *High-Speed Ground Transportation Noise and Vibration Impact Assessment*, Report Number DOT/FRA/ORD-12/15) and FTA published its latest noise and vibration guidelines in 2006 (entitled *Transit Noise and Vibration Impact Assessment*, Report Number FTA-VA-90-1003-06). The FRA guidelines are intended only for high-speed rail lines, where trains are traveling at speeds greater than 90 miles per hour. Because the maximum speeds associated with NNEIRI Build Alternative operations would be 79 miles per hour, the Study Team followed the FTA guidelines for this analysis.

The noise and vibration impact criteria are the same in the FRA and FTA guidelines. Each guideline addresses the same three categories of noise- and vibration-sensitive uses: highly sensitive, residential, and institutional. The noise impact categories for both guidelines are *no impact*, *moderate impact*, and *severe impact*, and the noise limits associated with these are on a sliding scale (changing with existing background levels). Moderate impacts are normally designated as warranting the consideration of noise mitigation and severe impacts are normally designated as requiring noise mitigation. The vibration impacts are based on absolute limits (independent of existing levels) that are identical for FRA and FTA. It is therefore important to define existing background levels at noise-sensitive locations that may be affected by the project but existing vibration levels do not need to be determined.

Methodology

There are three levels of noise and vibration analyses discussed in the guidelines (screening analysis, general assessment, and detailed analysis) based on three categories of sensitive receptors. Category 1 receptors are locations requiring exceptional quiet (such as outdoor theaters, recording studios, concert halls, or national historic landmarks), Category 2 receptors are residences and buildings in which people would be sleeping, and Category 3 receptors are institutional buildings with primarily daytime use (such as houses of worship and educational facilities).

The Study Team assessed the noise and vibration impacts of the Build Alternative using a mix of screening and general assessment analyses to determine if a more detailed assessment of noise and vibration impacts would be required. Category 1 receptors were not analyzed because these receptor sites would be addressed in a Tier 2 project level study, for which the level of detail necessary to identify Category 1 receptors would be more appropriate. Since this is a Tier 1 service-level EA, a detailed analysis is not required for this Tier 1 noise and vibration assessment. The more detailed analyses would be part of a Tier 2 project level review.

Screening Analysis

The noise and vibration screening analyses are based on determining whether a significant number of noise- and vibration-sensitive locations are located within specified distances of the rail centerline.

For noise, these screening distances are 750 feet for passenger rail operations and 1,600 feet for horns, each assuming an unobstructed view between the rail line and the sensitive locations. These values are shorter for locations having their views obstructed by intervening buildings however, since there are thousands of potential sensitive receptors along hundreds of miles in this Corridor, the Study Team assumed unobstructed views throughout the Corridor – the most conservative assumption -- to determine the potential impacts.

For vibration, the screening distances are 600 feet for highly vibration-sensitive buildings, 200 feet for residential buildings, and 120 feet for institutional buildings.

The FTA guidelines assume that if any noise- or vibration-sensitive locations are within the screening distances, impacts are likely to occur and a minimum of a general assessment is required. This is the case for both noise and vibration for the Build Alternative and the Study Team used the relevant screening distances to define the NNEIRI Study Area for noise and vibration.

General Assessment

For a general noise assessment, the Study Team estimated Build Alternative noise levels and existing noise conditions to determine the location of a noise impact contour, which defines the outer limit of an impact area. These estimates are based on calculations prescribed in the FTA guidelines. An inventory of noise impacts within the area then identifies locations where mitigation of noise impacts is likely to be needed.

The purpose of a general assessment for vibration is to develop estimates of the existing overall levels of ground-borne vibration (GBV) that can be compared to the acceptability criteria in the FTA guidelines. The general vibration assessment defines a curve that is used to predict the overall ground-surface vibration as a function of distance from the source. Adjustments to this curve are used to account for factors such as vehicle speed, building type, and receiver locations. Given the size and complexity of the NNEIRI Study Area, along with the lesser level of analysis typically performed for a Tier 1 study, building types were not included by the Study Team in this assessment.

Vibration impacts are generally considered in terms of annoyance potential. Typical rail operations are not capable of generating vibration levels that could cause structural damage; those kinds of levels are usually limited to heavy construction activities such as pile driving and blasting. With the possible exception of activities related to new station/platform construction in Worcester and Palmer, Massachusetts, the Study Team does not anticipate pile driving and blasting to occur in implementation of the Build Alternative.

For this Tier 1 analysis, a mixture of screening and general assessment analyses was performed by the Study Team to determine the potential extent of severe impacts throughout the Corridor. Category 1 receptors were not analyzed because these receptor sites would be addressed in a Tier 2 project level study, for which the level of detail necessary to identify Category 1 receptors would be more appropriate.

Existing Conditions

The 99-mile Boston to Springfield NNEIRI segment traverses the urban areas of Boston, Worcester, and Springfield, Massachusetts, and suburban and rural areas in between. The 210-mile NNEIRI segment from Northfield, Massachusetts to the Canadian border travels through Brattleboro, Bellows Falls, White River Junction, St. Albans, and Burlington, Vermont and rural areas in between. The rail line serves freight operations from CSX, Pan Am Southern (PAS), and NECR, along with Amtrak passenger service between Boston and Springfield and between Springfield, Massachusetts and St. Albans, Vermont, and MBTA passenger service between Boston and Worcester, Massachusetts.

The Study Team determined the existing noise levels throughout the Corridor by a combination of regional population density calculations and regional freight operations noise calculations, as prescribed in the FTA guidelines. The Study Team derived population densities and noise- and vibration-sensitive locations throughout the Corridor from existing GIS information and aerial photography. For Vermont, the Study Team selected residences from the E911 Site Location data. For Massachusetts, the Study Team used the latest town parcel data and selected parcels tagged with a residential land use. For New Hampshire, GIS data were not available and residential buildings were identified from recent (2011 or newer) aerial photographs.

Maximum speeds were assumed by the Study Team to be 59 miles per hour for all freight trains and 79 miles per hour for all passenger trains. The existing noise levels for each region of similar rail operations were considered by the Study Team to be the higher of these two calculated values, and these were used as the basis for the noise criteria established for the Build Alternative, since the noise criteria are based on the existing levels.

No-Build Alternative Consequences

No increase in passenger operations is anticipated by the Study Team along the Corridor in the No-Build scenario except along the New Haven, Connecticut to Springfield, Massachusetts segment, which would experience increase in passenger operations due to the NHHS service. Other anticipated increase would be in terms of the number of cars in each freight train, assumed at a growth rate of 2.2% per year through 2035. An exception to this would be in the CSX section between Worcester and Springfield, where four additional trains (3 daytime/1 nighttime) would be added due to the anticipated service growth. Therefore, no increase in noise or vibration exposures would result from the No-Build Alternative except for a slight increase between Worcester and Springfield.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA identified moderate train-horn noise impacts to 203 receptors (mainly residential) and severe horn noise impacts to two residential receptors. Based on the linear extent of the project and the number of the dense urban areas it passes through, the number of severe noise impacts is not significant. According to the EA, the project would have potential vibration impacts on residential and institutional land uses. However, the vibration impacts are not considered significant because of the limited number of train passing under the proposed alternative. As stated in the EA, the project would have two potential noise and vibration benefits through the use of mitigation measures: the designation of Quiet Zones and installation of resilient track fasteners or ballast mats.

The NHHS EA identified severe noise impacts at 1,847 noise-sensitive receptors and moderate noise impacts at 2,767 noise-sensitive receptors caused by train-horn noise at grade crossings and existing and new rail stations. Wallingford, Meriden, and Windsor are anticipated to have the most train-horn noise impacts. The project would also have severe wayside noise impacts to seven residential receptors and moderate wayside noise impacts to 214 residential receptors. The EA proposes designation of Quiet Zones to mitigate severe horn noise and provide increased noise insulation and home-specific improvements to mitigate wayside noise impacts. According to the EA, the project would have low to moderate noise impact to Springfield layover and maintenance facility, given the existing urban nature of the proposed site's vicinity, and therefore, no mitigation would be required. The EA notes that nearby receptors would be reviewed during the future Tier 2 to confirm that there are no impacts. The EA identified no adverse impacts due to project-related vibration as there are no vibration-sensitive receptors located within 60 feet of the tracks. Subsequent to the EA, some segments of the NHHS corridor were in final permitting and construction phase.

The SSX DEIR identified noise impacts at South Station, Widett Circle, and the Readville Yard layover facility in Alternative 1. According to the DEIR, because of the slow speeds at which trains operate when entering and leaving South Station, typical vibration levels are below the FTA impact criterion.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

In addition to the FTA screening analysis, which consisted of determining the number of noise- and vibration-sensitive receptors within the specified screening distances, the Study Team determined refined screening distances based on FTA general assessment noise and vibration calculations in regions where common operational conditions are anticipated to occur. These calculations are described in detail in the Noise and Vibration Technical Report (Appendix B) and the results of these calculations are summarized in Tables 4.1-3 and 4.1-4 for noise, and in Table 4.1-5 for vibration. The results are divided by residential (Category 2) and institutional (Category 3) properties.

These analysis performed by the Study Team indicates that there is the potential for a total of 435 severe noise impacts, 11,827 moderate noise impacts, and 2,234 vibration annoyance impacts due to the project. Most of the impacts are in the highly populated and heavily traveled Boston to Springfield segment. This is due to the nature of the FTA criteria, which become more stringent as existing noise levels increase (since background noise levels are higher in the Boston to Springfield segment than in other areas along the project Corridor). All potential noise impacts would be caused by horn soundings within the FRA-mandated ¼-mile distance of grade crossings. Vibration impacts would not result from horn soundings.

As is mentioned above, these calculations are based on the worst-case scenario of all trains travelling at maximum speeds throughout the Corridor and no natural or man-made noise buffers between the trains and sensitive locations. As these worst-case conditions would not be present everywhere along the Corridor, these estimates would decrease when a more detailed analysis (taking these factors into account) is performed in Tier 2.

Table 4.1-3. Potential severe noise impacts

Corridor segment		Number of residential (Category 2) receptors	Number of institutional (Category 3) receptors
Boston to Springfield	Boston to Route 128	68	0
	Route 128 to Framingham	130	0
	Framingham to Worcester	46	0
	Worcester area	79	0
	Worcester to Springfield	85	0
	Springfield area	26	0
East Northfield to Canadian Border	East Northfield to Brattleboro	0	0
	Brattleboro to Bellows Falls	0	0
	Bellows Falls to White River Junction	0	0
	White River Junction to Essex Junction (Burlington)	1	0
	Essex Junction to St. Albans	0	0
	St. Albans to Canadian border	0	0
Totals		435	0

Table 4.1-4. Potential moderate noise impacts

Corridor segment		Number of residential (Category 2) receptors	Number of institutional (Category 3) receptors
Boston to Springfield	Boston to Route 128	3,558	0
	Route 128 to Framingham	2,194	0
	Framingham to Worcester	1,185	1
	Worcester area	2,018	3
	Worcester to Springfield	1,850	1
	Springfield area	981	0
East Northfield to Canadian Border	East Northfield to Brattleboro	1	0
	Brattleboro to Bellows Falls	4	0
	Bellows Falls to White River Junction	6	0
	White River Junction to Essex Junction (Burlington)	22	0
	Essex Junction to St. Albans	0	0
	St. Albans to Canadian border	3	0
Totals		11,822	5

Table 4.1-5. Potential Vibration Annoyance Impacts

Corridor segment		Number of Residential (Category 2) receptors	Number of Institutional (Category 2) receptors
Boston to Springfield	Boston to Route 128	415	0
	Route 128 to Framingham	395	4
	Framingham to Worcester	199	5
	Worcester area	195	4
	Worcester to Springfield	208	1
	Springfield area	61	0
Northfield to Canadian Border	Northfield to Brattleboro	26	0
	Brattleboro to Bellows Falls	51	0
	Bellows Falls to White River Junction	134	0
	White River Junction to Essex Junction (Burlington)	399	0
	Essex Junction to St. Albans	78	0
	St. Albans to Canadian border	59	0
Totals		2,220	14

4.1.3 Flood Hazards and Floodplain Management

This section discusses the affected environment for floodplains and the environmental consequences associated with the No-Build and Build Alternative.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to and from floodplains and the relevant regulatory requirements.

Regulatory Requirements

Floodplains include the lands on either side of a stream or river that are inundated when the capacity of the stream or river channel is exceeded. The National Flood Insurance Program (NFIP) was established pursuant to the National Flood Insurance Act of 1968 (amended)³⁵ and the Flood Disaster Protection Act (FDPA) of 1973 (as amended)³⁶, to encourage sound floodplain management programs at the state and local levels. To provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Emergency Management Agency (FEMA) as the base flood for floodplain management and flood insurance purposes.

Executive Order (EO) 11988, Floodplain Management³⁷ (1977) directs federal agencies to "provide leadership and take action to reduce the risk of flood loss, to minimize the impacts of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." In addition, the USDOT Order 5650.2 describes policies and procedures for "ensuring that proper consideration is given to avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs and budget requests."³⁸

On January 30, 2015, President Obama issued Executive Order 13690³⁹ that revises Executive Order 11988 and proposes a new Federal Flood Risk Management Standard (FFRMS). The FFRMS gives agencies the flexibility to select one of three approaches for establishing the flood elevation and hazard area they use in siting, design, and construction. They can:

- Use data and methods informed by best-available, actionable climate science;
- Build two feet above the 100-year (1% annual-chance) flood elevation for standard projects, and three feet above for critical buildings like hospitals and evacuation centers; or
- Build to the 500-year (0.2% annual-chance) flood elevation.

³⁵ National Flood Insurance Act of 1968. 42 U.S.C.4001 et seq. (1968).

³⁶ Flood Disaster Act of 1973 [42 U.S.C.4001 et seq.] (amended).

³⁷ Executive Order 11988, "Floodplain Management," President of the United States, 1977.

³⁸ US Department of Transportation Order 5650.2, "Floodplain Management and Protection," April 23, 1979.

³⁹ Executive Order 13690, "Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input", President of the United States, January 30, 2015.

The Executive Orders and FRA's Procedures for Considering Environmental Impacts requires FRA to determine whether any project alternatives would affect a base floodplain. If one or more alternatives would affect a base floodplain further analysis should be conducted on any risk associated with each such alternative; the impacts on natural and beneficial floodplain values; the degree to which the alternative supports incompatible development in the base floodplain; and the adequacy of the methods proposed to minimize harm.

At the state level, the following legislation applies:

Massachusetts

- Massachusetts General Laws (M.G.L.) Chapter 183 section 69, as added by Session Laws: Chapter 177 of the Acts of 2014, An Act Further Regulating Flood Insurance, effective November 20, 2014 prohibits creditors from requiring residential flood insurance in excess of the outstanding mortgage balance, or with a deductible of less than \$5,000.

New Hampshire

In 2012 and 2104, Congress passed the following Acts, which made changes to flood insurance rates under the NFIP.

- July 6, 2012 - Biggert-Waters Flood Insurance Reform Act of 2012
- March 21, 2014 - Homeowner Flood Insurance Affordability Act of 2014

Vermont

- Environmental Protection Rule. Chapter 29: Vermont Flood Hazard Area and River Corridor Rule. Effective March 1, 2015
- Title 10 V.S.A. Chapter 32: Flood Hazard Areas, Chapter 39: Watershed Protection and Flood Prevention

Methodology

The Study Team determined floodplain limits (NNEIRI Study Area for floodplains) within the NNEIRI Corridor using FEMA Flood Insurance Rate Map (FIRM) databases. These flood-prone areas are most often delineated based upon the 100-year storm event. As would be expected, areas subject to flooding within the NNEIRI Study Area generally coincide with rivers, streams, wetlands, and nearby low-lying valley areas.

For both the Boston to Springfield and Springfield to Canadian border segments, the Study Team created 500 scale maps of areas where a second track is proposed, in order to closely examine possible floodplain impacts within or adjacent to 100-year or 500-year floodplains.

A floodplain is the area that is inundated with water during a flood. A 100-year flood, also referred to as base flood, is calculated to be the level of floodwater that has a one percent (%) chance of being equaled or exceeded in any single year. A floodplain is composed of two parts: the floodway and the floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order that the 100-year flood is carried without increasing the water surface elevation by more than one foot. The floodway fringe area is the outer portion of the floodplain beyond the floodway. Changes in the

floodway such as adding fill material, constructing buildings or bridges, or limiting the natural conveyance of floodwaters can cause a rise in the 100-year water surface and can subsequently impact properties not previously affected by a 100-year storm event.

500-year flood areas are moderate flood hazard areas between the limits of the base flood and the 0.2 percent (%) annual chance flood.

Existing Conditions

This section summarizes existing conditions of floodplain areas within the NNEIRI Study Area. Floodplains can pose significant constraints to the development of alternatives. Information on the nature and extent of floodplains within each segment is provided in the following sections.

Boston to Springfield

FEMA-designated floodplains comprise approximately 9,012 acres in the Boston to Springfield segment of the Corridor. Major river floodplains along this segment include the Charles, Sudbury, Quaboag, Chicopee, and the Connecticut Rivers. Floodplains also are mapped along numerous smaller tributaries and larger lakes along the Corridor.

Springfield to Canadian Border

FEMA-designated floodplains comprise approximately 25,036 acres in the Springfield to Canadian Border segment of the Corridor. Major river floodplains along this segment include the Connecticut River, Deerfield River, West River, White River (and its branches), Dog River, Winooski River, and Lamoille River. Floodplains also are mapped along numerous smaller tributaries and larger lakes along the Corridor.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to floodways, 100-year and 500-year floodplains.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS, and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA identified no potential impacts to the 100-year floodplains because the project would not require any additional fill material within waterways or floodplains. The proposed station improvements at Northampton and Greenfield are not within the 100-year floodplain (both Northampton and Greenfield are not located in a flood zone).

The NHHS EA identified potential impacts to floodplains (10.7 acres), floodways (1.0 acre) and stream channel encroachment lines (SCELS) (2.1 acres) and additional impacts to bridges and culverts in the Connecticut segment of the NHHS rail corridor. The NHHS rail program would have no impacts to floodplains in Massachusetts because there are no floodways or 100-year floodplains located within the vicinity of the Massachusetts improvements (e.g., Springfield Layover site), and SCELS are only applicable to Connecticut. The NHHS EA

proposed mitigation includes developing mitigation measures in coordination with Connecticut Department of Energy and Environmental Protection (CTDEEP) and USACE during the State Flood Management Certification (FMC) application and the SCEL permitting processes and/or providing compensatory mitigation if required. At the time of this writing, the NHHS project was in final permitting and construction.

To assess the SSX project's vulnerability to climate change, floodplains in the study area were identified using the 2016 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM); the newly-developed Boston Harbor – Flood Risk Model (BH-FRM); and the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model as well as a two-foot sea level rise added to the base flood elevations (BFEs). Results of the analysis were used to determine the amount of the project area that would be within the 1% chance flood event, the impact to the project area caused by different categories of hurricanes, and the inundation levels that could occur throughout the area from these events. Based upon 2016 FIRMs, approximately 3 acres of the South Station project footprint would be inundated by the 1% annual chance flood. Adding two feet to the flood elevation to reflect a future sea level rise scenario would amplify the risk at South Station and increase flood elevation to approximately 12 feet. In the absence of mitigation, the 1% annual chance floodplain would encompass approximately 28 acres of the South Station project footprint. To mitigate flooding on the project site, the Fort Point Channel seawall and the adjacent portion of Dorchester Avenue would be raised from their current elevation of 10.5 feet to 12.0 feet to match the elevation of the existing seawall to the north and south. Raising the seawall and adjacent roadway in this manner would help protect the South Station site in the area along Dorchester Ave where the USPS facility is currently located from future coastal storm flooding.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative is unlikely to have any impacts to floodplains in areas where no second track construction would take place due to the utilization of existing rail corridor. In locations where a second track is proposed, any floodplain impacts are anticipated to be minor because the Corridor was historically double tracked, which would be rehabilitated within the existing rail ROW. This limits the amount of fill required within the floodplain areas and are not likely to alter the flood plain elevations.

For both Boston to Springfield and Springfield to Canadian border segments, the Study Team created 500 scale maps of areas where a second track is proposed, in order to closely examine possible floodplain impacts. The most recent FEMA flood data was used to determine which areas were within or adjacent to 100-year or 500-year floodplains. These maps are included in Appendix C- Flood Zone Maps.

Boston to Springfield

Between Worcester and Springfield, an additional track is proposed within or adjacent to 100-year or 500-year floodplains for approximately 11.5 miles. The locations within the floodplain are summarized below by segment of added track. Table 4.1-6 summarizes the locations by milepost, town, and floodplain type.

Auburn to Charlton (Mileposts 48.3-57.7): This segment includes a few small sections within the floodplain totaling approximately 0.3 miles.

Charlton to East Brookfield (Mileposts 59.3-63.3): This segment includes a few small sections within the floodplain totaling approximately 0.1 miles.

East Brookfield to Brimfield (Mileposts 64.0-79.4): This segment of proposed second track is within the floodplain for approximately 10 miles. It is adjacent to the Quaboag River.

Palmer to Wilbraham (Mileposts 83.6-92.0): This segment of proposed second track is within the floodplain for approximately 1.1 miles. It is adjacent to the Quaboag River, Calkins Brook, and the Chicopee River.

Worcester Station: No mapped floodplains have been identified in the vicinity of Worcester Station; therefore, impacts due to the construction of a new passenger platform are not anticipated.

Palmer Station: The location for the proposed station at Palmer would be determined during Tier 2. Floodplains would be considered when determining potential sites to minimize any possible impacts. If potential impacts resulting from the construction or operation of the new station are identified, the project proponent would consult with the relevant federal and state resource agencies.

Table 4.1-6. Floodplain Impacts along Second Track – Boston to Springfield

Mile Post	Town	Types of Floodplain	Adjacent/Through the Floodplain
Mileposts 48.3 to 57.7			
50.0	Auburn	100-Year	Through (Bridge/Culvert)
50.6-50.7	Auburn	100-Year	Adjacent
55.1	Charlton	Floodway	Through (Bridge/Culvert)
55.9	Charlton	100-Year	Adjacent
Mileposts 59.3-63.3			
63.0	East Brookfield	100-Year	Through (Bridge/Culvert)
63.2-63.3	East Brookfield	100-Year	Through
Mileposts 64 to 79.4			
64.1	East Brookfield	100-Year	Through
65.0-65.1	East Brookfield	500-Year	Through

Mile Post	Town	Types of Floodplain	Adjacent/Through the Floodplain
65.1-65.9	East Brookfield/ Brookfield	100-Year	Through
66.0-66.1	Brookfield	500-Year	Adjacent
66.1-66.9	Brookfield	100-Year	Through
67.0-67.8	Brookfield	100-Year	Through
67.9	Brookfield	100-Year	Adjacent
68.2-68.8	West Brookfield	100-Year	Adjacent
68.8-69.4	West Brookfield	100-Year	Through
69.4-69.8	West Brookfield	500-Year	Through
69.8-69.9	West Brookfield	500-Year	Adjacent
69.9-70.2	West Brookfield	100-Year	Adjacent
70.2	West Brookfield	100-Year	Through
70.3-70.5	West Brookfield	100-Year	Adjacent
71.0-71.5	Warren	100-Year	Adjacent
71.7-71.9	Warren	100-Year	Adjacent
72.0-72.2	Warren	100-Year	Adjacent
72.8-73.1	Warren	100-Year	Adjacent
73.1	Warren	100-Year	Through (Bridge/Culvert)
73.4-73.5	Warren	100-Year	Through (Bridge/Culvert)
73.6-74.9	Warren	100-Year	Adjacent/Through
75.1-75.7	Warren	100-Year	Adjacent/Through
75.9-76.0	Warren	100-Year	Through
77.3-78.0	Warren/Brimfield	100-Year	Through
78.0-78.2	Brimfield	500-Year	Through
78.2-78.4	Brimfield	100-Year	Through
78.5-79.0	Brimfield	100-Year	Through
79.4-79.5	Brimfield	100-Year	Through
Mileposts 83.6 to 92.0			
83.6-84.6	Palmer/Monson	100-Year	Adjacent/Through
88.1	Monson	500-Year	Through
90.1	Monson	500-Year	Adjacent

Springfield to Canadian Border

Between Springfield and Canadian border, a second track is proposed within or adjacent to 100-year or 500-year floodplains for approximately 16.5 miles. The locations within the floodplain are summarized below by segment of added track. Table 4.1-7 summarizes the locations by milepost, town, and floodplain type.

East Northfield (Mileposts 110.5-111.8): This segment does not pass through any mapped floodplains.

Downtown Brattleboro (Mileposts 120.5-122.0): This segment runs through mapped 100-year or 500-year floodplain for its entire length (1.5 miles). It is adjacent to the Connecticut River.

Brattleboro to Bellows Falls (Mileposts 123.5-144.0): This segment runs parallel to the Connecticut River with the majority of its length within or adjacent to mapped 100-year or 500-year floodplain. It runs through or adjacent to the floodplain for approximately 14.4 miles. The segment crosses a mapped floodway in one location in Westminster.

Randolph (Mileposts 44.5-45.5): This segment does not pass through any mapped floodplains.

Roxbury (Mileposts 61.2-61.7): This segment runs adjacent to mapped 100-year floodplain for its entire length (0.5 miles).

St. Albans to Swanton (Mileposts 1.5-8.5): This segment runs through mapped 100-year floodplain for approximately 0.1 miles. It runs parallel to the Missisquoi River for approximately 2 miles but is outside any associated floodplains.

Table 4.1-7. Floodplain Impacts along Second Track – Springfield to Canadian Border

Mile Post	Town	Types of Floodplain	Adjacent/Through the Floodplain
Mileposts 120.5 to 122.0			
120.5-120.6	Brattleboro	100-year	Through
120.6-121.2	Brattleboro	500-year	Through
121.2-122.0	Brattleboro	100-year	Adjacent
Mileposts 123.5 to 144.0			
125.7-127.2	Dummerston	100-year	Adjacent
127.5-127.8	Dummerston	100-year	Through
127.8-128.4	Dummerston	100-year	Adjacent
128.4-130.0	Dummerston	100-year	Through
130.2-130.5	Dummerston/Putney	100-year	Adjacent
130.7-130.8	Putney	100-year	Adjacent
130.9-131.1	Putney	100-year	Adjacent
132.0-132.2	Putney	100-year	Adjacent
132.5	Putney	100-year	Adjacent

Mile Post	Town	Types of Floodplain	Adjacent/Through the Floodplain
133.3-133.4	Putney	100-year	Adjacent
134.0-134.5	Putney	100-year	Adjacent
134.5-135.6	Putney	100-year	Through
135.7-136.7	Putney/ Westminster	100-year	Adjacent
136.7-136.8	Westminster	500-year	Through
136.8-137.1	Westminster	100-year	Adjacent
137.1-137.3	Westminster	500-year	Through
137.4-137.6	Westminster	500-year	Through
137.7-138.4	Westminster	100-year	Adjacent
138.4-139.2	Westminster	100-year	Through
139.2-139.6	Westminster	500-year	Through
139.6-140.4	Westminster	100-year	Through
140.4-140.6	Westminster	Floodway	Through
140.6-140.9	Westminster	100-year	Through
141.5-141.7	Westminster	100-year	Adjacent
141.7-142.5	Westminster	500-year	Through
142.7-143.5	Westminster	500-year	Through
143.5-144.1	Westminster	100-year	Adjacent
144.1-144.2	Westminster	100-year	Through
144.3-144.7	Rockingham	100-year	Adjacent
Mileposts 61.2 to 61.7			
61.2-61.7	Roxbury	100-year	Adjacent
Mileposts 1.5 to 8.5			
2.5	St. Albans	100-year	Through
3.1	St. Albans	100-year	Through

4.1.4 Coastal Zone Management

This section discusses the affected environment for coastal areas and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to coastal areas and the relevant regulatory requirements.

Regulatory Requirements

According to Section 307 of the Federal Coastal Zone Management Act (CZMA) of 1972, as amended, and National Oceanic and Atmospheric Administration (NOAA) regulations (15 CFR part 930), federal actions occurring within or with the likelihood of affecting any land or water use, or natural resource of a state's coastal zone, including cumulative and secondary effects, must be consistent with a state's federally approved Coastal Zone Management Plan (CZMP).

The following regulations are applicable to the consideration of coastal zone management in the NNEIRI Corridor.

Massachusetts

- Massachusetts Office of Coastal Zone Management (MACZM) Policy Guide – October 2011

New Hampshire

- New Hampshire Coastal Zone Management Program

Vermont

- No Coastal Zone Management Program

Methodology

The Study Team used available GIS data⁴⁰ to depict the Coastal Zone Management Areas within one-half mile of the Corridor centerline for each segment of the NNEIRI Corridor. The NNEIRI Corridor is located outside of designated coastal zones with the exception of Boston and New Haven. FRA previously assessed the New Haven area as part of the NHHS EA. In the Boston area, the NNEIRI service utilizes a rail corridor that is already heavily used for MBTA commuter rail and Amtrak operations, therefore additional impacts to coastal zones are unlikely because improvements are not likely to alter the flood plain elevations.

⁴⁰ MassGIS Data – The Massachusetts Coastal Zone.
<http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/cstzone.html>

Existing Conditions

This section summarizes existing conditions of Coastal Zone Management Areas along the Corridor.

Boston to Springfield

According to the MACZM Policy Guide⁴¹, the official Massachusetts coastal zone includes the lands and waters within the seaward limit of the state's territorial sea to generally 100 feet beyond (landward of) the first major land transportation route encountered (a road, highway, rail line, etc.). The coastal zone in the state is divided into five distinct regions encompassing 78 coastal communities, including Boston. The Boston-to-Springfield segment of the Corridor transects the Massachusetts ocean management planning area boundary in Boston.

Springfield to Canadian Border

There are no coastal zones within the Springfield to Canadian Border segment of the Corridor.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in any additional direct or indirect impacts to coastal resources along the existing Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor – Restore Vermonter EA did not evaluate impacts to coastal zone resources as the proposed project is not within the coastal zone.

The NHHS EA identified no impacts to the coastal resources however, it suggests reviewing Coastal Consistency Review per the Coastal Area Management Act (CCMA) for North Haven Station because of the location of the project within Connecticut's designated coastal boundary. The EA further proposes coordination with CTDEEP to identify possible avoidance/minimization measures. At the time of this writing, the NHHS project was in final permitting and construction.

Based on the SSX DEIR, the project elements located in the Massachusetts Coastal Zone (i.e. Boston South Station terminal and Widett Circle) comply with the Massachusetts Coastal Zone Policy for the purposes of Federal Consistency Review.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one

⁴¹ Massachusetts Office of Coastal Zone Management (MACZM) Policy Guide – October 2011.

additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The NNEIRI Corridor is located outside of designated coastal zones with the exception of Boston and New Haven. The New Haven area has previously been assessed as part of the NHHS EA. The NHHS study concluded that the proposed project is not anticipated to impact coastal resources but since the proposed project is located within Connecticut's designated coastal boundary, the Connecticut DEEP would undertake a Coastal Area Management review during the permitting process. Subsequent to the NHHS EA, permitting for the southern segments of the NHHS corridor was completed and the construction has started. In the Boston area, the NNEIRI service utilizes a rail corridor that is already heavily used for MBTA commuter rail and Amtrak operations, and improvements due to NNEIRI service are not likely to alter the flood plain elevations, therefore additional impacts to coastal zones are unlikely. No coastal zones are impacted in the Springfield to Canadian border segment of the NNEIRI Corridor.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Water Quality

This section discusses the affected environment for water quality in relation to the surface and ground water resources, and the environmental consequences associated with the No-Build and Build Alternative.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to water quality and the relevant regulatory requirements.

Regulatory Requirements

The U.S. Clean Water Act (CWA) (1972 amendments to the Federal Water Pollution Control Act) provides surface water quality protection in the United States and provides for the regulation of the discharge of pollutants from point sources to waters of the U.S.⁴²

Section 303(d) of the CWA requires states, as part of required periodic assessment and reporting, to identify Impaired Waters, where specific designated uses are not fully supported. For these Impaired Waters, states must consider the development of a Total Maximum Daily Load (TMDL) or other strategy to reduce the input of the specific pollutant(s). The Massachusetts Section 303(d) List of Impaired TMDL Waters identifies those waters that do not support appropriate uses and details the type, cause/pollutant, source, and class of impairment.⁴³

⁴² Clean Water Act of 1972, 33 U.S.C. 1251 et seq. (2002). Retrieved from <<http://epw.senate.gov/water.pdf>>

⁴³ Massachusetts 303(d) Listed Waters for Reporting Year 2012
http://iaspub.epa.gov/tmdl/attains_impaired_waters.impaired_waters_list?p_state=MA&p_cycle=2012

Section 402 of the CWA also established the National Pollutant Discharge Elimination System (NPDES) permit program. Under this program, the U.S. Environmental Protection Agency (EPA) has regulatory authority over point source discharges on a sector-wide basis to protect water quality of the receiving waters and can designate permitting authority to the states. Point sources are discrete conveyances such as pipes or man-made ditches.

Principal applicable state laws and regulations are as follows:

Massachusetts

- Massachusetts Clean Waters Act (M.G.L. Chapter 21, Sections 26-53)

New Hampshire

- New Hampshire Revised Statutes Annotated (RSAs), Title 10: Public Health, Chapters 146-A: Oil Discharge or Spillage in Surface Water or Groundwater
- New Hampshire Water Quality/Quantity Rules (Env-Wq 300 Surface Water Protection and Env-Wq 400 Groundwater Protection)

Vermont

- Title 10 Vermont Statutes Annotated (V.S.A). Chapter 47 Water Pollution Control Act, Sections 1250-1386

Methodology

The Study Team compiled Geographic Information System (GIS) data and other available information from the United States Geological Survey (USGS) quadrangle maps, aerial photos, and Massachusetts Department of Environmental Protection (MassDEP) to identify existing and/or impaired surface water resources that either are crossed or are located within half-mile buffer zone (NNEIRI Study Area for water resources) of the NNEIRI Corridor.

For groundwater resources, the Study Team used statewide GIS data, as well as the USGS Hydrologic Atlas produced by the USGS Water Resources Discipline (WRD), to obtain information regarding the existing groundwater quality within the NNEIRI Study Area. Aquifer protection areas (APA) and wellhead protection areas (WPA) are regulated by MassDEP, New Hampshire Department of Environmental Services (NHDES), Vermont Department of Environmental Conservation (VTDEC) and by state and local health departments. APAs and WPAs generally indicate a high potential for drinking water use of high quality groundwater. Therefore, the location of these areas within the NNEIRI Study Area was identified.

The Study Team identified surface water crossings under the Build Alternative using GIS databases collected from federal and state agencies.

Existing Conditions

This section summarizes the existing conditions of surface and ground water resources and quality of water bodies along the Corridor.

Surface Water and Ground Water Resources

There are 23 major drainage basins within the NNEIRI Study Area. The Study Team evaluated publicly available data for all basins within the Study Area to assess public drinking water resource watersheds and community groundwater and surface wells. The assessment of existing conditions includes sole source aquifers, defined by EPA as those that supply at least 50% of the drinking water supply for the area. The Study Team also compiled public water resources for areas within one-half mile of each of the two corridor segments and three miles of key rail stations, which are summarized by segment, below. The protection of these resources during construction or project related activities could create constraints for alternatives that include potential impacts.

Boston to Springfield

There are seven major drainage basins located within the NNEIRI Study Area in the Boston to Springfield segment. The Study Team identified no sole source aquifers as designated by the EPA within the Boston to Springfield segment, however there are groundwater and surface water supply protection areas and public surface water and groundwater wells within this segment.

Springfield to Canadian Border

There are twelve major drainage basins located within the NNEIRI Study Area in the Springfield to Canadian border segment. No sole source aquifers are present within this segment. The NNEIRI Study Area is located within groundwater and surface water supply protection areas, and includes public surface water and groundwater wells.

Water Quality

Boston to Springfield

The Boston-to-Springfield segment of the Corridor crosses or is adjacent to 17 impaired water bodies within the state of Massachusetts. Appendix D lists the impaired water bodies, impaired use, reason for impairment, and location relative to the Corridor. For the water bodies in this segment, the primary potential causes of impairment, based on number of miles affected, are fecal coliform bacteria impairing recreational use, low dissolved oxygen, high nutrients, and high suspended solids which impair aquatic habitat, and polychlorinated biphenyls (PCBs) in fish tissue impairing fish consumption.

Springfield to Canadian Border

The Springfield to Canadian Border segment of the Corridor includes water bodies from three US states (Massachusetts, New Hampshire, and Vermont). Appendix D lists the impaired water bodies, impaired use, reason for impairment, and location relative to the Corridor. The Springfield to Canadian segment crosses or is adjacent to 25 impaired water bodies, including two public water supply areas in New Hampshire (Connecticut River and Partridge Brook). The major causes of impairment for water bodies in this segment, based on number of miles affected, are fecal coliform bacteria impairing recreational use, pH, high nutrients, and high suspended solids, which impair aquatic habitat, and PCBs and mercury in fish tissue impairing fish consumption.

No-Build Alternative Consequences

The No-Build Alternative would not result in additional direct or indirect water quality impacts to surface or groundwater resources within the Corridor from the NNEIRI specific improvements because those improvements would not occur under No-Build condition.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor – Restore Vermonter EA identified no potential impacts to water resources, as the project would not include any in-water work, additional clearing, additional fill, or alteration of any drainage structure or waterway. The project anticipates less than one-acre of ground disturbance as part of the proposed construction activities. If more than one-acre of ground disturbance occurs, the project would develop a Storm Water Pollution Prevention Plan (SWPPP) and file a Notice of Intent (NOI) with the EPA. Other mitigation measures include preparing temporary erosion and sediment control plan and a spill prevention control and countermeasure plan (SPCC) prior to initiating construction.

The NHHS EA identified no potential impacts to ground water resources. The NHHS EA identified some potential adverse impacts to surface waters from changes in storm water flows from impervious surfaces and erosion and sedimentation during the period of active construction. The NHHS EA proposed mitigation measures include developing drainage design details in coordination with CTDEEP and MADEP and other resource agencies and complying all construction activities with the storm water quality manuals and erosion and sedimentation control guidelines.

The SSX DEIR identified no impacts to surface water quality. No negative impacts to the water quality of Fort Point Channel, Charles River, and Neponset River are anticipated. According to the SSX DEIR, the project would have some potential impacts associated with storm water. The proposed project mitigation measures include both non-structural and structural BMPs, practices and procedures to mitigate direct and indirect adverse impacts to surface water quality.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative is not anticipated to have impacts to any surface or groundwater resources in areas along the existing Corridor where no second track construction would take place. In locations where a second track or passing siding is proposed, any impacts to surface and groundwater resources are anticipated to be minor because the Corridor was historically double tracked. All work related to the second track and passing sidings would occur adjacent to the existing rail tracks within the existing rail ROW. There may be temporary impacts to

some surface waters during construction because of the work performed on the railroad track bed. Best management practices for erosion and sedimentation control would be followed during the period of active construction to reduce the impacts.

A specific location for a proposed station at Palmer would be determined in a future phase of the program. Water quality impacts resulting from construction of a new station at Palmer would be considered when determining potential sites to minimize any possible impact to water quality and surface and ground water resources.

A summary of water quality and water resources within half-mile buffer zone of the NNEIRI Corridor areas where the second tracks are proposed is provided below by corridor segment.

- **Worcester to Springfield Double Tracking (Mileposts 48.3–57.7):** Groundwater supply protection areas are located to the south of the Corridor in Auburn. The Corridor runs through the groundwater supply protection area in Leister and Oxford. There are 2 and 3 community groundwater wells on the south side of the Corridor in Auburn and Oxford, respectively. In addition, the Corridor crosses the French River in Leister. Some public water supply resources are located to the south of the Corridor.
- **Worcester to Springfield Double Tracking (Mileposts 59.3–63.3):** The Corridor runs through groundwater supply in Spencer for approximately 1 mile. There is one community groundwater well to the north of the Corridor in Spencer.
- **Worcester to Springfield Double Tracking (Mileposts 64.0–79.4):** In East Brookfield and West Brookfield, the Corridor run through groundwater supply protection areas. The Corridor is adjacent to the groundwater supply protection areas just to the south. In Warren and Brimfield, the Corridor crosses the Quaboag River. There is one community groundwater well within the buffer zone to the south of the Corridor in Brookfield, two community groundwater well and one proposed well to the north of the Corridor in West Brookfield and one community well to the south of the Corridor in Warren.
- **Worcester to Springfield Double Tracking (Mileposts 83.6–92.0):** The Corridor runs across the Quaboag River in Palmer and Monson and adjacent to Chicopee River in Wilbraham. There are some public water supplies within the buffer zone to the north of the Corridor in Palmer, Monson and Wilbraham.
- **East Northfield Passing Siding (Mileposts 110.5–111.8):** There are no water resources within the buffer zone of the proposed passing siding however; the passing siding is located to the north of the impaired river (Connecticut River), within the buffer zone.
- **Downtown Brattleboro (Mileposts 120.5–122.0):** There are no mapped public water supplies in this segment. The Corridor crosses Whetstone Brook and West River in Brattleboro and runs parallel to Connecticut River along the entire segment.
- **Brattleboro to Bellows Falls (Mileposts 123.5–144.0):** Groundwater supply protection areas within the 100-foot buffer zone are identified at three locations in Vermont: north of the Corridor at approximately milepost (MP) 130 at Dummerston and Putney boundary line, north of the Corridor at approximately MP 139 and between MP 141 and 142 in Westminster. In New Hampshire, one groundwater supply protection area and a

community groundwater well are identified south of the Corridor at approximately MP 142 in Walpole. According to the GIS mapping, there is a surface water supply protection area from approximately MP 135.6 in Walpole, New Hampshire to 144.66 in Bellows Falls. The Corridor crosses Whetstone Brook and West River in Brattleboro and runs parallel to Connecticut River along the entire segment from Brattleboro and Bellows Falls. It crosses the Connecticut River just before reaching Bellows Falls Station.

- **Randolph Lengthening of Existing Passing Siding (Mileposts 44.5–45.5):** Randolph Station is within a surface water supply protection area.
- **Roxbury Passing Siding (Mileposts 61.2–61.7):** There are no mapped water quality resources at this location.
- **St. Albans to Swanton Double Tracking (Mileposts 1.5–8.5):** There is one small groundwater supply protection area south of the Corridor between MP 4 and 5 in Swanton. The Corridor crosses Stevens Brook at approximately MP 3.2 in St. Albans.

A summary of bridge work proposed under the Build Alternative is provided below by corridor segment.

Boston to Springfield: The Build Alternative would utilize existing bridges and seeks to improve them, where necessary, in order to accommodate the proposed service. Approximately 2,135 feet of bridge rehabilitation as well as 1,805 feet of bridge redecking is anticipated. This bridge work is necessary for the restoration of the second track between Boston and Springfield and would take place on the CSX track sections.

Springfield to Canadian Border: The Build Alternative would utilize existing bridges and seeks to improve them, where necessary, in order to accommodate the proposed service. Approximately 350 feet of bridge replacement is anticipated. The bridge replacement is anticipated for Walpole, New Hampshire and East Alburgh, Vermont.

4.2.2 Wetlands

This section discusses the affected environment for wetlands and the environmental consequences associated with the No-Build and Build Alternative.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to wetlands and the relevant regulatory requirements.

Regulatory Requirements

Federal agencies are required to avoid and minimize wetland impacts to the extent possible per EO 11990, Protection of Wetlands, and the U.S. Army Corps of Engineers (USACE) has jurisdictional responsibilities under Section 404 of the Clean Water Act (CWA). Many wetlands and other aquatic features are considered “waters of the U.S.,” and these

“jurisdictional” areas are protected under Section 404. Wetlands are defined under the CWA⁴⁴ as, “Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”⁴⁵

The national standard for wetland classification is the USFWS Classification System, which is used in the mapping of wetlands and Deepwater habitats performed for the National Wetlands Inventory (NWI).⁴⁶ The five major wetland and Deepwater systems are marine, estuarine, riverine, palustrine (non-tidal freshwater or salinities less than 0.5 parts per thousand), and lacustrine.

Wetlands in Vermont are classified as Class I, Class II, or Class III wetlands, as defined at 10 V.S.A. § 902 and Section 2 of the Vermont Wetland Rules.⁴⁷ All wetlands shown on the Vermont Significant Wetland Inventory maps are Class I or Class II wetlands, unless determined otherwise by the Secretary of the Agency of Natural Resources (ANR) or the Water Resources Panel of the Natural Resources Board. The Panel may designate a buffer zone contiguous to any Class I wetland and the Secretary may designate a buffer zone contiguous to any Class II wetland. Until otherwise designated by the Panel, a one hundred (100) foot buffer zone is established contiguous to the boundaries of a Class I wetland. Until otherwise designated by the Secretary, a fifty (50) foot buffer zone is established contiguous to the boundaries of a Class II wetland.

All wetlands contiguous to wetlands shown on the Vermont Significant Wetland Inventory maps are presumed to be Class II wetlands, unless identified as Class I or III wetlands, or unless determined otherwise by the Secretary or Panel pursuant to Section 8.⁴⁸

Principal applicable state law is as follows:

Massachusetts

- The Massachusetts Wetlands Protection Act (M.G.L. Chapter 13 Section 40).

New Hampshire

- New Hampshire Statutes. Title 50 Chapter 482-A: Fill and Dredge in Wetlands
- New Hampshire Wetland Rules (Chapter Env-Wt 100 – 900 Wetlands Rules)
<http://des.nh.gov/organization/commissioner/legal/rules/index.htm>

⁴⁴ As defined by the U.S. ACE (Title 33 CFR 328.3, 1986) and the U.S. EPA (40 CFR 230.3, 1980).

⁴⁵ Environmental Laboratory. *Corps of Engineers Wetland Delineation Manual Technical Report Y-87-1*. Prepared for the U.S. ACE, Washington, D.C. Final Report. January, 1987.

⁴⁶ Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Office of Biological Services. Washington D.C. 1979.

<http://des.nh.gov/organization/divisions/water/wetlands/documents/cowardin.pdf>

⁴⁷ Vermont Wetland Rules. Vermont. Code R. 12 004 056. Amendments adopted July 16, 2010, Effective August 1, 2010. <http://www.nrb.statevt.us/wrp/rules.htm>

⁴⁸ Ibid

Vermont

- Title 10 V.S.A. Chapter 37: Wetlands Protection and Water Resources Management Act, Sections 901-921

Methodology

The Study Team mapped and characterized federal and state tidal and freshwater wetlands within the Corridor segments by using information from the NWI, as well as the USGS National Hydrography Dataset. NWI mapping classifies wetlands into five major systems: marine, estuarine, riverine, lacustrine, and palustrine, and then further distinguishes wetland types within these systems by subsystem, class, and subclass based upon various criteria such as type of vegetative cover. Marine and Estuarine wetlands and waters are limited to tidal areas in the vicinity of Boston. The Riverine system encompasses all fresh water rivers and their tributaries. Lacustrine wetlands include lakes that are greater than 20 acres in area and more than 6.6 feet in depth. Palustrine wetlands are non-tidal freshwater wetlands dominated by trees, shrubs, and persistent emergent herbaceous plants. Freshwater ponds less than 20 acres fall within the palustrine system.

A one hundred (100) foot buffer zone around the boundaries of wetlands was defined as the NNEIRI Study Area in Massachusetts and a fifty (50) foot buffer zone around the boundaries of the wetlands in Vermont.

Existing Conditions

This section summarizes existing conditions of wetland resources as well as lakes, ponds and rivers within the Corridor segments. This section also identifies wetland types located in the NNEIRI Study Area. Wetlands can pose significant constraints to the development of alternatives. Information on the nature and extent of wetlands within each segment is provided in the following sections.

Boston to Springfield

NWI-mapped wetlands comprise approximately 7,760 acres in the Boston to Springfield segment of the Corridor. Freshwater (Palustrine) forested and shrub wetlands are the most abundant wetland type mapped in this segment, with lakes (Lacustrine) and freshwater emergent wetlands also relatively prevalent. Regionally significant wetlands occur in the headwaters region of the Sudbury River (Cedar Swamp) and along the Quaboag River valley.

Springfield to Canadian Border

NWI-mapped wetlands comprise approximately 19,175 acres in the Springfield to Canadian segment of the Corridor. Riverine and Freshwater (Palustrine) forested and shrub wetlands are the most abundant wetland type mapped in this segment. The presence of the Connecticut River, White River (and its branches), Winooski River, and the Richelieu River along much of the Corridor contributes substantially to the extensive area of Riverine wetland.

There are a number of regionally significant wetlands and/or aquatic systems along the segment, many associated with the Connecticut River, White River (and its branches) and the Lake Champlain area waterways, as indicated Wetland and aquatic resources form the

foundation of two national wildlife refuges along the Corridor: Silvio Conte and Missisquoi National Wildlife Refuges.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in any additional impacts to wetlands along the existing Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA would not result in any temporary or permanent impacts to wetlands as it would not involve placing any fill in wetlands or waterways, nor does it involve in-water work. Some areas of the project would likely be located within the Massachusetts Wetland Protection Area buffer zone to wetland resource areas and within previously disturbed Riverfront Areas and would require filing of a Notice of Intent (NOI) with the applicable Conservation Commissions (Northfield, Bernardston, Greenfield, Deerfield, Whately, Hatfield, Northampton, Easthampton, Holyoke, Chicopee and Springfield). Mitigation measures include erosion control measures and other BMPs to minimize disturbance of applicable buffer zones.

The NHHS EA identified that approximately 3.9 acres of wetlands along the NHHS rail corridor would be impacted from the restoration of double-tracking and construction of rail sidings. No wetland impacts are anticipated in Massachusetts. The NHHS EA potential mitigation include reducing impacts by minimizing expansion of railroad ROW, and coordinating with CTDEEP and USACE during permitting process and identifying appropriate compensatory mitigation measures. Subsequent to the EA, permits for wetlands were received and construction has started in some segments of the NHHS corridor.

The SSX DEIR identified wetland resource impacts of approximately 7.9 acres of 100-foot jurisdictional buffer to coastal bank at South Station site. There would be no impacts at Widett Circle. According to the SSX DEIR, wetland resource impacts at Readville Yard 2 layover facility site include approximately 0.05 acres of Riverfront Area, approximately 0.3 acres of the 100-foot buffer associated with the Neponset River bank and 0.2 acre of potential isolated wetland areas. Based on the SSX DEIR, each project element would be designed and constructed in a manner consistent with relevant performance standards established in the WPA regulations.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative is unlikely to impact wetland areas outside of locations where a second track is proposed due to the utilization of existing rail corridor. Since the proposed rail corridor follows an existing railroad embankment, wetland and stream crossings are currently bridged or culverted. As a result, the wetland systems that are crossed by the rail embankment have already been impacted by the placement of fill and culverts.

In locations where a second track is proposed, direct wetland impacts would be avoided or limited to the buffer zone due to the work occurring within the historically double tracked rail ROW. Since the Corridor accommodated a second track in the past, it would be rehabilitated as opposed to being built on previously undisturbed land. All existing bridges and culverts have the ability to accommodate a second track.

Boston to Springfield

In the Boston to Springfield segment, the Study Team created 500 scale maps for areas where a second track is proposed in order to closely examine possible wetland impacts in these areas. MassDEP designated wetlands as well as a 100-foot buffer were mapped by the Study Team in accordance with the Massachusetts Wetlands Protection Act. These maps are provided in Appendix E - Massachusetts and Vermont Resource Areas Map.

Between Worcester and Springfield, an additional track is proposed in the buffer zone for a total of approximately 11.3 miles. The locations within the buffer zone are summarized below by segment of added track. Table 4.2-1 summarizes the locations by milepost, town, and wetland type. There are no direct impacts to mapped wetland areas.

Auburn to Charlton (Mileposts 48.3-57.7): This segment has a relatively low density of wetlands with approximately 1.6 miles located within the 100' buffer zone. There are a few small wetlands located adjacent to the proposed second track as well as locations where the proposed second track is on the very edge of the buffer.

Spencer to East Brookfield (Mileposts 59.3-63.3): This segment has a moderate density of wetlands with approximately 1.1 miles located within the 100' buffer zone.

East Brookfield to Brimfield (Mileposts 64.0-79.4): This segment of proposed second track has a particularly high density of wetlands due to its proximity to Quaboag Pond and the Quaboag River and their associated wetlands. Approximately 6.8 miles of this segment are located within the 100' buffer zone.

Palmer to Wilbraham (Mileposts 83.6-92.0): This segment of proposed second track has some areas with a high density of wetlands, particularly in the vicinity of Calkins Brook in Monson. There are other small areas of wetland along the segment. Approximately 1.8 miles of this segment are located within the 100' buffer zone.

Worcester Station: No wetland areas have been identified in the vicinity of Worcester Station, therefore impacts due to the construction of a new passenger platform are not anticipated.

Palmer Station: A specific location for a proposed station at Palmer would be determined in a future phase of the program. Wetlands would be considered when determining potential sites to minimize any possible impact to wetland areas. If necessary, the project proponent would be responsible for coordinating with the USACE New England District Regulatory Branch and

obtaining any required permits during Tier 2. The project proponent would also follow construction BMPs, if appropriate, to minimize wetlands impacts.

Table 4.2-1. Potential Wetland Impacts along Second Track – Boston to Springfield

Mile Post	Town	Types of Wetland ^a	Adjacent/Through the Wetland Buffer Zone
Mileposts 48.3 to 57.7			
48.3-48.4	Worcester	M	Adjacent
48.9	Auburn	Unidentified	Through
49.4-49.5	Auburn	WS1	Through
50.1	Auburn	SS	Adjacent
51.1	Auburn	WS1	Adjacent
51.3	Auburn	WS1	Through
51.9-52.0	Auburn/Oxford line	DM	Through
52.3-52.4	Oxford	WS1	Through
52.5	Oxford	WS1	Adjacent
53.0-53.1	Oxford/Leicester line	SS	Adjacent
53.6-53.7	Charlton/Oxford line	WS1	Through
53.7-53.8	Charlton	WS1	Through
53.9-54.0	Charlton	WS1	Through
54.1	Charlton	Unidentified	Through
54.6	Charlton	SS	Adjacent
55.1	Charlton	Unidentified	Adjacent
55.7-55.8	Charlton	DM	Through
56.6-56.7	Charlton	SS	Through
57.1-57.2	Charlton	SS, WS1	Through
57.4-57.5	Charlton	M, WS1	Through
Mileposts 59.3 to 63.3			
59.2-59.3	Spencer	WS1	Adjacent
59.8-59.9	Spencer	WS1	Adjacent
61.9-62.1	Spencer	SS	Through
62.3-62.7	Spencer/East Brookfield	WS1, SS	Through
62.8-62.9	East Brookfield	DM	Through
63.0-63.1	East Brookfield	DM	Through
63.2-63.3	East Brookfield	WS1	Through

Mile Post	Town	Types of Wetland ^a	Adjacent/Through the Wetland Buffer Zone
Mileposts 64 to 79.4			
64.0-64.2	Brookfield	SS	Through
64.3-64.4	Brookfield	SS, DM	Through
64.4-64.5	Brookfield	WS1	Through
64.7-64.8	Brookfield	WS1, WS3, DM	Through
64.9-65.8	Brookfield	SS, M, WS1, WS3	Through
66.1-66.6	Brookfield	SS, DM	Through
66.7-66.8	Brookfield	WS1, DM	Through
67.0-67.8	Brookfield	WS1, M, DM	Through
68.2-69.5	West Brookfield	WS1, M, DM	Through
69.9	West Brookfield	DM	Through
Mileposts 83.6 to 92			
70.1-70.5	West Brookfield	SS, DM	Through
70.7-70.8	West Brookfield	BG	Adjacent
70.9-71.5	Warren	SS, DM, WS1	Through
71.7- 72.2	Warren	SS, DM	Through
72.8-73.2	Warren	SS	Through
73.3-73.5	Warren	SS	Through
74.6-74.8	Warren	WS1, DM	Through
75.4	Warren	SS	Through
75.5-75.6	Warren	SS	Through
75.8-75.9	Warren	SS	Through
82.8-83.0	Monson	SS	Through
84.1-84.5	Monson	SS, WS1, DM	Adjacent
84.8	Monson	DM	Adjacent
85.4-85.9	Monson	SS, M	Through
86.1	Monson	Unidentified	Adjacent
86.2-86.4	Monson	WS1	Through
86.7	Monson	WS1	Through
87.8-87.9	Wilbraham	DM	Through
91.1-91.2	Wilbraham	M	Through
91.7-91.8	Wilbraham	WS1	Through

Notes:

- a* **BG- Bog**
- DM- Deep Marsh*
- M- Shallow March, Meadow, or Fen*
- SS- Shrub Swamp*
- WS1- Wooded Swamp Deciduous*
- WS2- Wooded Swamp Coniferous*
- WS3- Wooded Swamp Mixed Trees*

Springfield to Canadian Border

In areas where a second track is proposed, the Study Team created 500 scale maps to closely examine possible wetland impacts in these areas. NWI designated wetlands were mapped as well as a 50-foot buffer in accordance with Vermont wetlands regulations (see Appendix E Massachusetts and Vermont Resource Areas maps). Between Springfield and Canadian border, a second track is proposed in the 50-foot buffer zone for a total of approximately 1.7 miles. The locations within the buffer zone are summarized below by segment of added track. Table 4.2-2 summarizes the locations by milepost, town, and wetland type.

East Northfield (Mileposts 110.5-111.8): This segment does not pass through mapped wetlands buffer area.

Downtown Brattleboro (Mileposts 120.5-122.0): This segment does not pass through mapped wetlands buffer area.

Brattleboro to Bellows Falls (Mileposts 123.5-144.0): This segment parallels the Connecticut River for much of its length and is near many of its associated wetlands. The segment passes through the 50’ buffer for a total of approximately 1.2 miles.

Randolph (Mileposts 44.5-45.5): This segment does not pass through mapped wetlands buffer area.

Roxbury (Mileposts 61.2-61.7): This segment is within the 50’ buffer area for approximately 0.1 miles.

St. Albans to Swanton (Mileposts 1.5-8.5): This segment passes through the 50’ buffer for a total of approximately 1.2 miles.

Table 4.2-2. Potential Wetland Impacts along Second Track – Springfield to Canadian Border

Mile Post	Town	Adjacent/Through the Wetland Buffer Zone
Mileposts 123.5 to 144.0		
127.2-127.8	Dummerston	Through
129.4-129.5	Dummerston	Adjacent
129.5-129.6	Dummerston	Through
130.4-130.5	Putney	Adjacent

Mile Post	Town	Adjacent/Through the Wetland Buffer Zone
130.7	Putney	Adjacent
134.6	Putney	Through
134.9-135.0	Putney	Adjacent
138.5	Westminster	Adjacent
Mileposts 61.2-61.7		
61.6-61.7	Roxbury	Through
Mileposts 1.5 to 8.5		
1.9-2.0	St. Albans	Adjacent
2.6	St. Albans	Adjacent
5.1-5.2	Swanton	Through
6.1-6.2	Swanton	Adjacent

4.2.3 Ecological Systems, Threatened and Endangered Species, and Wildlife

This section discusses the affected environment for ecological systems and the environmental consequences associated with the No-Build and Build Alternative.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to ecological systems, including threatened and endangered species and critical habitat, and the relevant regulatory requirements.

Regulatory Requirements

Threatened and endangered species and critical habitat are protected on both the federal and state level. The U.S. Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.) prohibits the “take” of any plant or animal species listed as endangered or threatened under this act, or their designated critical habitat. Section 7 of the Act requires consultation for actions that may affect listed species or their designated habitats with the U.S. Fish and Wildlife Service (USFWS) (for freshwater and wildlife) and National Marine Fisheries Service (NMFS) (for marine and anadromous species).⁴⁹

The United States Department of the Interior, National Park Service (NPS) designates certain privately- and publicly-held lands across the country as National Natural Landmarks (NNL). This designation is based on the lands’ unique or rare ecological characteristics. Although there are no specific federal or state regulations for NNLs, governing regulations for the NNL Program state that any federal project that is subject to NEPA, “...*should consider the*

⁴⁹ United States Endangered Species Act (16 United States Code [U.S.C.] 1531-1543).

existence and location of designated national natural landmarks...in assessing the effects of their activities on the environment under section 102(2)(c) of the National Environmental Policy Act.” (16 U.S.C. 1a–5, 461 et seq., 463, 1908).⁵⁰

Protection of migratory birds is also provided under Executive Order (EO) 13186, Responsibilities of Federal Agencies To Protect Migratory Birds, and the Migratory Bird Treaty Act (MBTA) of 1918, which prohibits, unless permitted by regulations, the “take” of any migratory bird. The Federal Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) provides for the protection of bald and golden eagles. Birds are also protected under state legislation.

Principal applicable state laws and regulations are as follows:

Massachusetts

- Inland Fisheries and Game and Other Natural Resources (M.G.L. Chapter 131)
- Massachusetts Endangered Species Act (MESA) (M.G.L. Chapter 131A) provides for the protection of threatened and endangered species and associated habitat, among other provisions.

New Hampshire

- New Hampshire Endangered Species Conservation Act (Title XVIII Fish and Game, Chapter 212-A: Endangered species Conservation Act)

Vermont

- Title 10 V.S.A. Chapter 123, Protection of Endangered Species
Vermont Fish and Wildlife Regulations (10 V.S.A. Appendix Section 121. Rule establishing a list for prohibited, restricted and unrestricted fish species)

Methodology

The Study Team identified ecologically sensitive areas, endangered and threatened species, and critical habitat within a half-mile of the Corridor centerline (NNEIRI Study Area) through available GIS data layers and from the USFWS and state agency websites. The Study Team obtained federal listing status and occurrences from the USFWS website and used GIS information for mapping ecological zones, occurrences of listed species and significant natural communities.

Increased train frequency and speed could create a barrier to wildlife along the Corridor, particularly in the Green Mountains of Vermont. Trains could potentially inhibit wildlife from crossing the Corridor to access valuable habitat. High speed trains could also increase the danger of crossing and wildlife mortality due to train strikes. GIS mapping was therefore used for further analysis of the potential barrier impacts to wildlife.

The Study Team would consult the USFWS, Massachusetts Natural Heritage and endangered Species Program (Massachusetts NHESP), New Hampshire Fish and Game Department, and

⁵⁰ “National Natural Landmarks (NNL) Program.” *Federal Register* 64 (May 12, 1999) p. 25717.

Vermont Fish and Wildlife Department (VFWD) about the specific species and habitats associated with the Natural Diversity Database (NDDB) and NHESP records, as necessary based on review of potential impacts. The Study Team would use the responses from agencies as a basis for evaluating whether the proposed project would affect the type of habitats indicated by the records. The Study Team would consult agencies for any recommended protection actions (i.e., avoidance, minimization, and mitigation measures) that may require further study as part of Tier 2 activities.

Existing Conditions

This section summarizes existing conditions of ecological systems, including threatened and endangered species and critical habitat along the Corridor.

Overall, the Study Team noted ecological areas, indicated by the prominent wetland/aquatic habitats, in the NNEIRI Study Area along various segments of the Corridor. Many of these are associated with river valleys and associated wetlands and floodplains, along which the rail lines were previously developed due to the flat terrain in these areas. Specific areas noted within each segment are described below.

Increasing concern has been developing in recent years over the presence and expansion of plant invasive species, due to their potential for out-competing native vegetation and adversely affecting the suitability of habitats to support native wildlife species. Transportation corridors such as railways are prone to invasive species proliferation and expansion due to disturbance factors and ease of distribution. Invasive species of note in the northeast region that may be prone to occur along railways include common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), and several species of honeysuckle (*Lonicera* spp.). No specific documentation or mapping of such species presence is available for review on the scale of this assessment.

There are no NNLs located in the Corridor.

Threatened and Endangered Species

Boston to Springfield

Areas within the Corridor between Boston and Springfield that are designated as habitat for state-listed species (Priority Habitat and Estimated Habitat) by the Massachusetts NHESP comprise approximately 5,914 acres (9.4% of the Corridor); a total of 28 discrete areas mapped as habitat for state-listed species occur within the Boston to Springfield segment of the Corridor. Notable areas of these habitat zones include Cedar Swamp (Westborough, Massachusetts), Lake Quinsigamond area (Worcester, Massachusetts), the Quaboag River valley, and Chicopee River and adjacent floodplain. Species-specific details of these Priority and Estimated Habitat areas have not been determined for this assessment.

Springfield to Canadian Border

Areas within the Corridor between Springfield and Canadian Border that are designated as habitat for state-listed species comprise 25,384 acres, or 15.3% of the Corridor. A total of 3,459 discrete areas mapped as habitat for state-listed species occur within the segment, with

more than 50% of these occurrences attributed to state-listed plant species. Notable areas within the segment that are mapped as state-listed species habitats include several areas along the Connecticut River north of Springfield and north of the Vermont state line; the Connecticut River and its floodplain just north of Bellows Falls, Vermont; an extend stretch of the Connecticut River below White River Junction, Vermont; a stretch of the Third Branch White River through Randolph, Vermont; the Lamoille River at Arrowhead Mountain Lake, Vermont; and the Missisquoi National Wildlife Refuge.

The northern long-eared bat (NLEB) has recently been added to the federal threatened list. The range is statewide. Typical concerns would be clearing trees in the pup rearing season. A “no effect” determination would require tree clearing activities to occur between August 15 to April 15 at a minimum.

Wildlife

Boston to Springfield

Based upon the habitat cover types and considering the regional landscape factors that influence habitat suitability and wildlife use, a wide variety of wildlife species are expected to occur along the Corridor. Table 4.2-3 provides a listing of common reptiles, amphibians, birds, and mammals that are likely to occur along the Boston to Springfield segment of the Corridor.

Table 4.2-3. Common Wildlife Species Likely to Occur in Habitats along the Corridor

Species Type	Common Name	Scientific Name
Amphibian	Redback salamander	<i>Plethodon cinereus</i>
Amphibian	Eastern American toad	<i>Bufo a. americanus</i>
Amphibian	Green frog	<i>Rana clamitans melanota</i>
Amphibian	Pickerel frog	<i>Rana palustris</i>
Amphibian	Bull frog	<i>Rana catesbeiana</i>
Reptile	Eastern garter snake	<i>Thamnophis s. sirtalis</i>
Reptile	Painted Turtle	<i>Chrysemys picta</i>
Reptile	Snapping Turtle	<i>Chelydra serpentine</i>
Bird	Turkey vulture	<i>Cathartes aura</i>
Bird	Broad-winged hawk	<i>Buteo platypterus</i>
Bird	Red-tailed hawk	<i>Buteo jamaicensis</i>
Bird	Wild turkey	<i>Meleagris gallopavo</i>
Bird	American woodcock	<i>Scolopax minor</i>
Bird	Mourning dove	<i>Zenaida macroura</i>
Bird	Downy woodpecker	<i>Picoides pubescens</i>
Bird	Hairy woodpecker	<i>Picoides villosus</i>
Bird	Northern flicker	<i>Colaptes auratus</i>
Bird	Eastern phoebe	<i>Sayornis phoebe</i>
Bird	Eastern kingbird	<i>Tyrannus tyrannus</i>
Bird	Blue jay	<i>Cyanocitta cristata</i>
Bird	American crow	<i>Corvus brachyrhynchos</i>
Bird	Black-capped chickadee	<i>Parus atricapillus</i>
Bird	Tufted titmouse	<i>Parus bicolor</i>
Bird	Red-breasted nuthatch	<i>Sitta Canadensis</i>
Bird	White-breasted nuthatch	<i>Sitta carolinensis</i>
Bird	House wren	<i>Troglodytes aedon</i>
Bird	American robin	<i>Turdus migratorius</i>
Bird	Gray catbird	<i>Dumetella carolinensis</i>
Bird	Northern mockingbird	<i>Mimus polyglottos</i>
Bird	Red-eyed vireo	<i>Vireo olivaceus</i>
Bird	Yellow warbler	<i>Dendroica petechial</i>
Bird	Northern cardinal	<i>Cardinalis cardinalis</i>

Species Type	Common Name	Scientific Name
Bird	Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Bird	Chipping sparrow	<i>Spizella passerine</i>
Bird	Song sparrow	<i>Melospiza melodia</i>
Bird	White-throated sparrow	<i>Zonotrichia albicollis</i>
Bird	Dark-eyed junco	<i>Junco hyemalis</i>
Bird	Red-winged blackbird	<i>Agelaius phoeniceus</i>
Bird	Purple finch	<i>Carpodacus purpureus</i>
Bird	House finch	<i>Carpodacus mexicanus</i>
Bird	American goldfinch	<i>Carduelis tristis</i>
Mammal	Northern short-tailed shrew	<i>Blarina brevicauda</i>
Mammal	Eastern mole	<i>Scalopus aquaticus</i>
Mammal	Star-nosed mole	<i>Condylura cristata</i>
Mammal	Little brown myotis	<i>Myotis lucifugus</i>
Mammal	Eastern cottontail	<i>Sylvilagus floridanus</i>
Mammal	Eastern chipmunk	<i>Tamias striatus</i>
Mammal	Woodchuck	<i>Marmota monax</i>
Mammal	Gray squirrel	<i>Sciurus carolinensis</i>
Mammal	Red squirrel	<i>Tamiasciurus hudsonicus</i>
Mammal	Southern flying squirrel	<i>Glaucomys volans</i>
Mammal	White-footed mouse	<i>Peromyscus leucopus</i>
Mammal	Meadow vole	<i>Microtus pennsylvanicus</i>
Mammal	Coyote	<i>Canis latrans</i>
Mammal	Red fox	<i>Vulpes vulpes</i>
Mammal	Gray fox	<i>Urocyon cinereoargenteus</i>
Mammal	Raccoon	<i>Procyon lotor</i>
Mammal	Striped skunk	<i>Mephitis mephitis</i>
Mammal	Norway rat	<i>Rattus norvegicus</i>
Mammal	Virginia opossum	<i>Didelphis virginiana</i>
Mammal	White-tailed deer	<i>Odocoileus virginianus</i>

Springfield to Canadian Border

Wildlife species anticipated to occur within the habitats along the Springfield to Canadian Border segment are more diverse than that of the Boston to Springfield segment due to the

larger area, more varied terrain, and more rural setting. In addition to the species listed in Table 4.2-3, species that may occur in the northern part of this segment include those requiring larger, undisturbed tracts of land.

Habitat

Boston to Springfield

The most abundant habitats in the Boston to Springfield segment include deciduous, evergreen, mixed, and wetland forests. Forested habitats are dispersed along this rail segment between the urban centers of Boston, Worcester, and Springfield, and include numerous small forest stands in suburban areas. Collectively, these forest cover types comprise approximately 40% of the Corridor between Boston and Springfield. Notable habitat blocks in this rail segment include those along major rivers such as the Charles, Sudbury, Quaboag, and Chicopee Rivers. Roughly, 50% of the Corridor is classified as developed land uses.

Springfield to Canadian Border

The most abundant habitats within the Springfield to Canadian Border segment include deciduous forest and woody wetland. Forested cover types comprised roughly 48% of the Corridor. A much reduced proportion (23%) of this segment of the Corridor consists of developed land uses than along either of the other segments.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in any additional impacts to ecologically sensitive areas, threatened and endangered species, or wildlife along the existing Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA does not anticipate new impacts to the threatened or endangered species or their habitats and vegetated areas as the project would occur within the existing disturbed areas of the MassDOT Connecticut River Line ROW.

The NHHS EA does not anticipate any impacts to threatened and endangered species and habitats in Massachusetts as no species or habitats of concern were identified in Massachusetts. In Connecticut, the EA identified as many as 18 Connecticut-listed species in the vicinity of several regional rail station sites and double-tracking segments. The NHHS EA proposed mitigation includes working within the existing railroad ROW and coordinating with CTDEEP to determine whether the species and habitats of interest actually occur at the specific improvement sites. At the time of this writing, some segments of the NHHS corridor were in permitting and construction phase. Subsequent to the EA, detailed surveys have been done as part of the permitting. Some species identified in the EA were not found, while other species that were not anticipated were found.

The SSX DEIR does not anticipate any impacts to the threatened or endangered species or their habitats.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trip trains).

The Build Alternative is unlikely to have any impacts to ecologically sensitive areas, threatened and endangered species habitats, or wildlife in areas where no second track construction would take place due to the utilization of existing Corridor. In locations where a second track is proposed, any impacts to designated habitats are anticipated to be minor or temporary because the Corridor is historically double tracked and all the track construction would be limited to the existing ROW.

In areas where a second track is proposed, the Study Team created 500 scale maps in order to closely examine possible endangered species impacts in these areas. Massachusetts NHESP designated habitats were mapped by the Study Team in GIS to determine where the proposed second track coincides with potential endangered species habitats (see Appendix E, Massachusetts and Vermont Resource Areas Map). Construction within Priority Habitat must be reviewed according to the Massachusetts Endangered Species Protection Act (MESA) guidelines; this would occur at the Tier 2 stage.

Boston to Springfield

Between Worcester and Springfield, a second track is proposed within or adjacent to Priority Habitat of Rare Species for 12.7 miles. The locations within the Priority Habitat are summarized below by segment of added track. Table 4.2-4 summarizes the locations by milepost, town, and classification.

Auburn to Charlton (Mileposts 48.3-57.7): There are no mapped Priority Habitats in this segment.

Spencer to East Brookfield (Mileposts 59.3-63.3): This segment of proposed second track is within designated Priority Habitat for approximately 0.5 miles. The segment is adjacent to the Seven Mile River.

East Brookfield to Brimfield (Mileposts 64.0-79.4): This segment of proposed second track is within designated Priority Habitat for approximately 8.8 miles. The segment is adjacent to the Quaboag River and the Quaboag Wildlife Management Area.

Palmer to Wilbraham (Mileposts 83.6-92.0): This segment of proposed second track is within designated Priority Habitat for approximately 3.4 miles. The segment is adjacent to the Quaboag River, Calkins Brook, and the Chicopee River.

Worcester Station: The desktop review conducted by the Study Team did not indicate any protected species or habitat present in the vicinity of Worcester Station; therefore, impacts due to the construction of a new passenger platform are not anticipated.

Palmer Station: The location for the proposed station at Palmer would be determined during Tier 2. Protected species and habitat would be considered when determining potential sites in order to minimize potential impacts. If potential impacts resulting from the construction or operation of the new station are identified, the project proponent would consult with the relevant federal and state resource agencies.

Table 4.2-4. Endangered Species Habitat along Second Track – Boston to Springfield

Mile Post	Town	Classification ^a	Adjacent/Through the Habitat
Mileposts 59.3 to 63.3			
63.1-63.6	East Brookfield	E, P	Through
Mileposts 64.0 to 79.4			
64.0-64.2	East Brookfield	E, P	Through
65.7-65.8	Brookfield	E, P	Adjacent
66.1-69.5	Brookfield/ West Brookfield	E, P	Through
69.8-70.5	West Brookfield	E, P	Through
71.0-71.4	Warren	E, P	Through
71.9-72.0	Warren	E, P	Through
74.9-75.1	Warren	E, P	Adjacent
75.1-76.6	Warren	E, P	Through
76.6-77.1	Warren	P	Through
77.1-78.3	Warren/Brimfield	E, P	Through
78.5-79.0	Brimfield	E, P	Adjacent
Mileposts 83.6 to 92.0			
83.7-83.9	Monson	E, P	Through
83.9-84.6	Monson	E, P	Adjacent
85.6-87.2	Monson/Wilbraham	E, P	Through
87.7-87.9	Wilbraham	E, P	Through
89.8-90.1	Wilbraham	E, P	Through
90.7-91.1	Wilbraham	E, P	Through

Note:

^a E - NHESP Estimated Habitats for Rare Wildlife; P-NHESP Priority Habitats for Rare Species.

Springfield to Canadian Border

Between Springfield and Montreal, a second track is proposed within or adjacent to mapped endangered or threatened species habitat for approximately 3.3 miles. The locations within the Priority Habitat are summarized below by segment of added track. Table 4.2-5 summarizes the locations by milepost, town, and classification.

East Northfield (Mileposts 110.5-111.8): This segment runs through mapped endangered species habitat for approximately 0.4 miles.

Downtown Brattleboro (Mileposts 120.5-122.0): This segment runs through mapped state endangered or threatened species habitat for approximately 1.5 miles. This includes both animal and plant habitats. Many of the habitats in this segment are located along the banks of the Connecticut River.

Brattleboro to Bellows Falls (Mileposts 123.5-144.0): This segment runs through mapped state endangered or threatened species habitat for approximately 1.4 miles. This includes both animal and plant habitats. Many of the habitats in this segment are located along the banks of the Connecticut River.

Randolph (Mileposts 44.5-45.5): This segment does not pass through any mapped habits.

Roxbury (Mileposts 61.2-61.7): This segment does not pass through any mapped habits.

St. Albans to Swanton (Mileposts 1.5-8.5): This segment does not pass through any mapped habitats.

Table 4.2-5. Endangered Species Habitat along Second Track – Springfield to Canadian Border

Mile Post	Town	Classification ^a	Adjacent/Through the Habitat
Mileposts 110.5-111.8			
110.7-110.9	Vernon, VT	Other-Plant	Through
111.5-111.7	Vernon, VT	Other-Plant	Through
Mileposts 120.5 to 122.0			
120.5-120.8	Brattleboro	SE-Animal	Adjacent
120.8-121.3	Brattleboro	SC-Plant	Through
121.3-121.8	Brattleboro	SE-Animal	Adjacent
121.8-122.4	Brattleboro	SE-Animal	Through
Mileposts 123.5 to 144.0			
123.7	Brattleboro	SE Animal	Through
128.3-128.5	Dummerston	Other-Natural Community	Through
129.3-129.4	Dummerston	SC-Plant	Through
134.3-134.5	Putney	ST-Plant	Through
135.9-136.0	Putney	SC-Plant	Adjacent

Mile Post	Town	Classification ^a	Adjacent/Through the Habitat
142.0-142.5	Westminster	SC-Plant	Adjacent
143.8-144.0	Westminster	SC-Plant	Adjacent

Note:

^a SE - State Endangered Species; ST - State Threatened Species; SC - Special Concern

4.3 HUMAN ENVIRONMENT

4.3.1 Land Use, Existing and Planned

This section summarizes discusses the affected environment and planned land use and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential land use impacts and the relevant regulatory requirements.

Regulatory Requirements

NEPA requires federal agencies to consider the land use and zoning impacts of federal actions. Principle applicable state laws are listed below:

Massachusetts

- M.G.L. Chapter 40A: The Zoning Enabling Act enacted by Chapters 368 and 551 of the Acts of 1954 and became effective on August 1, 1954. Revised on August 2010.
- The Executive Office of Energy and Environmental Affairs (EEA) Smart Growth & Smart Energy policy

New Hampshire

- New Hampshire Statutes. Title 64: Planning and Zoning, Chapter 674: Local Land Use Planning and Regulatory Powers

Vermont

- Title 10 V.S.A Chapter 151: State Land Use and Development Plans (Act 250 Statute)

Methodology

The Study Team compiled the land use classifications for areas within one-half mile (NNEIRI Study Area for land uses) of each of the two route segments and identified land use constraints, by segment, for any construction or new land use outside the existing ROW.

The Study Team characterized existing land use conditions within the NNEIRI Study Area using the 2006 National Land Cover Database (NLCD) set. The NLCD set was created through

a cooperative project conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies consisting of the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the U.S. Forest Service (USFS), the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), the Bureau of Land Management (BLM) and the USDA Natural Resources Conservation Service (NRCS).

Unlike local, regional, and state land use mapping, which varies among entities by land use type and specificity, the NLCD is based upon general use, intensity, and cover type. The applicable NLCD classifications reported for the NNEIRI Study Area are:

- **Barren Land.** Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
- **Cultivated Crops.** Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
- **Deciduous Forest.** Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
- **Developed, High Intensity.** Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial. Impervious surfaces account for 80 -100 percent of the total cover.
- **Developed, Low Intensity.** Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.
- **Developed, Medium Intensity.** Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.
- **Developed, Open Space.** Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- **Emergent Herbaceous Wetlands.** Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- **Evergreen Forest.** Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.

- **Grassland/Herbaceous.** Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
- **Mixed Forest.** Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
- **Open Water.** All areas of open water, generally with less than 25% cover of vegetation or soil.
- **Pasture/Hay.** Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
- **Shrub/Scrub.** Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
- **Woody Wetlands.** Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

The Build Alternative follows an existing rail corridor and does not involve construction outside the existing ROW, including construction of new support facilities or stations, other than the new station at Palmer, Massachusetts. Therefore, the Study Team's analysis of the potential impacts to existing or future land use was focused on the new Palmer station and the new station platform at Worcester Union Station.

Existing Conditions

This section identifies the general land uses within the NNEIRI Study Area (within one-half mile of each of the two route segments). Land use classifications and constraints, by segment, are summarized below.

Boston to Springfield

Boston to Springfield is a highly developed segment, with development accounting for nearly 50 percent of the land area within one-half mile of the Corridor. These heavily concentrated population centers could pose constraints for any construction outside the existing ROW. In addition, approximately one-third of the classified land use within the Boston to Springfield segment exhibits a combination of deciduous forest and woody wetlands. This segment is dominated by forest, pasture, low, medium and high intensity developed land, and developed open spaces, along with wetlands and water bodies. These resource areas can also pose constraints for permitting and construction activities.

Springfield to Canadian Border

Springfield to Canadian Border segment is mostly rural and less developed with development accounting for less than 25 percent of the land area within one-half a mile of the Corridor segment. It is dominated by forest, pasture, cropland, medium and low intensity developed

land, and developed open space, along with wetlands and water bodies. These wet and woody areas, along with croplands and other resource areas could pose constraints to the development of some alternatives.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in any change to compatibility with land uses within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA identified no impacts to land use or zoning within the Knowledge Corridor project study area. The project is consistent with regional and local transportation land use plans and the proposed stations would not negatively affect land use or require significant changes to zoning in the Knowledge Corridor project study area. The project supports transit-oriented development (TOD) and is consistent with local and regional land use plans.

The NHHS EA identified no direct or indirect impacts to land use impacts associated with non-station area improvements. According to the EA, at six of the 12 station locations, the project would either have beneficial impact as these station areas would complement TOD plans and other planned improvements or would have adverse impacts because of the increased activity at the stations resulting in direct impacts to access surrounding land uses. The mitigation measures include maintaining ongoing coordination with affected communities during final design.

The SSX DEIR anticipates limited direct land use impacts due to the project. The South Station and proposed layover facility sites are all characterized by existing urban and industrial land uses, which are predominantly altered areas. The project would require demolition of the USPS General Mail Facility. The relocation of this facility would be part of a separate MEPA review. Based on the DEIR, two of the proposed layover facilities would require property acquisitions; however, acquisitions would be limited to the minimum footprints required to support each function.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Corridor is a currently active railroad and additional train operations of NNEIRI service are unlikely to have any impacts on the land uses. The Build Alternative service would not result in any change to compatibility with land uses, land use patterns, character of existing

adjacent development, access to land or compatibility with existing zoning because no property acquisition would be necessary for adding second track. The second track and passing sidings would be added to the adjacent existing tracks within the railroad ROW. The railroad ROW is wide enough to accommodate both tracks where double-tracking is proposed, with no other land required to be used. Re-installation of the double-track would occur primarily where two tracks existed historically.

Since no new layover and maintenance sites are proposed for the Build Alternative, there would be no potential impact to land use.

Palmer Station: Three potentially suitable sites, including the Historic Palmer Station, are under consideration for a new Palmer Station. None of these sites are anticipated to have impacts on land use because any new improvements would be limited to the existing railroad ROW and would be consistent with the existing local land use and zoning. The railroad was historically double-track but most of the track was removed in the mid-20th century. The exact location of the station would be determined upon further refinement in later phase of the NNEIRI Study.

New platform at Worcester Union Station: A new platform would be provided at Worcester Union Station in the center of the existing ROW. Connection to Worcester Union Station would be provided via new vertical access to an existing pedestrian tunnel that was historically used to connect passengers to center island platforms. Tracks would be re-configured to accommodate the new platform, including the addition of new interlockings. Additionally, a controlled siding in Worcester would be taken out of service to accommodate the new platform and track configuration.

4.3.2 Socioeconomic and Environmental Justice

This section discusses the affected environment for socioeconomic and environmental justice (EJ) communities and environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to evaluate impacts to socioeconomic resources and environmental justice communities and the relevant regulatory requirements.

Regulatory Requirements

FRA's Procedures for Considering Environmental Impacts requires consideration of both beneficial and adverse impacts of program alternatives on the socioeconomic environment, including demographic shifts and impacts on commerce, metropolitan areas, and business districts.

Environmental justice (EJ) refers to social equity in sharing the benefits and burdens of a project or program. Title VI, enacted as part of the U.S. Civil Rights Act of 1964 (42 U.S.C 2000d) prohibits discrimination on the bases of race, color, or national origin in federally assisted programs or activities. In addition, Title II of the U.S. Americans with Disabilities Act

(42 U.S.C. 12101) and Section 504 of the U.S. Rehabilitation Act of 1973 (29 U.S.C. 794) prohibit discrimination on the basis of disability in all public transportation. EO 12898, *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,"* requires each federal agency to identify and address, as appropriate, *"disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."*⁵¹

The United States Department of Transportation (USDOT) issued Order 5610.2(a) to address environmental justice for minority and low-income populations.⁵² The Council on Environmental Quality (CEQ) provides policy guidance in implementing NEPA⁵³ that defines minority and low-income populations as either:

- The minority or low-income population of the affected area exceeds 50 percent.
- The population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

The USDOT has a policy to insure nondiscrimination under Title VI of the Civil Rights Act of 1964. The specifics of Title VI are that *"no person in the United States shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."*

The Executive Office of Energy and Environmental Affairs' (EEA) Environmental Justice Policy⁵⁴ refers minority to individuals who identify themselves on federal census forms as non-white or Hispanic.

The EEA defines Environmental Justice Populations as a neighborhood whose annual median household income is equal to or less than 65 percent of the statewide median or whose population is made up of 25 percent Minority, Foreign Born, or Lacking English Language Proficiency.

At the state level, the following legislation applies:

Massachusetts

- Environmental Justice Policy of the EEA

New Hampshire and Vermont

- Use federal standards

⁵¹ Executive Order 12898. "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Federal Register, Volume 59, No. 32, February 11, 1994.

⁵² U.S. Department of Transportation, 2012. USDOT Order 5610.2(a), "Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Federal Register, Volume 77, No. 99, May 10, 2012.

⁵³ National Environmental Policy Act, 1969. "Title II, Council on Environmental Quality." Amended, January 1, 1970, July 3, 1975, August 9, 1975 and September 13, 1982.

⁵⁴ Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs. <http://www.mass.gov/eea/docs/eea/ej/ej-policy-english.pdf>

Methodology

Demographic and Socioeconomic

The Study Team used the U.S. Census Bureau's American Community Survey (ACS) 5-year estimates for 2007-2011 by census block group for demographic and socioeconomic analysis. For employment figures, the U.S. Census uses total population ages 16 and over. For the demographic and socioeconomic analysis, the NNEIRI Study Area includes all U.S. census block groups within the Corridor buffer boundary (one half mile along the Corridor, 3 miles around the stations), as well as all block groups that are partially located within the buffer boundary regardless of how much of the geographic unit is located within the buffer. In other words, block groups were not clipped or divided at the NNEIRI Study Area buffer, but rather kept whole and counted in their entirety as part of the analysis. The same is true of census tracts used for the employment calculation.

For the economic overview, the Study Team used gross domestic product (GDP) as an indicator of economic production. The Study Team obtained the Bureau of Economic Analysis (BEA) 2012 statistics on gross domestic product (GDP) for each metropolitan area along the Corridor and for the states that comprise the New England region.

The analysis provides a general discussion of the potential effects of the Build Alternative on the socioeconomic environment within the more populated and urban areas in the Corridor.

Environmental Justice

The Study Team used federal thresholds of minority and low income populations to identify and quantify environmental justice populations within the NNEIRI Study Area. Census block groups with at least 50% minorities or 50% or more residents living below the poverty level were identified as areas with potential environmental justice populations. In order to account for regional variation in economic intensity, the Study Team used a regional indicator. Thus, block groups with percentages of minorities or low income populations higher than 10% above the county average in which the block group is located are also identified as potential environmental justice populations. In the few cases where the county average was more than 50% minorities or low income, the 50% threshold was used.

The methodology utilizes GIS to compare the Build and No-Build Alternative infrastructure and services against the mapped location of environmental justice populations to identify and describe the relative benefits and burdens of the project, such as proximity to stations and proximity to potential noise and air quality impacts.

Existing Conditions

The NNEIRI Corridor spans diverse socioeconomic and economic environments through New England. The vast majority of the population and employment are located in the metropolitan areas in the region that anchor the Corridor segments – Boston and Springfield, and the other metropolitan regions in between – Worcester and Burlington. The high population and employment densities of these metropolitan areas were also the location of the highest concentrations of minorities and low-income households. Outside of the metropolitan areas along the Corridor, there are rural areas with low population and employment densities.

This section provides an overview of the economic landscape of the region and the demographic, socioeconomic, and environmental justice characteristics of the people living and working within the NNEIRI Study Area along with their interaction with the comprehensive transportation network and community facilities. The transportation network in a region is vital to its economic vitality through its movement of goods and people within and beyond the region. Connectivity and capacity that allow free movement of goods and people increase economic vitality and improve access to employment opportunities and services.

NNEIRI Study Area Overview

Demographic and Socioeconomic

Within the NNEIRI Study Area of the two segments, the population is estimated to be 1,492,786 and households number 606,036. Minorities comprise 31% of the NNEIRI Study Area population. One fifth of the households in the NNEIRI Study Area do not have vehicles available.

Approximately 62% of the population above working age is employed with the unemployment rate at an average of 8% within the NNEIRI Study Area. Average median household income in the NNEIRI Study Area is \$58,801 with approximately 16% of the population living below the poverty/low income threshold. Details on the demographic and socioeconomic characteristics of the NNEIRI Study Area are provided in Table 4.3-1 below.

Table 4.3-1. Demographic and Socioeconomic Characteristics in the NNEIRI Study Area

Demographic and Socioeconomic Characteristics	Count	%
Total Population	1,492,786	
Total Households	606,036	
Minority Population	464,873	31.1%
Households without Vehicles Available	130,354	21.5%
Population Living Below Poverty Level	229,136	16.3%
Median Household Income	\$58,801	
Employed Population	759,408	61.5%
Unemployment	66,426	8.1%

Environmental Justice

Potential environmental justice populations are identified by block group by minority status and household income. Table 4.3-2 describes potential environmental justice populations by block group for the NNEIRI Study Area as a whole. The table shows that within the Study Area, approximately 35% of block groups have higher than average concentrations of minorities and approximately 25% have higher than average concentrations of low income populations.

Table 4.3-2. Environmental Justice Populations in the NNEIRI Study Area

Environmental Justice Characteristic	Block Groups	Percentage of Total
NNEIRI Study Area	1209	
Minority	420	34.7%
Low Income	297	24.6%

Economic Overview

For the economic overview, the Study Team used Gross Domestic Product (GDP) as an indicator of economic production. The New England region has a regional GDP of \$829,745 and within the region, the metropolitan areas in the Corridor produce 49% of the regional GDP.

Boston to Springfield

The Boston to Springfield segment includes the Boston, Worcester, and Springfield metropolitan areas. The discussion on Springfield’s social and economic resources is split between the two sections as it is common to both segments.

Demographic and Socioeconomic

The population in the Boston to Springfield segment is estimated to be 1,042,505 (approximately 70% of the total population in the NNEIRI Study Area) from 2011 Census block groups. Within this segment, there are 419,124 households, which represent 69% of all households in the NNEIRI Study Area. The minority population in this segment comprises 38% of the total population. Table 4.3-3 describes the demographic characteristics of this segment.

Table 4.3-3. Demographic Characteristics - Boston-to-Springfield Segment

Demographic Characteristic	Count	Percentage of Total
Total Population	1,042,505	69.8%
Total Households	419,124	69.2%
Minority Population	393,524	37.7%

The Boston to Springfield segment has employment of 534,848. The unemployment rate in this segment is approximately 8%. Median household income in this segment is \$64,557. Table 4.3-4 provides detailed socioeconomic characteristics of the segment.

Table 4.3-4. Socioeconomic Characteristics - Boston-to-Springfield Segment

Socioeconomic Characteristic	Count	Percentage of Total
Population Living Below Poverty Level	171,481	17.6%
Median Household Income	\$64,557	
Households without Vehicles Available	112,569	26.9%
Employed Population	534,848	61.5%
Unemployment	47,601	8.2%

Environmental Justice

The Study Team identified potential environmental justice populations by block group by minority status and household income. Table 4.3-5 shows that within the Boston to Springfield segment, 42% of block groups have higher than average concentrations of minorities and 28% have higher than average concentrations of low income populations.

Table 4.3-5. Environmental Justice Populations - Boston to Springfield Corridor

Environmental Justice Characteristic	Block Groups	Percentage of Total
NNEIRI Study Area	846	
Minority	357	42.2%
Low Income	237	28.0%

Springfield to Canadian Border

The Springfield to Canadian border segment includes the Springfield and Burlington metropolitan areas. The discussion on Springfield's social and economic resources is split between the two sections as it is common to both segments.

Demographic and Socioeconomic

The population in this segment is estimated to be 450,281 (approximately 30% of the total population in the NNEIRI Study Area). Within this segment, there are 186,912 households, which represent approximately 31% of all households in the NNEIRI Study Area. The Springfield to Canadian border segment has the lowest percentage of minority population of the two segments at approximately 16%. Details on the demographic characteristics of the segment are provided in Table 4.3-6.

Table 4.3-6. Demographic Characteristics - Springfield to Canadian Border Segment

Demographic Characteristic	Count	Percentage of Total
Total Population	450,281	30.2%
Total Households	186,912	30.8%
Minority Population	71,349	15.8%

Along the Springfield to Canadian border segment of the Corridor, the percentage of residents living below the poverty level as defined by US Census Bureau threshold is the lower of the two segments. In Urban Areas with substantial transit options, the absence of an automobile does not in itself signify any economic condition. However in areas with limited transit options, a characteristic of this segment, the absence of a vehicle is an indicator of poverty. Slightly less than 10% of the households within this segment do not have a vehicle available. Table 4.3-7 describes the socioeconomic characteristics of this segment.

Table 4.3-7. Socioeconomic Characteristics - Springfield to Canadian Border Segment

Socioeconomic Characteristic	Count	Percentage of Total
Population Living Below Poverty Level	57,655	13.2%
Median Household Income	\$53,046	-
Households without Vehicles Available	17,785	9.5%
Employed Population	224,560	61.4%
Unemployment	18,825	7.8%

Environmental Justice

Within the Springfield to Canadian border segment, the Study Team identified very few block groups as having potential environmental justice populations (Table 4.3-8). The majority of the block groups with potential environmental justice populations are in Massachusetts, and more specifically in Springfield, Holyoke, and Northampton. However within the cities of Brattleboro, Vermont; Greenfield, Northampton, Holyoke and Springfield, Massachusetts, there may be some individual Census Block Groups that have higher levels of minority, poverty or Persons with Limited English proficiency.

Table 4.3-8. Environmental Justice Populations - Springfield to Canadian Border Segment

Environmental Justice Characteristic	Block Groups	Percentage of Total
NNEIRI Study Area	363	-
Minority	63	17.4%
Low Income	60	16.5%

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to socioeconomic resources and environmental justice communities within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA identified potential beneficial economic development impacts along the corridor as a result of passenger rail improvements. The EA identified overall benefit to EJ populations in Greenfield and Northampton as a result of improved access. Residents of Amherst would have to travel to Northampton to access the Vermonter. Existing and planned public transportation services between Amherst and Northampton would provide adequate access to the Northampton station for residents of Amherst. According to the EA, the project would experience an increase in train traffic however, overall, there would be no disproportionately high and adverse effect on low income or minority populations.

The NHHS EA identified no adverse impacts to socioeconomic conditions. The project would have beneficial regional and national economic impacts due to job creation. The project would have beneficial impact on EJ populations in the vicinity of improved existing stations and relocated and proposed new stations as the project provides new or improved access to regional rail service thus improving mobility options. The EA identified adverse impacts to EJ populations due to increased traffic congestion at several intersections and increased noise levels. The NHHS EA mitigation measures include improving traffic signals and intersections, establishing Quiet Zones and using noise insulation of some homes.

According to the SSX DEIR, the project would displace approximately 1,000 USPS jobs, which are anticipated to be relocated within South Boston. The project does not anticipate a net loss of USPS employment within the Boston area as MassDOT intends to include retail functions of the USPS facility in the terminal expansion. The SSX project is expected to benefit EJ populations by improving accessibility to public transportation and public access within the station and would not provide a burden to the EJ populations greater than any non-EJ populations. MassDOT would provide acquisition and relocation assistance, if required, for affected properties at the Widett Circle and Readville – Yard 2 layover facility sites.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative's service enhancements would have a beneficial impact on economic development and EJ populations in the vicinity of the existing stations and the proposed new station. The Build Alternative would provide improved mobility options for those who are transit-dependent as the additional trains provided under NNEIRI service would improve access to regional passenger rail services.

The NNEIRI service would lead to jobs related to the construction of the proposed improvements, suppliers of materials and equipment and related professional services. Additionally the proposed developments would improve access to jobs via wider access to employment and commercial centers, especially for persons without access to cars and the mobility impaired. Other potential economic benefits from a passenger rail project include increased property values around station areas. Indirect benefits include economic opportunities for redevelopment of communities in proximity to rail, mixed-use development, which creates a more livable community that improves public health by providing transportation options within walking or bicycling distances.

Proposed double-tracking and new or extended passing sidings would be provided within the existing railroad ROW, resulting in no substantive physical changes or disproportionate impacts to areas with EJ populations. Additionally, the Build Alternative does not include construction of any new layover facility or maintenance site thus resulting in no impact to the areas with EJ populations. It is anticipated that EJ populations near Framingham, Worcester, Springfield, Holyoke and Northampton stations would be most beneficially impacted because of high percentage of minority and low income population. Other stations that would have beneficial impacts on EJ population include Northampton and Greenfield in Massachusetts, Brattleboro, Bellows Falls, White River Junction, Randolph, and Essex Junction in Vermont and Claremont in New Hampshire.

4.3.3 Possible Barriers to the Elderly and Handicapped

This section discusses the affected environment for the elderly and people with disabilities and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

Regulatory Requirements

The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination and ensures equal opportunity for persons with disabilities in employment, State and local government services, public accommodations, commercial facilities, and transportation. The current text of

the ADA includes changes made by the ADA Amendments Act of 2008 (P.L. 110-325), which became effective on January 1, 2009. The ADA was originally enacted in public law format and later rearranged and published in the United States Code (U.S.C.).

At the federal level, laws relating to pedestrian access routes and parking spaces for persons with disabilities also include the 2006 USDOT's Americans with Disabilities Act of 1990 (ADA) Standards for Transportation Facilities.⁵⁵ DOT's ADA standards apply to facilities used by state and local governments to provide designated public transportation services, including bus stops and stations, and rail stations. They apply to new construction and alterations.

U.S. Department of Justice 2010 ADA Standards for Accessible Design (ADAAG): The new Title II (State and Local Government) and Title III (Places of Public Accommodations) regulations are now in effect. The 2010 ADA Standards for Accessible Design are in effect as of March 15, 2012. All state, county and municipally owned and leased building must satisfy the requirement of equal access under Title II of the ADA.

At the state level, the following legislation applies:

Massachusetts

- 521 Code of Massachusetts Regulations (CMR), the Rules and Regulations of the Massachusetts Architectural Access Board (AAB)

New Hampshire

- New Hampshire Statutes. Title 23: Labor, Chapter 275-C: Governor's Commission on Disability. Sections 275-C:10 to 275-C:18
- The Architectural Barrier-Free Design Code for the State of New Hampshire (Abfd 300 - AB Code)

Vermont

- 2012 Vermont Access Rules - (accepted) - (Effective November 15, 2013)
- Vermont Accessibility Standards Statute -- 20 VSA Chapter 174

Methodology

All stations except Palmer are existing stations and the Build Alternative would utilize the existing platforms except for the new station platform at Worcester Union Station. No modifications to the existing stations would be made with the exception of the Palmer Station, which would be designed to be ADA compliant. Any newly constructed stations in Connecticut and Massachusetts, with the exception of the new passenger platform at Worcester, Massachusetts and new station at Palmer, Massachusetts, would be built as part of New-Haven Hartford Springfield and Knowledge Corridor / Restore the Vermonter projects. No new stations would be built in Vermont.

⁵⁵ U.S. Department of Transportation. Americans with Disabilities Act (ADA) Standards for Transportation Facilities. 2006. <http://www.access-board.gov/guidelines-and-standards/transportation/facilities/about-the-ada-standards-for-transportation-facilities/ada-standards-for-transportation-facilities-single-file>

Existing Conditions

Boston to Springfield

All the existing stations in the Boston to Springfield segment meet ADA accessibility guidelines. All the stations have on-site parking spaces and dedicated accessible parking spaces except for Back Bay. Below is a brief discussion of each station in Boston to Springfield Corridor segment.

South Station: South Station is considered an ADA accessible station. The Station has seven high-level platforms and public safety facilities. **Back Bay Station:** is ADA accessible. The station has no on-site parking but private parking garages are proximate to the station, which have accessible parking spaces.

Framingham: The Framingham Station meets ADA accessibility guidelines. The station has a 166-space parking lot, with four spaces designated for disabled passengers.

Worcester Union Station: The Worcester Union Station features a single high-level platform, five tracks and public safety facilities. The station facilities meet ADA accessibility requirements. The station has a 500 car garage with nine designated as ADA accessible.

Springfield: The existing Springfield Union Station currently meets ADA accessibility standards and includes public safety facilities. Parking is available adjacent to the station and some parking spaces are designated for ADA accessibility.

Springfield to Canadian Border

All the existing stations in the Springfield to Canadian Border meet ADA accessibility guidelines except for Windsor and Montpelier Stations in Vermont. Windsor, Essex Junction, St. Albans, Brattleboro and Montpelier Stations do not have accessible parking spaces.

Brattleboro: The station, located near Brattleboro town center, has no dedicated vehicular parking.

Bellows Falls: The station is located in an industrial area in eastern Bellows Falls. Ten short-term parking spaces are provided at the station along with the accessible parking spaces.

Claremont, New Hampshire: The station is located in a rural area west of central Claremont but has nearby accessible and general parking spaces.

Windsor: The station is located in Windsor town center. However, the station does not meet ADA accessibility guidelines and does not have accessible parking spaces.

White River Junction: The station is located near in the White River Junction Historic District and meets ADA accessible guidelines.

Randolph: The station facilities meet ADA accessibility requirements. ADA accessible parking spaces are available. The station is located near historic Randolph town center.

Montpelier Station in Vermont does not meet ADA requirements. The station is located in a rural area west of central Montpelier.

Waterbury: Parking is provided at the station at a Revitalizing Waterbury owned lot; the lot includes ADA accessible spaces.

Essex Junction – Burlington, Vermont: The station does not meet ADA accessibility requirements according to Amtrak’s ADA standards. The station has an eight space vehicle parking lot owned and managed NECR; none of the spaces are designated ADA accessible. Through Amtrak’s Accessible Stations Development Plan, steps have been proposed to address and rectify any non-ADA compliance issues, such as level boarding of disabled persons.

St. Albans: The station offers 14 parking spaces, with no dedicated accessible spaces. According to Amtrak’s website, the station platform and access to trains meet ADA accessibility requirements but enclosed passenger waiting areas do not.

Table 4.3-9 summarizes the stations that meet ADA accessible requirement and the availability of accessible parking spaces in the stations.

Table 4.3-9. Existing Station Site Assessment

Station	ADA Accessible Station	Vehicle Parking Available/Accessible Parking	No of Parking Spaces/ No. of Accessible Parking
South Station	Yes	Yes/Yes	223/8
Back Bay	Yes	Off-site/Off-site	0
Framingham	Yes	Yes/ Yes	166/ 4
Worcester	Yes	Yes/ Yes	500/ 9
Springfield	Yes	Yes/ NA	NA
Brattleboro	Yes	No/ No	0
Bellows Falls	Yes	Yes/ Yes	10/ NA
Claremont	Yes	Yes/ Yes	15/ NA
Windsor	No	Yes/ No	NA/ 0
White River Jct.	Yes	Yes/ Yes	16/ NA
Randolph	Yes	Yes/ Yes	NA
Montpelier	No	Yes/NA	NA
Waterbury	Yes	Yes/ Yes	NA
Essex Junction	Yes	Yes/ No	8/ 0
St. Albans	Yes	Yes/ No	14/ 0

Source: NNEIRI, April 2014, Station Site Assessment & Guidelines.

Note: NA: Not Available

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in possible barriers to the elderly and handicapped persons.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA and the SSX DEIR did not include evaluation of this environmental resource.

The NHHS EA identified no possible barriers to the elderly and handicapped persons. All stations that are reconstructed, relocated, or new would provide ADA accessibility to trains and services. High-level platforms, connected by aerial pedestrian overpass with stairs and an elevator, would provide safe access to trains, the station and parking. Springfield Union Station does not have high-level platforms, accessibility improvements to this station would be part of a future project. At the time of this writing, the NHHS project was in final permitting and construction.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative is not anticipated to create any additional barriers to elderly and handicapped since it utilizes the existing track alignment and existing stations and platforms. Additionally, it would have positive impacts to elderly and handicapped since people who cannot drive can use rail service.

All the track improvement work, restoration of second tracks and addition of passing siding under the Build Alternative would take place within the existing rail ROW. The Build Alternative proposes a new station in Palmer, which would be designed to be ADA compliant. Three feasible sites are currently under consideration for a new Palmer Station. Additionally, a new ADA compliant high-level platform at Worcester Union Station would be provided in the station. Connection to Worcester Union Station would be provided via new vertical access to an existing pedestrian tunnel that was historically used to connect passengers to center island platforms.

The Build Alternative would not result in any change to the accessible parking spaces available at the existing stations. Since there would be no modifications to the existing stations and accessible parking areas, it would not create any additional possible barriers to the elderly and handicapped persons.

There might be an indirect impact due to the additional trains along the Corridor, where closure of at-grade crossings may become more frequent and opportunities to cross the tracks may be reduced. However, the frequency of trains under the NNEIRI Build Alternative is relatively low so that potential indirect impact due to the additional trains along the Corridor is not anticipated.

4.3.4 Public Health and Safety

This section discusses the affected environment for health and safety and the environmental consequences associated with the No-Build and Build Alternatives. Refer to Section 4.3.12 for existing transportation characteristics on these routes in terms of type of service (i.e. freight, commuter, etc.), speeds, and existing safety infrastructure.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to public health and safety and the relevant regulatory requirements.

Regulatory Requirements

NEPA and FRA's Procedures require federal agencies to consider the impact of federal actions on public health and safety. The following laws are applicable for public safety:

- Rail Safety Improvement Act of 2008 (Public Law 110-432): One aim of the statute is to improve conditions of rail bridges and tunnels. The Rail Safety Improvement Act also requires that railroads implement Positive Train Control (PTC) systems to prevent train-to-train collisions on certain rail lines by the end of 2015.
- Federal Railroad Administration (49 CFR Volume 4, Chapter II, Part 200 to 299): FRA regulations for railroad transportation safety, including standards, rules, and practices, are listed in 49 CFR Parts 200 to 299.
- U.S. Code on Railroad Safety (49 U.S.C. §§ 20101 et seq.): Part A of Subtitle V of Title 49 of the United States Code (49 U.S.C. §§ 20101 et seq.) contains a series of statutory provisions affecting the safety of railroad operations. In particular, Section 20109 protects the reporting of safety concerns and injuries and prohibits railroads from disciplining, discharging, or retaliating in any form against employees who engage in protected activities.

At the state level, the following legislation applies:

Massachusetts

- M.G.L. Title 10 Chapter 17: Department of Public Health

New Hampshire

- New Hampshire Statutes. Title 10: Public Health

Vermont

- V.S.A Title 18: Health

Methodology

The Study Team identified facilities and services related to the provision and protection of safety in the NNEIRI Corridor through data provided by municipal planning staff/offices,

limited field review, and review of current aerial maps of the Corridor. Increases of train traffic at higher speeds could create a potential hazard to vehicles and pedestrians in the vicinity of at-grade crossings. At-grade crossings were evaluated based on the FRA diagnostic to determine necessary improvements.

The Study Team mapped improvements in and around stations (NNEIRI Study Area) throughout the Corridor in order to demonstrate increased connectivity to the surrounding community, and used mapping to identify existing and planned sidewalk and bike lane infrastructure.

Existing Conditions

This section summarizes station accessibility and rail operations safety and security within the NNEIRI Study Area.

Station Accessibility

Boston to Springfield

The existing stations at South Station, Back Bay, Framingham, Worcester and Springfield are pedestrian friendly and are easily accessible to pedestrians. At the Worcester Union Station, wayfinding can be difficult, with signs incomplete in certain areas. The Worcester Union Station is reasonably accessible to pedestrians through sidewalks and passageways from the bus station and garage; however, Interstate 290 and adjacent elevated railroad tracks create a barrier for pedestrians accessing the station. Bicycle parking spaces are available in South Station, Back Bay and Framingham.

Springfield to Canadian Border

In the Springfield to Canadian border segment, all the existing stations are pedestrian friendly and accessible to pedestrians except for Claremont, New Hampshire, which is located in a rural area west of central Claremont and is not easily accessible to pedestrians. Bicycle parking is available at Essex Junction Station. Brattleboro, Bellows Falls and Montpelier do not have dedicated bicycle parking. Information about bicycle parking at other stations is not available.

Rail Operations Safety and Security

Train Operations

Amtrak service within the Corridor includes the Northeast Regional, Springfield Shuttle, Acela Express, Lake Shore Limited, and Vermonter services.

Passenger Areas

Passenger waiting areas/facilities/platforms are sources of a range of safety and security concerns. There are 19 stations in the Boston to Springfield (5 stations) and Springfield to Canadian border segments (14 stations). All of these stations are existing or planned Amtrak station (Holyoke) and as such, are already subject to safety and security regulations. Amtrak and the Amtrak Police Department handle safety and security at the stations.

Yard/Service Areas

Within the NNEIRI Study Area, there are two Amtrak yard and maintenance facilities (Southampton Yard in Boston and a rail yard in New Haven). Amtrak is responsible for safety and security at these facilities.

Crossing Safety

Rail-Rail Crossings: Control of interlockings/priorities is determined by the controlling railroad at each intersection. The movement of passenger and freight trains on the same track is controlled by a dispatcher. On such tracks, redundant safeguards are in place to avoid movements that could result in collisions.

Highway-Rail and Pedestrian-Rail Crossings: Federal Highway Administration (FHWA) and FRA have regulatory jurisdiction for safety at crossings⁵⁶ and the states have jurisdiction over highway-rail grade crossings⁵⁷. Other federal and state agencies also have assigned safety-related responsibilities for highway-rail crossings. Responsibility for grade crossing consolidations and closures falls to the following entity in each NNEIRI Study Area state:

- Massachusetts: Department of Telecommunications and Energy, Department of Highways
- New Hampshire: Department of Transportation
- Vermont: Vermont Transportation Board⁵⁸

In each state in the NNEIRI Study Area, overall authority for highway-rail grade crossing safety is conferred upon the state agency that regulates and oversees transportation. Table 4.3-10 summarizes the railroad crossing type by segment. Public grade crossings are roadways that are under the jurisdiction of and maintained by a public authority. Private grade crossings are on privately owned roadways such as those leading into an apartment complex, housing estate, or commercial/industrial development. A private crossing is not intended for public use and is not maintained by a public road authority.

Table 4.3-10. Railroad Crossing

Corridor Segment	Pedestrian Crossing	Private At Grade Crossing	Public At Grade Crossing
Boston-Springfield	3	32	12
Springfield Canada Border	3	30	51

Source: Federal Railroad Administration Office of Safety Analysis

⁵⁶ Highway Safety Act of 1966, Title 23, Chapter 4. [Highway Safety Act of 1966](#)

⁵⁷ Federal Highway Administration. Railroad-Highway Grade Crossing Handbook 2007. [Federal Highway Administration](#)

⁵⁸ Federal Railroad Administration. Compilation of State Laws and Regulations Affecting Highway-Rail Grade Crossings. 5th Edition, 2009. [Federal Railroad Administration](#)

Emergency Access during Grade Crossing Closures or Blockages

Throughout the NNEIRI Study Area, the Corridor passes through numerous jurisdictions, all of which have at least one emergency service provider (i.e. police, fire, ambulance). The various jurisdictions individually coordinate with the local railroad owner to implement a plan for dealing with unplanned grade crossing closures, crash reduction or blockages.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in additional direct or indirect impacts to public health and safety within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA identified no significant adverse effect on public health and safety because the project would only add one train daily north and southbound on an active rail line. The project anticipates improving public health and safety by upgrading 37 grade-crossings with active warning devices and reducing congestion and improving safety on the roads and highways by diverting some traffic from I-91 to Route 9 and other local roads within the Knowledge Corridor project study area.

The NHHS EA identified no adverse impacts to public health, safety and security in the rail corridor because the rail line is currently active and operational with safety measures such as crossing gates in place. For increased passenger train frequency and speed in the rail corridor, the project proposes grade crossings improvements with supplemental safety devices and conforming the project to all applicable FRA, FTA, Occupational Safety and Health Administration (OSHA), Amtrak and state safety and security requirements, standards and certifications.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative would not have a significant impact to public health and safety because the NNEIRI service would be running on the currently active and operational rail line with safety measures, such as grade crossing warning devices already in place and there would be no change to the existing sidewalks and bike lanes in the Corridor. Further grade crossing safety improvements are planned as part of the Build Alternative. The rehabilitation or addition of new double-tracking and addition of new passing sidings would take place within the existing railroad ROW adjacent to the existing track, resulting in no substantive physical changes to the areas.

Though the NNEIRI Build Alternative proposes to increase or provide new service levels in the Corridor, the frequency of trains under the Build Alternative is relatively low so that potential public safety impact at grade crossings due to the additional trains along the Corridor is not anticipated. Additionally, the Corridor is a currently active railroad and has safety measures in place and the Build Alternative also includes improvements to some signals and grade crossings resulting in a benefit to public health and safety.

The Build Alternative would have positive impacts by diverting 113 million VMT (analysis year 2035) to rail mode, which has a low fatality rate compared to motor vehicles. Diverted VMT is the calculated reduction in miles traveled by passenger vehicle as a direct result of mode shift to the proposed train service. According to the FTA's *2009 Rail Safety Statistics Report*⁵⁹, rail transit modes (heavy rail and light rail) rank among the safest modes of transportation as it had the lowest occurrence of passenger fatalities (0.02 deaths per 100 million passenger miles) from 2003 to 2008 compared to 1.42 deaths for motor vehicles. Amtrak and commuter rail also had low fatality rates of 0.03 and 0.06 per 100 million passenger miles, respectively. As such, the Build Alternative is anticipated to have benefits of public safety to people travelling by rail.

Three station sites are under consideration for a new Palmer Station. The surrounding district in Palmer is pedestrian friendly. Safe pedestrian access to the new station site would be considered during the site selection and station design process. Additionally, the Build Alternative would provide increased passenger connectivity due to improved access to the new platform at Worcester Union Station. Access to the platform from the station building would be provided through an existing tunnel that links the station with an adjacent parking garage.

4.3.5 Hazardous Materials

This section discusses the affected environment for hazardous waste and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts due to hazardous materials and the relevant regulatory requirements.

Regulatory Requirements

Federal agencies are required to consider the impact of federal actions on hazardous material sites. The use, storage, transportation and disposal of contaminated and hazardous materials are regulated at the federal level by the EPA. At the state level, many of the environmental regulations are enforced by MassDEP, Vermont Department of Environmental Conservation (VTDEC) and New Hampshire Department of Environmental Services (NHDES). The U.S. Resource Conservation and Recovery Act (RCRA) of 1976 gives the U.S. EPA the authority to

⁵⁹ Federal Transit Administration. 2009 Rail Safety Statistics Report. http://transit-safety.volpe.dot.gov/publications/RailSafety/Rail_Safety_Statistics_Report_2009-FINAL.pdf

regulate hazardous waste from the “cradle-to-grave.” This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes.

The Comprehensive Environmental Resource Conservation and Liability Act of 1980 (CERCLA), commonly known as Superfund, created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. The law authorized the EPA to identify parties responsible for contamination of sites and compel the parties to clean up the sites.

In 1984, Congress added Subtitle 1 to RCRA requiring the U.S. EPA to regulate underground storage tanks (USTs). The 1986 amendments to RCRA enabled the U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

In 1988, the U.S. EPA issued federal UST regulations laying out a comprehensive program for the monitoring and upgrading of USTs in the nation.

At the state level, the following legislation applies:

Massachusetts

- M.G.L. Title 2 Chapters 21C, 21D and 21E

New Hampshire

- New Hampshire Statute, Title 10: Public Health, Chapters 147-A to 147-D

Vermont

- V.S.A. Title 10 Chapter 159: Waste Management
- Vermont Hazardous Waste Management Regulations, Effective October 15, 2006

Methodology

Federal hazardous material release sites are identified under the USEPA National Priorities List (NPL) of sites of known or potential release sites and the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list.

VTDEC Waste Management and Prevention Division oversee the use, treatment, and handling of hazardous waste. The Division performs emergency response for hazardous materials spills, issues permits for federal and state programs regulating hazardous wastes, and underground storage tanks, and manages cleanup at hazardous sites under state and federal authorities.

The NHDES Waste Management Division manages oil and/or hazardous material releases under Env-Or 600 Contaminated Site Management, RSA 146 –A Oil Discharge or Spillage in Surface Water or Groundwater, and RSA 485-C Groundwater Protection Act.

MassDEP Bureau of Waste Site Cleanup manages oil and/or hazardous material releases under the Massachusetts Contingency Plan (MCP). MassDEP oversees cleanup of spills and situations presenting "imminent hazards" when appropriate. In order to streamline cleanup of disposal sites, MassDEP relies on Licensed Site Professionals (LSPs), experts in assessment

and cleanup who are licensed by the Commonwealth and can be hired by the private sector to manage/oversee cleanups, allowing assessments and cleanups to proceed at most sites without delays due to the need to get MassDEP approvals.

The Study Team reviewed available online databases, including the Vermont Natural Resources Atlas (NRA) mapping database, NHDES One Stop sites list, MassGIS and MassDEP sites list, and available USEPA's online databases in order to identify areas of known releases and potential hazardous material sites within the existing railroad ROW for those towns located in the NNEIRI Corridor in Massachusetts, New Hampshire and Vermont.

Existing Conditions

This section reviews the existing hazardous materials release sites within the NNEIRI Study Area. The NNEIRI Study Area for hazardous materials consists of a one-half mile buffer on either side of the railroad ROW centerline. However, due to the limited anticipated ground disturbance, the NNEIRI Study Area for the regulatory record search radius of one mile was scaled back to include only the railroad ROW.

Boston to Springfield

Based on a review of available databases for Massachusetts, the Study Team identified 13 release sites within the railroad ROW. All of these release sites have been closed with a Class A1, A2 or B1 Response Action Outcome (RAO). A Class A1 RAO is achieved when a Permanent Solution has been achieved and the level of oil and/or hazardous material in the environment has been reduced to background; or response actions have eliminated all threats of release and no release of oil and/or hazardous material to the environment has occurred. A Class A2 RAO is achieved when a Permanent Solution has been achieved, the level of oil and/or hazardous material in the environment has not been reduced to background; and one or more activity and use limitation (AUL) is required to maintain a level of no significant risk. A Class B1 RAO is achieved when it has been determined as a result of an assessment that a level of No Significant Risk exists and no remedial actions are required.

Springfield to Canadian Border

The release sites for Springfield are discussed in the Boston to Springfield segment. The Study Team did not identify any release sites in Massachusetts within the railroad ROW north of Springfield to the border of the U.S. and Canada. However, one CERCLIS/release site in Hatfield, Massachusetts, which is classified as Tier ID, was identified abutting the railroad ROW, and is discussed here due to its potential to impact the ROW (see Table 4.3-11). A Tier ID classification is a default MassDEP classification for a property when responsible parties fail to meet regulatory deadlines. In reviewing information pertaining to this facility, it appears the property owners are elderly and unable to pay for any investigations and/or remedial actions.

The Study Team did not identify any sites on the NHDES One Stop database and on the Vermont GIS database within the railroad ROW based on site names (Amtrak was not listed).

Table 4.3-11. Summary of Release Sites, Springfield-to-Montreal

Site Name	Address/ Location	Status	Comments
Tremblay Barrel	Bridge Street, Hatfield, MA, Abuts RR ROW to East	CERCLIS, Tier ID	RTN 1-00087: Release notification July 1988. Impacts to soil from barrel reconditioning include PCBs, thallium, chlordane and volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) are present in groundwater. Property owner purchased property without knowledge of impacts and unable to afford remedial investigations/cleanup. Property owner applied for financial inability Status in 2005. No further information available.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to hazardous material release sites within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/ Restore Vermonter EA identified no impact to known contaminated sites or hazardous waste as the project would occur within the existing MassDOT-owned Connecticut River Line ROW. For the construction activity, the project would conform with the applicable U.S. EPA and MassDEP regulations and permit regulations. The contractor would prepare spill prevention control and countermeasure (SPCC) plan that provides specific guidance for managing contaminated media that may be encountered in the ROW.

The NHHS EA identified some potential impacts to environmental risk sites. The project would have a high risk for encountering contaminated soils or debris in the existing railroad track, including the vicinity of the Springfield Layover site, during project construction. The EA identified two potential hazardous waste source sites, which include the site proposed for North Haven and a property in Hartford. The EA identified no CERLIS-listed sites within 250 feet of the rail line. The proposed mitigation measures include developing and complying with Waste Management Plan and following State of Connecticut's regulatory requirements. According to the EA, all Massachusetts work involving potential hazardous materials or sites would be addressed in future Tier 2 environment documents.

The SSX DEIR anticipates some form of contamination as part of project construction because of the historic uses within the project area. The DEIR identified some historic release or threat of release into the environment at the South Station site, Widett Circle site and Readville Yard 2 site. Construction activities at Beacon Park Yard and Readville Yard 2 could require remediation in compliance with the Massachusetts Contingency Plan (MCP).

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

All the hazardous release sites identified within railroad ROW in Massachusetts have been closed except for the one CERCLIS/release site in Hatfield, Massachusetts that was identified abutting the railroad ROW. It is classified as Tier ID, which is a default MassDEP classification when responsible parties fail to meet regulatory deadlines. No second track or passing siding is proposed in Hatfield and this part of the Corridor has already been covered as part of the Knowledge Corridor study, which did not identify any impact to hazardous or contaminated sites at this location. Therefore, no impacts are anticipated under the Build Alternative and hence no mitigation measures would be required.

4.3.6 Solid Waste Disposal

This section discusses the affected environment for solid waste and the environmental consequences associated with No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to solid waste and the relevant regulatory requirements.

Regulatory Requirements

The US EPA does not regulate non-hazardous wastes at the federal level; these are regulated at the state and local level. The Resource Conservation and Recovery Act (RCRA), enacted in 1976, is the principal federal law in the United States governing the disposal of solid waste.⁶⁰

State agencies, including the Vermont Department of Environmental Conservation (VTDEC), the New Hampshire Department of Environmental Services (NHDES), and the Commonwealth of MassDEP manage solid waste landfills (SWLs) under the solid waste programs. The Solid Waste Program, under RCRA Subtitle D, encourages states to develop comprehensive plans to manage non-hazardous industrial solid waste and municipal solid waste (MSW), sets criteria for municipal solid waste landfills and other solid waste disposal facilities, and prohibits the open dumping of solid waste.⁶¹ This includes the generation, transportation, treatment, storage, and disposal of solid waste.

⁶⁰ Resource Conservation and Recovery Act (RCRA) 1976, Title 40 of the Code of Federal Regulations (CFR) Parts 239 through 259. <http://www.epa.gov/wastes/laws-regs/regs-non-haz.htm>

⁶¹ United States Environmental Protection Agency, Non-hazardous waste/solid waste. <http://www2.epa.gov/regulatory-information-topic/waste#solid>

Massachusetts

- Solid Waste Facilities/Management Acts (M.G.L. Chapter 21H and M.G.L. Chapter 111, Sections 150-150A1/2)

New Hampshire

- Solid Waste Management Act, Chapter 149-M
- Solid Waste rules (Env-Sw 100-2100 Solid Waste Rules)

Vermont

- Title 10 V.S.A Chapter 159 Waste Management Act

Methodology

The Study Team used the Vermont Natural Resources Atlas (NRA) mapping program, Massachusetts Geographic Information System (MassGIS) mapping programs, and NHDES One Stop database to locate mapped SWLs along the railroad ROW. Unpermitted solid waste dumps may be present along the ROW, but are not depicted on these mapping applications.

Existing Conditions

This section summarizes existing conditions of SWLs along the Corridor.

Boston to Springfield

Based on the review of the MassGIS solid waste landfills (SWL) mapping, no SWLs were identified by the Study Team within the railroad ROW. The Study Team identified four SWLs abutting the railroad ROW, which are summarized below.

Table 4.3-12. Solid Waste Landfills - Boston to Springfield

Name	Direction	Status	Type
Auburn Landfill, Auburn, MA	Abuts to west	Inactive	Municipal solid waste
East Brookfield Landfill, East Brookfield, MA	Abuts to north	Inactive	Municipal solid waste
Wilbraham Lindsay Landfill and Wilbraham Grassy Hollow Landfill, Wilbraham, MA	Abuts to south	Inactive	Municipal solid waste
Cottage Street Landfill, Springfield, MA	Abuts to east and west	Inactive	Municipal solid waste

Springfield to Canadian Border

Based on review of the Vermont NRA mapping, the NHDES SWL information obtained from the One Stop database, and the Vermont NRA SWL mapping, the Study Team identified one SWL within the railroad ROW and four landfills abutting the railroad ROW.

Table 4.3-13. Solid Waste Landfills - Springfield to Canadian Border

Name	Direction	Status	Type
Mt. Tom Generating Company, LLC, Mt. Tom, Massachusetts	in ROW and to east	Inactive	Ash
Bernardston Landfill, Bernardston, Massachusetts	Abuts to south	Inactive	Municipal solid waste
Not specified, Randolph, Vermont	Abuts to the west off Landfill Road, and one abuts to East off Landfill Road	Inactive	Not Specified
Not Specified, Lower Newton Road, St. Albans, Vermont	Abuts to east at Lower Newton Road	Inactive	Not Specified

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in the generation of any additional solid waste along the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS and the SSX projects. The Knowledge Corridor – Restore Vermonter EA, the NHHS EA and the SSX DEIR did not evaluate solid waste impacts.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative would not directly or indirectly impact landfill areas in the Corridor. It is not anticipated that any materials would be removed from the ROW other than some rail components and rail tracks. During the construction phase, solid wastes would be disposed appropriately in accordance with the approved disposal plans of each state agency. Non-hazardous solid waste requirements vary from state to state.

States have differing requirements for handling and disposing of these wastes. Disposal of non-hazardous construction waste would be done in a construction waste-specific landfill. Before any construction begins, the project proponent (e.g., MassDOT, VTrans) would determine any

state requirements (e.g., recycling standards and proper disposal of solid wastes) and would be responsible for compliance.

4.3.7 Aesthetic and Design Quality Impacts

This section discusses the affected environment for visual and aesthetic quality and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to aesthetics and design quality and the relevant regulatory requirements.

Regulatory Requirements

NEPA requires federal agencies to examine the impacts of federal actions on visual resources. Evaluation of aesthetics and design quality includes identification of any changes likely to occur in the natural landscape and in the developed environment.

- There are no governing state statutes in Massachusetts, New Hampshire, or Vermont.

Methodology

In the absence of specific rail-related guidance, the Study Team used the Federal Highway Administration's (FHWA) *Visual Impact Assessment for Highway Projects* (1988)⁶² as guidance for this evaluation. Visual resources are significant built features such as public parks, landmark structures or districts, otherwise distinct buildings or groups of buildings, and natural resources such as vegetation, wetlands and geologic, topographic and aquatic features within the NNEIRI Study Area.

The visual assessment was developed through the use of readily available Geographic Information System (GIS) data sets and aerial imagery.⁶³ The visual analysis considers views of and from the railroad. The Study Team grouped the existing locations where visual and aesthetic quality are most evident into three broad categories: the communities where stations are located, protected natural areas (i.e., open space, conservation areas, local/state/national parks and forests), cultural and historic resources where the user experience may be interrupted by the presence of rail use and viewer groups. Protected natural areas, including federal, state, municipal/county open spaces, parks and recreational facilities and cultural and historic resources within 300 feet of the rail centerline were identified for visual resources assessment. Detailed methodology for cultural resources and Sections 4(f) and 6(f) properties is addressed in Sections 4.3.8 through 4.3.10. While a subjective category, this section does not intend to determine whether rail use and railroad features are positive or negative, but rather identify sensitive locations where interaction between the railroad and the public occur.

⁶² Federal Highway Administration (FHWA) *Visual Impact Assessment for Highway Projects*. 1988.
<http://www.dot.ca.gov/ser/downloads/visual/FHWAVisualImpactAssmt.pdf>

⁶³ GIS layers include: Massachusetts "Protected and Recreation OpenSpace," updated 2013; New Hampshire "nhrec," updated 2010; Vermont "Cadastral Conspub," updated 2009; and ESRI "Schools," updated 2012.

Existing Conditions

This section summarizes the existing visual setting and scenic resources in the NNEIRI Study Area.

Station communities

Issues of visual and aesthetic quality are intertwined with other resource areas discussed as part of the entire *Affected Environment and Consequences* chapter (Chapter 4). Historically, station communities may have developed because of the existence of the railroad, and the stations seen as symbols of community identity. Visual and aesthetic quality is likely to be an issue if the following factors are present:

- The existence of an historic depot, station, or other railroad infrastructure;
- Local zoning protection via design review;
- Local, state or federal protection as a designated historic site or district.

The following sections summarize whether the existing stations have historic designation or have potential for such designation, and whether the community has additional design review criteria because of such designation or potential.

Boston to Springfield

The Boston to Springfield segment has five (5) station communities. Three of the station communities, located in Palmer (Union Station), Worcester and Boston (South Station), have historic designation or have potential for such designation. Worcester Union Station and Boston South Station have additional design review criteria. Intercity passenger rail service is currently not provided to Palmer, Massachusetts.

Springfield to Canadian Border

The Springfield to Canadian Border segment has nine (9) station communities. Five of them (Springfield and Northampton in Massachusetts and Saint Albans, White River Junction and Bellow Falls in Vermont) have historic designation or have potential for such designation. All of these communities have additional design review criteria except for Bellow Falls.

Protected Natural Areas, Cultural and Historic Resources

Visual and scenic resources along the Corridor include historic buildings, structures and districts and parks, recreational areas, natural areas and wildlife refuges within the 300-foot buffer. The NNEIRI Corridor's visual characteristic is defined by a variety of landscapes, including low, medium and high intensity developed areas, industrial properties, historic properties, forests, parks and open space, wetlands, pasture, crop lands, and surface waters and the NNEIRI Corridor and stations.

Boston, Framingham, Worcester, Springfield are the most urbanized areas and therefore offer predominant views of many buildings, roadways, bridges, parking/pavement, while the smaller municipalities along the corridor offer predominant views of wetlands, forests and crop lands.

Cultural resources, Sections 4(f) and 6(f) and other parks and recreational areas along the Corridor are summarized below and addressed in more detail in Sections 4.3.8 through 4.3.11.

Boston to Springfield

Boston to Springfield is a highly developed segment, with development accounting for nearly 50 percent of the land area within one-half mile of the Corridor segment. In addition, approximately one-third of the classified land use within the Boston to Springfield segment exhibits a combination of deciduous forest and woody wetlands. This segment is dominated by forest, low, medium and high intensity developed land, developed open spaces, along with wetlands and water bodies.

According to the National Register (NR) GIS, there are 59 National Register-listed buildings, structures, objects and districts within the NNEIRI Study Area in the segment between Boston and Springfield. There are 48 Section 4(f) public parks, recreation areas and wildlife or waterfowl refuges and six Section 6(f) properties within the NNEIRI Study Area in the Boston to Springfield segment. Additionally, there are other parks, recreational areas and open spaces in this segment, which do not meet the criteria for Sections 4(f) and 6(f) (see Section 4.3.11).

Springfield to Canadian Border

Springfield to Canadian Border segment is mostly rural and less developed with development accounting for less than 25 percent of the land area within one-half a mile of the Corridor segment. It is dominated by forest, pasture, cropland, medium and low intensity developed land, and developed open space, along with wetlands and water bodies.

The National Register GIS identified 39 National Register-listed buildings, structures, objects and districts within the segment of the Corridor between East Northfield, Massachusetts and Alburgh, Vermont. There are 24 Section 4(f) public parks, recreation areas and wildlife or waterfowl refuges and four Section 6(f) properties within the NNEIRI Study Area in the segment between East Northfield, Massachusetts and Alburgh, Vermont. Additionally, there are other parks, recreational areas and open spaces in this segment, which do not meet the criteria for Sections 4(f) and 6(f) (see Section 4.3.11).

Viewer Groups

The FHWA's *Visual Impact Assessment for Highway Projects* (1988), differentiates major viewer groups into two categories based on physical factors: view from the road and view of the road. For the NNEIRI Study, the viewer groups include *the railroad users who get the view from the railroad* (drivers and passengers of the trains) and *the railroad neighbors who get the view of the railroad and trains* (residents, people with commercial/industrial interests, recreational users and other special interest groups, including civic, cultural, environmental, educational and economic). Residents located in the cities, suburbs and towns adjacent to the railroad ROW who would have the potential for undesirable views of the railroad facilities are considered to be sensitive visual receptors.

While the sidings and track are at the ground-level and are low-profile visual elements, the trains are vertical elements that are periodically seen by sensitive viewers. Currently, the Boston to Springfield segment experiences views of 2-3 daily roundtrips of freight service between Boston and Worcester Intermodal Terminal and 25 weekday freight roundtrip trains per week from Worcester to Springfield and view of one roundtrip Amtrak Lake Shore Limited passenger service between Boston and Springfield Union Station. Additionally, the segment experiences view of commuter rail service operated by MBTA (24 local and express round trip trains each day) between Boston and Worcester. Similarly, the Springfield to Canada Border

segment currently experiences views of seven freight trains per day (TPD) (three between Springfield and East Northfield, Massachusetts, two between East Northfield, Massachusetts and St. Albans, Vermont and two between St. Albans, Vermont to Canada Border) and one round trip Amtrak Vermonter passenger service. Existing train stations and depots are also visible to residents in adjacent neighborhoods.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to aesthetic and design quality of the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor – Restore Vermonter EA did not evaluate impacts to aesthetic and design quality.

The NHHS EA identified no impacts to visual resources and quality in the NHHS project study area except for the potential adverse impacts to the visual environment in the vicinity of the existing and proposed NHHS rail stations at Wallingford, Berlin, Newington and Windsor, Connecticut. The mitigation measures include coordination and design reviews with the communities so that landscaping and use of building construction materials, colors and architectural styles would be consistent with station sites' surroundings.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The Build Alternative utilizes the existing railroad embankment, which was historically double-tracked; however, most of the double-track was removed in the mid-20th century. As part of the Build Alternative, additional trains would be added between Boston and Springfield, and New Haven and Montreal. Proposed track improvements and addition of second track would take place within the existing ROW. No layover facilities are proposed for the Build Alternative. The restoration of a second track is planned between Worcester and Springfield in Massachusetts and between Brattleboro and Bellows Falls and between St. Albans and Swanton in Vermont. One double track location between Spencer and East Brookfield would require an additional siding to accommodate NNEIRI services. Other locations where additional sidings would be provided are East Northfield, Massachusetts extending to Vernon, Vermont and Roxbury and Randolph, Vermont.

These improvements would occur in the vicinity of the following historic properties: Union Station in Brattleboro, the Brattleboro Downtown Historic District, the Brooks House, the East

Putney Brook Stone Arch Bridge, the Westminster Village Historic District and the Vernon District Schoolhouse No. 4. Additionally, these improvements would occur adjacent to the following Section 4(f) properties: Quaboag Wildlife Management Area in East Brookfield, Massachusetts, and to Cutter Park, the Warren Common in Warren, Massachusetts, and the Spencer Forest.

Since the proposed track improvements, restoration of second tracks and addition of the passing sidings are at the ground-level and would not change the existing views of the railroad sidings and track substantially along the Corridor, the Study Team does not anticipate any adverse impacts to the aesthetic and design quality in the Corridor.

Under the Build Alternative, additional trains would be added between Boston and Springfield, and New Haven and Montreal. Although trains are vertical elements that are periodically seen by sensitive viewers, the frequency of additional trains is relatively low and therefore the Study Team does not anticipate any potential visual impacts due to increase in service levels along the Corridor.

The Build Alternative utilizes the existing train stations except for Palmer, where three potential locations are currently under consideration. At least one of the sites considered for Palmer lies in close proximity to the historic Palmer Station. As such, there is the potential for indirect visual effects; however, direct effects to the aesthetic and design quality are not anticipated. In addition, a new passenger platform would be constructed at Union Station in Worcester. The platform would be an island location between tracks and would be located within the ROW in an area historically used for station platforms. The platform would connect to Worcester Union Station via an elevator and stair beneath the platform to the existing pedestrian tunnel. The pedestrian tunnel originally connected passengers from the Worcester Union Station headhouse to island platforms. Although the elevator and stair would be vertical elements, they would connect from tunnel below the tracks vertically to the platform surface therefore, no visual effects to Worcester Union Station are anticipated.

During Tier 2, more details relating to the design of a new Palmer Station and a platform at Worcester Union Station would likely be developed. At that time, further analysis would be conducted to determine any adverse visual impacts.

4.3.8 Cultural Resources and Historic Properties

This section discusses the affected environment for cultural resources and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

Regulatory Requirements

Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires that federal agencies take into account the effects of their undertakings on historic properties. A historic property is any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP). The Section 106

review process is outlined in regulations promulgated by the Advisory Council on Historic Preservation (ACHP), "Protection of Historic Properties" (36 CFR Part 800). Effects to historic properties are further regulated under Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303). Under Section 4(f), a federal transportation agency may not approve the use of a Section 4(f) property (which includes historic sites) unless it determines that there is no feasible and prudent alternative to avoid the use of the property and the action includes all possible planning to minimize harm resulting from such use, or the project has a *de minimis* impact. Section 4(f) is further discussed in Section 4.3.9.

The following state legislation addresses historic preservation:

Massachusetts

- M.G.L. Title 2 Chapter 9, Sections 26 to 27C: Sections 26 to 27C calls for the establishment of the Massachusetts Historical Commission (MHC). The Commission advises the State Secretary on matters relating to the historical and archeological assets of the Commonwealth and assists the Secretary in compiling and maintaining an inventory of the assets. The Commission encourages all governmental bodies and persons considering actions that may affect a historical or archeological asset of the Commonwealth to consult with the Commission to avoid any adverse effect.

New Hampshire

- New Hampshire Statutes Title 19 Chapter 227-C: Historic Preservation: Chapter 227-C calls for the establishment of the Division of Historical Resources, which serves as the State Historic Preservation Office (SHPO). The regulations also establish a review process, which is administered by the Director of the Division of Historical Resources, to ensure the protection of designated New Hampshire heritage landmarks.

Vermont

- Vermont Historic Preservation Act (V.S.A. Title 22 Chapter 14: Historic Preservation): The Act requires that state agencies take measures to preserve the historic resources under its ownership. A state agency, department, division or commission must consult the Vermont Advisory Council on Historic Preservation before demolishing, altering or transferring any property that is potentially of historical, architectural, archeological or cultural significance.
- Act 250 (Title 10 V.S.A Chapter 151: State Land Use and Development Plans): Act 250's broad objective is to prevent Vermont land from being used in a manner detrimental to the environment. The Act requires that permits be issued for certain developments to ensure that the development would not have an adverse effect on key resource areas, including historic sites.

Methodology

To identify historic properties along the Corridor, the Study Team reviewed the National Register of Historic Places (NRHP) Geographic Information System (GIS) database in March and April 2015. A combination of spatial data and tabular data contributed to the derivation of the full list of National Register-listed properties. The Study Team further identified historic properties by reviewing a NRHP GIS data layer for properties determined eligible for the

National Register and through the State of Massachusetts GIS.⁶⁴ Comparable state GIS data documenting historic properties is currently not available in New Hampshire or Vermont. No additional data collection efforts were undertaken for the Corridor segment between New Haven, Connecticut and Springfield, Massachusetts or for the segment between Springfield and East Northfield, Massachusetts, as both segments were the subject of prior NEPA documentation and Section 106 review by the FRA. No online data was available on historic properties within the Canadian segment of the Corridor.

For the purposes of this Tier 1 analysis, the Study Team defined a preliminary Area of Potential Effect (APE) that extends 300 feet from the rail centerline (NNEIRI Study Area for cultural resources). Based on the NRHP and Massachusetts GIS data, properties that lie within the preliminary APE were identified. FRA sent information packages describing the NNEIRI Build Alternative and the preliminary APE to the Massachusetts, New Hampshire, Vermont, and Connecticut State Historic Preservation Officers (SHPOs). FRA's correspondence with SHPOs emphasized that this is a Tier 1 service-level EA, which itself does not have the potential to affect historic properties. Should the study advance to Tier 2, the lead federal agency (FRA or otherwise) would be responsible for Section 106 compliance at the project level.

The Study Team inventoried existing bridges located between Boston to Springfield and north of East Northfield, Massachusetts into New Hampshire and Vermont using existing sources such as track charts and other available databases. Structures that are likely to be modified or replaced under the Build Alternative have been identified at the conceptual level.

The objective of this Tier 1 evaluation was to identify the locations of known historic properties within the preliminary APE from readily available federal and state GIS data, and to assess the potential for effects to these properties based on conceptual plans for the Build Alternative. As the design of the Build Alternative is advanced and more detailed information becomes available in Tier 2, the APE would be formally determined by FRA, or another lead federal agency, in consultation with the appropriate SHPOs. The lead federal agency's Tier 2 Section 106 efforts would also include, in consultation with the appropriate SHPOs and consulting parties, the identification of additional historic properties, determinations of effect, and resolution of any adverse effects.

The following analysis identifies National Register-listed properties by segment, concentrations of such properties, and properties that, due to their proximity to planned passenger rail-related improvements, may be the most likely to be affected. In addition, National Register-eligible properties as identified with the NRHP GIS data were also identified. Due to irregularities within the National Register GIS and to access issues along the Corridor, additional analysis would be required in Tier 2 to precisely identify and determine impacts to historic properties. Any additional consideration of bridges, culverts, and other railway infrastructure in the segments between Boston, Massachusetts and Springfield, Massachusetts and East Northfield, Massachusetts and Alburgh, Vermont required under

⁶⁴ Massachusetts GIS data was sourced from <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/srhp.html>; National Register GIS data was sourced from http://www.nps.gov/nr/research/data_downloads.htm.

Section 106 will occur during Tier 2. Section 11504 of the Fixing America's Surface Transportation (FAST) Act (Pub. L. 114-94) enacted on December 4, 2015 mandates the development of a Section 106 exemption for railroad rights-of-way; it is possible that certain railroad-related resources along the NNEIRI corridor will be exempt from the requirements of Section 106 in the future.

Existing Conditions

This section describes the known historic properties in the NNEIRI Study Area based on readily available information in the NRHP and SHPO databases.

Boston, Massachusetts to Springfield, Massachusetts

According to the Massachusetts and National Register GIS data, there are 59 National Register-listed properties within the Corridor in the segment between Boston and Springfield. Many of these properties are clustered in Springfield, Worcester, and Newton, Massachusetts. Of these properties, four are historic railroad stations: Union Station in Palmer, Union Station in Worcester, the Framingham Railroad Station, and the Wellesley Farms Railroad Station. An additional eight properties are documented as eligible within the National Register GIS. A summary of the National Register-listed and eligible properties is provided below in Table 4.3-14.

Table 4.3-14: National Register (NR) Properties - Boston to Springfield

Property Type	Number of Properties
NR Building	39
NR Structure	0
NR District	18
NR Object	1
NR Site	1
Total NR-Listed Properties	59
NRDOE*	7

Source: National Register Information System (NRIS) GIS 2015 and Massachusetts GIS 2015

Note:

* Properties identified as Determined Eligible are those listed as such in NRIS GIS data; additional eligible properties may be identified in Tier 2 in consultation with the Massachusetts SHPO

According to track charts, there are 186 bridges in the Corridor between Boston and Springfield. Of these, 77 are undergrade bridges and 109 are overhead bridges. Information such as date, materials, and methods of construction is not currently available, and thus FRA has not made any determinations of National Register eligibility at this time. In addition, a comprehensive list of culverts and other railway infrastructure along the Corridor is not available, nor is data on archaeological resources within the Corridor. Consequently, additional data needs may be identified in Tier 2 in consultation with the Massachusetts Historical Commission (MHC).

Springfield, Massachusetts to New Haven, Connecticut

Historic properties within the Corridor between New Haven, Connecticut and Springfield, Massachusetts are addressed in the *New Haven-Hartford-Springfield Line High Speed Intercity Passenger Rail Project Environmental Assessment/Environmental Impact Evaluation* (NHHS EA/EIE). FRA prepared the NEPA document in cooperation with the Federal Transit Administration (FTA) and the Connecticut Department of Transportation (CTDOT) in May 2012 and made a Finding of No Significant Impact (FONSI) on August 9, 2012. In addition, FRA, FTA, CTDOT, Connecticut SHPO, and MHC executed a Section 106 Programmatic Agreement for the NHHS High Speed Intercity Passenger Rail Project on August 9, 2012; FRA, CTDOT, and Connecticut SHPO executed a Section 106 Memorandum of Agreement on April 23, 2015 addressing adverse effects to bridges and culverts within the NHHS rail corridor between New Haven and Windsor; and FRA made a final Section 4(f) determination on May 12, 2015 regarding these bridges and culverts. For a detailed discussion of historic properties within this segment of the Corridor, refer to the NEPA, Section 106, and Section 4(f) documentation for the NHHS project.

Springfield, Massachusetts to Canada Border

Historic properties within the Corridor between Springfield and East Northfield, Massachusetts are addressed in the *Environmental Assessment for the Knowledge Corridor – Restore Vermonter, Springfield to East Northfield, Massachusetts* prepared by FRA and the Massachusetts Department of Transportation (MassDOT) in 2009. Section 106 consultation occurred between FRA and MHC in September 2010 regarding effects to 16 historic bridges requiring in-kind repair or replacement of components, effects of station and platform improvements to the nearby Northampton Downtown Historic District and the Greenfield Main Street Historic District, and effects to Northampton Railroad Station (Union Station). FRA determined, and MHC concurred, that the Knowledge Corridor project would not result in adverse effects to these historic properties. FRA issued a FONSI for this project on February 5, 2011. For a detailed discussion of historic properties within this segment of the Corridor, refer to the Knowledge Corridor NEPA documentation.

The National Register GIS identified 39 National Register-listed properties within the segment of the Corridor between East Northfield, Massachusetts and Alburgh, Vermont. The majority of these are historic districts in small village centers in Vermont. Two additional properties are documented as eligible within the National Register GIS. A summary of the National Register-listed and eligible properties is provided below in Table 4.3-15.

Table 4.3-15: National Register (NR) Properties - East Northfield, Massachusetts to Alburgh, Vermont

Property Type	Number of Properties
NR Building	12
NR Structures	6
NR District	21

Property Type	Number of Properties
NR Object	0
Total NR-Listed Properties	39
NRDOE*	1

Source: Natural Register Information System (NRIS) GIS 2015 and Massachusetts GIS 2015

** Properties identified as Determined Eligible are those listed as such in NRIS GIS data; additional eligible properties may be identified in Tier 2 in consultation with SHPOs.*

According to track charts, there are 141 bridges in the Corridor between East Northfield, Massachusetts and Alburgh, Vermont. Of these, 103 are undergrade bridges and 38 are overhead bridges. Information such as date, materials and methods of construction is not currently available, and thus FRA has not made any determinations of National Register eligibility at this time. In addition, a comprehensive list of culverts and other railway infrastructure along the Corridor is not available, nor is data on archaeological resources within the Corridor. Additional data needs may be identified in Tier 2 in consultation with the Massachusetts, New Hampshire, and Vermont SHPOs.

No-Build Alternative Consequences

Under the No-Build Alternative, the CTDOT infrastructure improvements to the NHHS rail line have been completed or are underway, including double-tracking, station improvements, and repair and replacement of numerous bridges and culverts. The NHHS improvements affecting historic properties in the segment of the corridor between New Haven and Windsor are already covered by Section 106 agreement documents and adverse effects have been resolved through consultation among FRA, CTDOT, CTSHPO, and other consulting parties. Tier 2 NEPA analysis, a Memorandum of Agreement, and a 4(f) Evaluation for the portion of the corridor between Windsor and Springfield (Phase 3B) will be completed prior to the release of construction funding for these improvements. Similarly, site-specific compliance and documentation will be undertaken for four planned stations along the NHHS corridor. In addition, Section 106 consultation between FRA and MHC for the Knowledge Corridor project between Springfield and East Northfield, Massachusetts also occurred, which resulted in a No Adverse Effect determination for the Northampton Railroad Station (Union Station), the Northampton Downtown Historic District, and the Greenfield Main Street Historic District.

Other planned passenger rail-related projects, including Springfield Union Station improvements and the expansion of Boston's South Station (SSX), and associated layover facilities, improvements to the rail infrastructure between the U.S. border and Montreal, and improvements to the Montreal Central Station Customs Checkpoint would also be completed under the NNEIRI No-Build Alternative.

In accordance with the MEPA, MassDOT prepared a state-level DEIR for the SSX project on October 31, 2014, and received a MEPA Certificate from the Massachusetts Secretary of Energy and Environmental Affairs on December 31, 2014. MassDOT also received grant funding from FRA to conduct preliminary engineering and NEPA analysis for the SSX project.

As of the writing of this EA, MassDOT, in coordination with FRA, is preparing an EA for the SSX project. Section 106 consultation between FRA, MassDOT, MHC and other consulting parties is being coordinated with the NEPA process, and will be completed before FRA makes a NEPA determination. This Section 106 review will consider effects to the National Register-listed station building, as well as any other historic properties in the APE.

No additional impacts to cultural resources beyond those resulting from, and already documented elsewhere for, the above projects are anticipated from the No-Build Alternative.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

Under the Build Alternative, railroad tracks and alignment would be upgraded so that speeds up to 79 mph would be possible throughout the Corridor. Although track improvements would be undertaken, including minor realignments and double tracking, all work would take place within the existing ROW. Improvements to some passenger stations and bridges and the installation of signal systems would also occur. No new layover facilities are proposed beyond those identified under the No-Build Alternative.

ROW improvements are planned in the segment of the Corridor between Worcester, Massachusetts and Springfield, Massachusetts. This segment of the ROW was historically a double-track corridor; however, most of the track was removed in the mid-20th century. The additional service within the Corridor would require the reconstruction of the second track and minor track realignments. In addition, one double track location between Spencer, Massachusetts and East Brookfield, Massachusetts would require an additional siding to accommodate NNEIRI services. These improvements would occur in the vicinity of the following National Register-listed properties: West Brookfield Center Historic District, the Warren Town Hall, the Warren Public Library, the 1767 Milepost, the Warren First Congregational – Federated Church, and Union Station in Palmer, Massachusetts. However, the improvements would be limited to the existing ROW and therefore adverse effects to adjacent historic properties are not anticipated. In addition, seventeen bridges and overpasses located in the segment of the Corridor between Worcester and Springfield would need to be modified to accommodate the double track. Any additional consideration of bridges, culverts, and other railway infrastructure required under Section 106 will occur during Tier 2.

The restoration of a second track is also planned along the Corridor between Brattleboro, Vermont and Bellows Falls, Vermont and between St. Albans, Vermont and Swanton, Vermont. These improvements would occur in the vicinity of the following National Register-listed properties: Union Station in Brattleboro, the Brattleboro Downtown Historic District, the Brooks House, the East Putney Brook Stone Arch Bridge, and the Westminster Village Historic District. However, the improvements would be limited to the existing ROW and therefore an adverse effect to the adjacent historic properties is not anticipated. The double-

track between Brattleboro and Bellows Falls would require improvements to five bridges and overpasses along the Corridor. Any additional consideration of bridges, culverts, and other railway infrastructure required under Section 106 will occur during Tier 2. No known historic properties are located in the area of planned double tracking between St. Albans and Swanton. Additional passing sidings would be provided in East Northfield, Massachusetts, extending into Vernon, Vermont, and Roxbury, Vermont and Randolph, Vermont. Although the Vernon District Schoolhouse No. 4 is adjacent to one of these track-work areas, the work would be limited to the existing ROW and thus adverse effects are not anticipated.

The NNEIRI program includes improvements at two stations along the Corridor between Boston and Springfield. Three locations are currently under consideration for construction of a new station in Palmer, Massachusetts. At least one of these sites lies in close proximity to the historic Palmer Union Station. As such, there is the potential for visual effects; however, direct effects to this resource are not anticipated. In addition, a new 1,000-foot long platform would be constructed at Union Station in Worcester. The platform would be an island location between tracks and would be located within the existing ROW in an area historically used for station platforms. The platform would connect to Worcester Union Station via an elevator and stair beneath the platform to the existing pedestrian tunnel. The pedestrian tunnel originally connected passengers from the Worcester Union Station headhouse to island platforms. Although the elevator and stair would be vertical elements, they would connect from tunnel below the tracks vertically to the platform surface; therefore, no visual effects to Worcester Union Station are anticipated.

Centralized Traffic Control (CTC) would be added along those segments of the Corridor that are currently under Track Warrant Control (TWC); specifically in the section between from East Northfield, Massachusetts to West River, Vermont, and from White River Junction, Vermont to Alburgh, Vermont. Intermediate signals would be installed every two miles and interlocking signals would be added at the ends of the planned passing sidings in St. Albans, Oakland, Berlin, Roxbury, Bethel, South Royalton, Hartland, Swanton, Fonda Junction, Bolton Valley, Randolph and Brattleboro, Vermont. Signal systems would be located entirely within the existing ROW and generally not visible to the public. Where elements are visible, they would be compatible with existing railway infrastructure. Thus, adverse effects to historic properties resulting from the signal systems are unlikely.

As part of the NEPA and Section 106 processes for the NHHS project, the entire rail corridor between New Haven and the Connecticut/Massachusetts state line was determined eligible for the National Register. Contributing elements include passenger stations, bridges, culverts, freight houses, signal towers, historic archaeological sites, and wayside railroad features. The segment of the rail line from the Connecticut/Massachusetts state line to Springfield was not determined eligible for the National Register. Any additional consideration of bridges, culverts, and other railway infrastructure required under Section 106 will occur during Tier 2. In addition, efforts to identify areas of potential archaeological sensitivity along the Corridor, should any exist, would occur in Tier 2.

Based on the nature of the improvements that would be necessary to implement NNEIRI service, direct and indirect effects to historic properties are likely. However, at the Tier 1 level, there is not enough information to be able to assess and determine effects to historic properties.

FRA, or another lead federal agency, would be responsible for Section 106 compliance for any Tier 2 projects affecting historic properties.

4.3.9 Use of 4(f) Protected Properties

This section discusses the affected environment for Section 4(f) properties and potential Section 4(f) uses associated with the No-Build and Build Alternatives. It discusses the historic properties, public parks, recreation areas, and wildlife refuges in the NNEIRI Study Area. A full Section 4(f) analysis and determination would occur during Tier 2 project level analysis.

Methodology and Regulatory Requirements

This section summarizes the methodology used to evaluate potential impacts to Section 4(f) properties and the relevant regulatory requirements.

Regulatory Requirements

Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966, which provided for consideration of park and recreation lands, wildlife and waterfowl refuges, and historic sites during transportation project development. The law, now codified in 49 U.S.C. §303 and 23 U.S.C. §138, applies only to the U.S. Department of Transportation (USDOT) and is implemented by the Federal Highway Administration (FHWA) and the Federal Transit Administration through the regulation 23 Code of Federal Regulations (CFR) 774.

In accordance with Section 4(f) of the Department of Transportation Act of 1966, the Secretary of Transportation must make every effort to “preserve the natural beauty of the countryside, publicly owned parks, recreation areas, wildlife and waterfowl refuges, or any historic sites of national, state, or local significance.” As such, Section 4(f) prohibits federal transportation agencies from approving a project that uses land from a significant public park, recreation area, wildlife or waterfowl refuge, or historic site listed on or eligible for listing on the NRHP, unless the agency determined that there is no feasible or prudent avoidance alternative to the use of that property and that the proposed project includes all feasible planning to minimize harm to the property resulting from its use; or the agency determines that the use, including any measures to minimize harm, would ultimately have a minimal and insignificant adverse effect on the property. The use of a Section 4(f) property occurs when the property is permanently incorporated into the transportation project through a taking of the land; when it is temporarily occupied; or when its significant features are substantially impaired such that its value as a 4(f) resource would be meaningfully diminished or lost.

The following is a summary of defining characteristics that properties must possess in order to qualify for protection under Section 4(f):

Parks, Recreation Areas and Refuges

- It must be publicly owned, meaning it is owned by a local, state or federal government agency;
- It must be open to the public (except in certain cases for refuges). Open to the public means access is permitted to the entire public during normal hours of operation;

- Its major purpose (or primary function) must be for park, recreation, or refuge activities; and
- It must be significant as a park, recreation area or refuge. A determination of significance is made during consultation with the official with jurisdiction over the property.

Historic Sites

In order to qualify for protection under Section 4(f), a historic site must meet the following criteria:

- It must be of national, state or local significance; and
- It must be on or eligible for listing on the NRHP.

Unlike the other Section 4(f) property categories—parks, recreation areas, and refuges—historic sites do not require public ownership in order to qualify for protection under Section 4(f).

Archaeological Sites

In order for archaeological resources to be eligible for protection under Section 4(f):

- It must be listed on or eligible for listing on the NRHP; and
- It must warrant “preservation in place”

Additional coordination with the appropriate (SHPOs would need to be undertaken as the project development process advances in order to determine if archaeological resources exist within the Corridor, and if so, the applicability of Section 4(f) to archaeological resources within the Corridor.

Since Section 4(f) is strictly a federal regulation applicable only to federal transportation agencies, there is no state regulatory equivalent.

Methodology

The Study Team identified public parks, recreation areas, wildlife refuges and waterfowl refuges from GIS data from the states of Massachusetts, New Hampshire and Vermont. In addition, the Study Team obtained schools data from Environmental Systems Research Institute (ESRI), since some school grounds include publicly-used playgrounds and recreational fields. GIS data layers reviewed included:

- Massachusetts “Protected and Recreation Open Space” updated 2013
- New Hampshire “nhrec” updated 2010
- Vermont “Cadastral Conspub” updated 2009
- ESRI “Schools” updated 2012

The Study Team then compiled the GIS data and queried out parks that are privately-owned or are the property of organizations or land trusts. In addition, private schools, public schools without known or visible outdoor recreational areas, and publicly owned lands that do not serve primarily recreational purpose were removed. The Study Team then plotted the remaining properties on base mapping overlaid on the NNEIRI Study Area. For the purposes of this Tier 1 analysis, the NNEIRI Study Area for Section 4(f) properties encompasses an envelope that extends 300 feet from the rail centerline. An analyst then progressively examined

the Corridor from Boston to Springfield, Massachusetts, and from East Northfield, Massachusetts to Alburgh, Vermont to identify and annotate locations where public parks, recreation areas, wildlife or waterfowl refuges encroach into the NNEIRI Study Area envelope. Encroachments were qualified into three categories in order to assess the potential for impacts:

- 1 Property is within 300 feet of the rail centerline;
- 2 Property is within 300 feet of the rail centerline and actually abuts the ROW; and
- 3 Property is bisected by the ROW.

For each GIS data polygon/point that fell within the NNEIRI Study Area, the Study Team conducted internet research to obtain additional information about the property to help confirm or refute its status as a Section 4(f) resource. Also, when progressively viewing the NNEIRI Study Area on aerial base mapping, the analyst noted recreational facilities in the NNEIRI Study Area envelope that were not included in the GIS data. The analyst subsequently conducted internet queries for each of those suspect properties, namely reviewing specific town plans including conservation and development plans and/or parks and recreation plans, to determine whether those facilities or properties qualify as Section 4(f) resources. The Study Team did not undertake additional data collection efforts for the segment between New Haven, Connecticut and Springfield, Massachusetts or for the segment between Springfield and East Northfield, Massachusetts, as both segments were the subject of prior NEPA documentation. In addition, no data was available within Canada. The results of the parks, recreation areas, and refuge analysis were reported in tables for each segment of the Corridor. These tables are included as Tables 4.3-16 and 4.3-17 below.

The Study Team proceeded the identification of Section 4(f) historic properties along the NNEIRI Study Area in a similar manner using different data sources. That analysis involved reviewing the NRHP GIS database in March and April 2015. A combination of spatial data and tabular data contributed to the derivation of the full list of National Register-listed properties. To address irregularities in the spatial data, the Study Team confirmed historic district boundaries based on maps or boundary descriptions provided within the National Register nominations, where feasible. The Study Team further identified the properties through the State of Massachusetts GIS. Then the Study Team cross-referenced the National Register-listed properties within the Massachusetts GIS against the NRHP data. Comparable state GIS data documenting historic properties is not currently available in New Hampshire and Vermont. A NRHP GIS data layer for properties determined eligible for the National Register was also consulted. As mentioned above, the Study Team did not undertake additional data collection efforts for the segment between New Haven, Connecticut and Springfield, Massachusetts or for the segment between Springfield and East Northfield, Massachusetts. In addition, no data was available on Section 4(f) historic properties within Canada. Refer to Appendix F - *Cultural Resources and Historic Properties Technical Memorandum* for historic properties within the Corridor.

The objective of this Tier 1 evaluation was to identify locations of known Section 4(f) properties within the NNEIRI Study Area from readily available federal and state GIS data, and to assess the potential for effects to these 4(f) properties based on conceptual plans for the proposed Build Alternative. As the design of the Build Alternative is advanced and more

detailed information becomes available in Tier 2, the nature and extent of impacts to Section 4(f) resources can be more formally evaluated.

The following analysis identifies Section 4(f) properties by segment, concentrations of such properties, and properties that, due to their proximity to planned passenger rail-related improvements, may be the most likely to be affected.

Existing Conditions

Boston to Springfield

According to the Massachusetts GIS data and information identified while screening the NNEIRI Study Area, there are 48 public parks, recreation areas and wildlife or waterfowl refuges within the Corridor in the segment between Boston and Springfield. Of these 48 Section 4(f) properties, five are bisected by the ROW, 23 properties abut the ROW, and the remainder are within 300 feet of the rail centerline. Larger concentrations of Section 4(f) recreational resources are found in the urban centers of Boston, Worcester and Springfield as well in the Boston suburbs of Newton and Wellesley.

Table 4.3-16 below summarizes these Section 4(f) parks, recreation areas and wildlife refuges. Detailed description, including their location, formal name, and their relationship to the NNEIRI Study Area is provided in Appendix G.

Table 4.3-16. Section 4(f) Parks, Recreation Areas and Wildlife Refuges – Boston to Springfield

Property Type	Number of Properties
Properties within 300 feet of the rail centerline	20
Properties that abut the ROW	23
Properties that are bisected by the ROW	5
Total	48

Source: MassGIS “Protected and Recreation OpenSpace” updated 2013; New Hampshire GRANIT “nhrec,” updated 2010; Vermont Center for Geographic Information “Cadastral Conspub,” updated 2009; and ESRI “Schools” updated 2012.

According to the Massachusetts and National Register GIS data, there are 59 National Register-listed buildings, sites, structures, objects and districts within the Corridor in the segment between Boston and Springfield. These include 39 buildings, 18 districts, one object and one site. Many of these properties are clustered in Springfield, Worcester, and Newton, Massachusetts. An additional seven properties are documented as eligible within the National Register GIS, including five buildings, one district and one structure. Based on the GIS data, of the 19 historic districts, three appear to abut the ROW and another three are bisected by it. Refer to the *Cultural Resources and Historic Properties Technical Memorandum* included herein as Appendix F for a full list of historic properties. Additional properties may be identified as part of the Tier 2 analysis.

Data on National Register archaeological resources warranting preservation in place, which qualifies them for protection under Section 4(f) is not available for the Corridor at this Tier 1

stage. Additional data needs may be identified in Tier 2 in consultation with the Massachusetts SHPO.

New Haven to Springfield

Section 4(f) properties within the Corridor between New Haven, Connecticut and Springfield, Massachusetts are addressed in the NHHS EA/EIE. FRA prepared the NEPA document in cooperation with the Federal Transit Administration (FTA) and the CTDOT in May 2012 and made a Finding of No Significant Impact (FONSI) on August 9, 2012. In addition, FRA, FTA, CTDOT, Connecticut SHPO, and MHC executed a Section 106 Programmatic Agreement for the NHHS High Speed Intercity Passenger Rail Project on August 9, 2012; FRA, CTDOT, and Connecticut SHPO executed a Section 106 Memorandum of Agreement on April 23, 2015 addressing adverse effects to bridges and culverts along the NHHS rail corridor between Windsor and Springfield; and FRA made a final Section 4(f) determination on May 12, 2015 regarding these bridges and culverts. A 4(f) Evaluation for the portion of the corridor between Windsor and Springfield (Phase 3B) will be completed before the release of construction funding for these improvements. For a detailed discussion of Section 4(f) properties within this segment of the Corridor, refer to the NEPA, Section 106, and Section 4(f) documentation for the NHHS project.

Springfield to Canadian Border

Section 4(f) properties within the Corridor between Springfield and East Northfield, Massachusetts are addressed in the *Environmental Assessment for the Knowledge Corridor – Restore Vermonter, Springfield to East Northfield, Massachusetts* prepared by FRA and the MassDOT in 2009. FRA made a FONSI for this project on February 5, 2011. For a detailed discussion of Section 4(f) properties within this segment of the Corridor, refer to the Knowledge Corridor EA.

According to the Massachusetts, New Hampshire and Vermont GIS data and information identified by the analyst while screening the NNEIRI Study Area, there are 24 public parks, recreation areas and wildlife or waterfowl refuges within the Corridor in the segment between East Northfield, Massachusetts and Alburgh, Vermont. Of these 24 Section 4(f) properties, three are bisected by the ROW, eight properties abut the ROW, and the remainder are within 300-feet of the rail centerline. Two of the three properties that are bisected by the ROW are expansive wildlife management areas (the White River Wildlife Management Area and the Missisquoi National Wildlife Refuge). Due to the less urbanized character of the Corridor through Vermont as compared to the segment from Boston to Springfield, there are no areas with large concentrations of Section 4(f) recreational resources. Towns with several Section 4(f) resources include Hartford/White River Junction, South Royalton, Bethel, and Waterbury.

Table 4.3-17 summarizes these Section 4(f) parks, recreation areas and wildlife refuges. Detailed description, including their location, formal name, and their relationship to the NNEIRI Study Area is provided in Appendix G. There are no Section 4(f) resources within the NNEIRI Study Area in the State of New Hampshire.

Table 4.3-17. Section 4(f) Parks, Recreation Areas and Wildlife Refuges – Springfield to Canadian Border Corridor

Property Type	Number of Properties
Properties within 300 feet of the rail centerline	13
Properties that abut the ROW	8
Properties that are bisected by the ROW	3
Total	24

Source: MassGIS “Protected and Recreation OpenSpace” updated 2013; New Hampshire GRANIT “nhrec,” updated 2010; Vermont Center for Geographic Information “Cadastral Conspub,” updated 2009; and ESRI “Schools”, updated 2012.

The National Register GIS identified 39 National Register-listed buildings, sites, structures, objects and districts within the segment of the Corridor between East Northfield, Massachusetts and Alburgh, Vermont. This includes 12 buildings, 21 districts, and six structures. The majority of the properties are historic districts in small village centers in Vermont. One additional property, a historic bridge in Northfield, Vermont, is documented as eligible within the National Register GIS. Of the 21 historic districts, five abut the ROW and an additional 10 are bisected by the ROW. Refer to the *Cultural Resources and Historic Properties Technical Memorandum* included herein as Appendix F for a full list of historic properties. Additional properties may be identified as part of the Tier 2 analysis.

Data on National Register archaeological resources warranting preservation in place which qualifies them for protection under Section 4(f) is not available for the Corridor at this Tier 1 stage. Additional data needs may be identified in Tier 2 in consultation with the Massachusetts, New Hampshire and Vermont SHPOs.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to Section 4(f) properties within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS, and the SSX projects.

FRA determined that the Knowledge Corridor – Restore Vermonter project would affect, but not adversely affect, historic properties (Northampton Railroad Station (Union Station), the Northampton Downtown Historic District, and the Greenfield Main Street Historic District) that are protected under Section 4(f). Because FRA made a No Adverse Effect determination pursuant to Section 106, and MHC concurred, FRA was able to make a *de minimis* impact determination under Section 4(f).

For the segment of the NHHS corridor between New Haven and Windsor (Phase 1, Phase 2 and Phase 3A of the NHHS Project), FRA submitted a draft Section 4(f) Evaluation to the U.S.

Department of the Interior (DOI) for review and comment pursuant to Section 4(f) of the U.S. Department of Transportation Act of 1966. FRA received DOI's concurrence with its finding on April 1, 2015, and FRA made its final Section 4(f) determination regarding the use of historic properties in this portion of the corridor on May 12, 2015. FRA determined that the NHHS improvements between New Haven and Windsor would not require the use of any publicly owned parks, recreational areas, or wildlife or waterfowl refuges. In this same segment of corridor, FRA determined that there was no prudent and feasible alternative to the proposed use of 4(f) historic properties, which consist of 14 bridges, 15 culverts, and one tunnel that are contributing resources to the National Register-eligible NHHS Rail Corridor Historic District. The improvements include rehabilitation and replacement of these 30 historic properties. All possible planning to minimize harm was incorporated into the project design and project mitigation commitments; this includes execution in April 2015 of an MOA between FRA, CTSHPO, and CTDOT pursuant to Section 106 of the NHPA. Tier 2 NEPA analysis, a Memorandum of Agreement, and a 4(f) Evaluation for the portion of the corridor between Windsor and Springfield (Phase 3B) will be completed before the release of construction funding for improvements in this segment of the corridor. Similarly, site-specific compliance and documentation will be undertaken for four planned stations along the NHHS corridor.

Other planned passenger rail-related projects, including Springfield Union Station and the expansion of Boston's South Station (SSX), and associated layover facilities, improvements to the rail infrastructure between the U.S. border and Montreal, and improvements to the Montreal Central Station Customs Checkpoint would also be completed under the NNEIRI No-Build Alternative. No additional impacts to cultural resources beyond those resulting from, and already documented elsewhere for, the above projects are anticipated from the No-Build Alternative.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

Under the Build Alternative, the railroad tracks and alignment would be upgraded so that speeds up to 79 mph would be possible throughout the Corridor. Although tracks would be upgraded, including minor realignments and double-tracking, all work would take place within the existing ROW. Improvements to some passenger stations and bridges and the installation of signal systems would also occur. No new layover facilities are proposed beyond those identified under the No-Build Alternative.

ROW improvements are planned in the segment of the Corridor between Worcester and Springfield, Massachusetts. This segment of the ROW was historically a double-track corridor, however most of the track was removed in the mid-20th century. The additional service within the Corridor would require the reconstruction of the second track and minor track

realignments. These improvements would occur adjacent to the Quaboag Wildlife Management Area in East Brookfield, Massachusetts, and to Cutter Park and the Warren Common in Warren, Massachusetts. In addition, one double track location between Spencer and East Brookfield would require an additional siding to accommodate NNEIRI services. This would occur in the vicinity of the Spencer State Forest. However, it is unlikely that they would diminish significant features or the use of the wildlife management area, forest or parks, and thus adverse impacts to these 4(f) resources are unlikely. In addition, the ROW improvements would occur in the vicinity of several 4(f) historic properties including the West Brookfield Center Historic District (Boundary Increase) in West Brookfield, Massachusetts; the Warren Town Hall, Warren Public Library, 1767 Milepost, and the Warren First Congregational – Federated Church in Warren, Massachusetts; and Union Station in Palmer, Massachusetts. However, the improvements would be limited to the existing ROW and therefore the use of these 4(f) historic properties is not anticipated.

The restoration of a second track is also planned along the Corridor between Brattleboro and Bellows Falls, Vermont and between St. Albans and Swanton, Vermont. There are no 4(f) parks, recreation areas and wildlife refuges in the immediate vicinity of the improvements. There are several 4(f) historic properties adjacent to these segments of the Corridor, including Union Station in Brattleboro, the Brattleboro Downtown Historic District, and the Brooks House in Brattleboro, Vermont; the East Putney Brook Stone Arch Bridge, in East Putney, Vermont; and the Westminster Village Historic District in Westminster, Vermont. However, the improvements would be limited to the existing ROW and therefore the use of adjacent 4(f) properties is not anticipated. Additional passing sidings would be provided in East Northfield, Massachusetts, extending into Vernon, Vermont, and Roxbury and Randolph, Vermont. Although the Vernon District Schoolhouse No. 4 is adjacent to one of these track-work areas, the work would be limited to the ROW and thus adverse effects are not anticipated.

Seventeen bridges and overpasses located in the segment of the Corridor between Worcester and Springfield, Massachusetts would be modified to accommodate the double track. An additional five bridges and overpasses would require improvements due to double-tracking between Brattleboro and Bellows Falls, Vermont. Any additional consideration of bridges, culverts, and other railway infrastructure required under Section 106 will occur during Tier 2. Consistent with 49 USC 303, as amended by the FAST Act, improvements to these rail bridges and overpasses may not be considered a use of a historic site subject to Section 4(f), regardless of whether they are listed or eligible for listing on the NRHP.

The NNEIRI program includes improvements at two stations along the Corridor between Boston and Springfield. Three locations are currently under consideration for construction of a new station in Palmer, Massachusetts. At least one of these sites lies in close proximity to the historic Palmer Union Station, a 4(f) historic property. In addition, a new platform would be constructed at Union Station in Worcester. The platform would be an island location between tracks and would be located within the existing ROW in an area historically used for station platforms. The platform would connect to Worcester Union Station via an elevator and stair beneath the platform to the existing pedestrian tunnel. The pedestrian tunnel originally connected passengers from the Worcester Union Station headhouse to island platforms. Although the elevator and stair would be vertical elements, they would connect from a tunnel

below the tracks vertically to the platform surface therefore, no visual effects to Worcester Union Station are anticipated.

Centralized Traffic Control (CTC) would be added along those segments of the Corridor that are currently under Track Warrant Control (TWC); specifically, in the section between East Northfield, Massachusetts and West River, Vermont, and in the section between White River Junction and Alburgh, Vermont. Intermediate signals would be installed every two miles and interlocking signals would be added at the ends of the planned passing sidings in St. Albans, Oakland, Berlin, Roxbury, Bethel, South Royalton, Hartland, Swanton, Fonda Junction, Bolton Valley, Randolph and Brattleboro, Vermont. Signal systems would be located entirely within the existing ROW and generally not visible to the public. Thus, these improvements would not require the use of 4(f) properties.

Based on the type of improvements that would be necessary to implement NNEIRI service, there is the potential for the use of 4(f) historic properties. However, FRA does not generally make 4(f) determinations in Tier 1 NEPA documents. The use of 4(f) properties resulting from the NNEIRI program will be thoroughly evaluated in Tier 2 upon completion of the Section 106 process.

4.3.10 Use of Section 6(f) Lands

This section discusses the affected environment for special lands and Section 6(f) properties.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to Section 6(f) properties and the relevant regulatory requirements.

Regulatory Requirements

The Land and Water Conservation Fund (LWCF) Act of 1965 (16 USC 460 1-4) (Section 6(f)) was enacted to preserve, develop and assure accessibility to outdoor recreation resources by:

- 1 Providing funds for and authorizing federal assistance to states for the planning, acquisition, and development of needed land and water areas and facilities; and
- 2 Providing funds for the federal acquisition and development of certain land areas.

The actual LWCF is funded by the revenue from fees paid to the federal government from offshore drilling, surplus property taxes, motorboat fuel tax, and other revenue streams. Administration of the LWCF program is the responsibility of the National Park Service (NPS) as codified in 36 CFR 59.

Properties acquired (either wholly or partially), developed, or redeveloped with LWCF funds are identified as Section 6(f) properties and are afforded protection under the Act. As such, any project that proposes to convert property that was purchased or improved with Section 6(f) funds must receive approval from the NPS. Although there is no formal permit process with the NPS for Section 6(f) approval, the project proponent must make a formal request to the NPS for authorization of the Section 6(f) property conversion. Requests are made through the state agency with Section 6(f) oversight; in this case The Massachusetts Department of

Conservation and Recreation (DCR) for properties located in Massachusetts; the Vermont Department of Forests, Parks and Recreation for properties located in Vermont; and the New Hampshire Department of Resources and Economic Development (DRED) for properties located in New Hampshire. Requests must include details of the proposal to substitute the converted Section 6(f) land with other property of equivalent usefulness and location and with equal or better fair market value. Securing Section 6(f) conversion approval typically occurs during the National Environmental Policy Act (NEPA) documentation process.

Section 4(f) of the Department of Transportation Act of 1966, which regulates public parks, recreation areas, wildlife refuges and National Register historic sites affected by US DOT projects, is a regulatory program that has some overlapping jurisdiction with Section 6(f) because of the protection it affords to public recreational properties. A separate *Section 4(f) Technical Memorandum* has been prepared and is included herein as Appendix G.

Section 6(f) is strictly federal legislation. There is no state equivalent legislation for the protection of Section 6(f) properties.

Methodology

The Study Team identified the Section 6(f) properties through a three-step process that first involved collecting and reviewing public recreation and open space GIS data from the states of Massachusetts, New Hampshire and Vermont. GIS data layers reviewed included:

- Massachusetts “Protected and Recreation Open Space” updated 2013⁶⁵
- New Hampshire “nhrec” updated 2010⁶⁶
- Vermont “Cadastral Conspub” updated 2009⁶⁷

As part of this first step, the Study Team queried the compiled GIS data to identify privately-owned recreation and open space properties as well as those properties owned by organizations or land trusts. The Study Team removed those properties and plotted the remaining properties on base mapping overlaid on the NNEIRI Study Area. For the purposes of this analysis, the NNEIRI Study Area encompasses an envelope that extends 300 feet from the rail centerline. In the second step, an analyst progressively examined the Corridor from Boston to Springfield, Massachusetts, and from East Northfield, Massachusetts to Alburgh, Vermont to identify and annotate locations where public parks and recreation areas (potential Section 6(f) properties) encroach into the NNEIRI Study Area envelope. Encroachments were qualified into three categories in order to assess the potential for impacts:

- 1 Property is within 300 feet of the proposed NNEIRI Study Area;
- 2 Property is within 300 feet of the proposed NNEIRI Study Area and actually abuts the ROW; and

⁶⁵ MassGIS, “Protected and Recreation Open Space” data layer updated 2013. Available at <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/srhp.html>.

⁶⁶ New Hampshire GRANIT, “nhrec” data layer updated 2010. Available at <http://www.granit.unh.edu/data/downloadfreedata/downloaddata.html>.

⁶⁷ Vermont Center for Geographic Information, “Cadastral Conspub” updated 2009. Available at <http://vcgi.vermont.gov>.

3 Property is bisected by the ROW.

Step three involved comparing properties that fell within the NNEIRI Study Area envelope with a list of properties that were either acquired, developed or redeveloped with LWCF funds (i.e., Section 6(f) properties). The Study Team consulted the Land and Water Conservation Fund State Assistance Program website (<http://waso-lwcf.ncrc.nps.gov/public/index.cfm>)⁶⁸ to acquire a list of Section 6(f) properties for each state: Massachusetts, Vermont, and New Hampshire. Section 6(f) properties identified as lying partially or wholly within the NNEIRI Study Area were then tabulated (refer to Appendix H, *Section 6(f) Technical Memorandum*) and the potential for impacts assessed.

The objective of this Tier 1 evaluation was to identify locations of known Section 6(f) properties within the NNEIRI Study Area from readily available federal and state GIS data, and to assess the potential for effects to these properties based on conceptual plans for the proposed Build Alternative. As the design of the alternative is advanced and more detailed information becomes available in Tier 2, the nature and extent of impacts to Section 6(f) properties can be more formally evaluated.

The following analysis identifies Section 6(f) properties by segment that, due to their proximity to planned rail-related improvements, may be the most likely to be affected.

Existing Conditions

Boston to Springfield

According to the Massachusetts GIS database “Protected and Recreation Open Space”⁶⁹ and the Section 6(f) properties listing obtained from the Land and Water Conservation Fund State Assistance Program website (identified above), there are six Section 6(f) properties within the Corridor in the segment between Boston and Springfield. These include one park in Natick, three parks in Worcester, and two parks in Springfield. Of the six Section 6(f) properties, one is bisected by the ROW, two abuts the ROW and three are within 300 feet of the rail centerline. Refer to Appendix H for detailed information about the city or town where each Section 6(f) property is located, the formal name of the parks, and a general description of each property, and an explanation of the spatial relationship between each Section 6(f) property and the Corridor ROW.

New Haven to Springfield

Section 6(f) properties within the Corridor between New Haven, Connecticut and Springfield, Massachusetts are addressed in the NHHS EA/EIE. FRA prepared the NEPA document in cooperation with the Federal Transit Administration (FTA) and the Connecticut Department of Transportation (CTDOT) in May 2012 and made a Finding of No Significant Impact (FONSI)

⁶⁸ The Land and Water Conservation Fund State Assistance Program website. Available at <http://waso-lwcf.ncrc.nps.gov/public/index.cfm>.

⁶⁹ MassGIS, “Protected and Recreation Open Space” data layer updated 2013. Available at <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/srhp.html>.

on August 9, 2012. For a detailed discussion of Section 6(f) properties within this segment of the Corridor, refer to the NEPA documentation for the NHHS project.

Springfield to Canada Border

Section 6(f) properties within the Corridor between Springfield and East Northfield, Massachusetts are addressed in the *Environmental Assessment for the Knowledge Corridor – Restore Vermonter, Springfield to East Northfield, Massachusetts* prepared by FRA and the MassDOT in 2009. FRA made a FONSI for this project on February 5, 2011. For a detailed discussion of Section 6(f) properties within this segment of the Corridor, refer to the Knowledge Corridor EA.

According to the Vermont GIS database “Cadastral Conspub” (2009) and the Section 6(f) properties listing obtained from the Land and Water Conservation Fund State Assistance Program website (identified above), there are four Section 6(f) properties within the Corridor between East Northfield, Massachusetts and Alburgh, Vermont. No Section 6(f) properties are located within 300 feet of the rail centerline in New Hampshire; all four Section 6(f) properties are located in Vermont. Of the Section 6(f) properties in Vermont, two are parks (Camels Hump State Park and Maple Street Park and Pool), one is a boat access (Old Ferry Road Boat Access), and the other is a wildlife management area (White River Wildlife Management Area). Refer to Appendix H for detailed information about the city or town where each Section 6(f) property is located, the formal name of the parks, and a general description of each property, and an explanation of the spatial relationship between each Section 6(f) property and the Corridor ROW.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to Section 6(f) properties within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor – Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor – Restore Vermonter EA identified no impact to Section 6(f) resources.

According to the NHHS EA, the NHHS project is immediately adjacent to the west of the Bushnell Park located in Downtown Harford, Connecticut. This is the only Section 6(f) property within the NHHS corridor and the NHHS EA identified no impact to the park as a result of the proposed project.

Other planned passenger rail-related projects, including Springfield Union Station improvements and the expansion of Boston’s South Station (SSX), and associated layover facilities, improvements to the rail infrastructure between the U.S. border and Montreal, and improvements to the Montreal Central Station Customs Checkpoint would also be completed under the NNEIRI No-Build Alternative.

No additional impacts to Section 6(f) properties beyond those resulting from, and already documented elsewhere for, the above projects are anticipated from the No-Build Alternative.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

Under the Build Alternative, the following improvements are proposed:

- Additional train service & upgrade of railroad tracks
- ROW improvements
- Restoration of second track and sidings
- Modifications to bridges and overpasses
- Station Improvements
- Addition of Centralized Traffic Control

Additional Train Service and Upgrades to Railroad Tracks

Under the Build Alternative, additional trains would be added between Boston and Springfield, and New Haven and Montreal. Railroad tracks and alignment would be upgraded so that speeds up to 79 mph would be possible throughout the Corridor. Although track improvements would be undertaken, including minor realignments and double-tracking, all work would take place within the existing ROW. Improvements to some passenger stations and bridges and the installation of signal systems would also occur. No new layover facilities are proposed beyond those identified under the No-Build Alternative. The additional train service and track improvements would not require the conversion of Section 6(f) protected properties to uses other than public outdoor recreational uses, and as such permanent impacts to Section 6(f) properties are not anticipated. The potential for the temporary (less than 6-months in duration) non-conforming use of Section 6(f) properties during construction is also unlikely as it is not expected that any project activities will occur within the physical limits of a Section 6(f) protected property. This presumption will be evaluated and verified in Tier 2 when specific projects have been identified.

Right-of-way (ROW) Improvements

ROW improvements are planned in the section of the Corridor between Worcester, Massachusetts and Springfield, Massachusetts. This segment of the ROW was historically a double-track Corridor; however, most of track was removed in the mid-20th century. The additional service within the Corridor would require the reconstruction of the second track and minor track realignments. However, the realignments would not occur in the immediate vicinity of any identified 6(f) properties and thus there would be no impacts.

Restoration of Second Track and Sidings

The restoration of a second track is also planned along the Corridor between Brattleboro, Vermont and Bellows Falls, Vermont and between St. Albans, Vermont and Swanton, Vermont. In addition, one double track location between Spencer and East Brookfield would require an additional siding to accommodate NNEIRI services. However, no Section 6(f) properties have been identified in the areas of planned double-tracking. Additional passing sidings would be provided in East Northfield, Massachusetts, extending into Vernon, Vermont, and Roxbury and Randolph, Vermont however, no Section 6(f) properties have been identified within these proposed track-work areas. Thus, there would be no impacts.

Modifications to Bridges & Overpasses

Seventeen bridges and overpasses located in the segment of the Corridor between Worcester, Massachusetts and Springfield, Massachusetts would be modified to accommodate the double track. An additional five bridges and overpasses would require improvements due to double-tracking between Brattleboro, Vermont and Bellows Falls, Vermont. None of these bridge and overpass improvements would have an impact on Section 6(f) properties identified along the Corridor.

Station Improvements

The NNEIRI program includes improvements at two stations along the Corridor between Boston and Springfield. Three locations are currently under consideration for a new station in Palmer, Massachusetts. There are no Section 6(f) properties located along the Corridor in Palmer that would be impacted by new station work. In addition, a new platform would be constructed at Union Station in Worcester. There are no Section 6(f) properties in the vicinity of the Union Station in Worcester so no impacts would occur from work associated with these station improvements.

Centralized Traffic Control

Centralized Traffic Control (CTC) would be added along those segments of the Corridor that are currently under Track Warrant Control (TWC); specifically, in the section between East Northfield, Massachusetts and West River, Vermont, and in the section between White River Junction and Alburgh, Vermont. Intermediate signals would be installed every two miles and interlocking signals would be added at the ends of the planned passing sidings in St. Albans, Oakland, Berlin, Roxbury, Bethel, South Royalton, Hartland, Swanton, Fonda Junction, Bolton Valley, Randolph and Brattleboro, Vermont. Signal systems would be located entirely within the existing ROW and thus impacts to Section 6(f) properties resulting from the new signal systems are unlikely.

4.3.11 Recreational Opportunities

This section discusses the potential impacts to recreational areas associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

Regulatory Requirements

Federal protection of parklands is provided under Section 4(f) of the U.S. Department of Transportation Act (for federally funded transportation projects) and under Section 6(f) of the LWCF Act (for LWCF-funded parks). Please see Sections 4.3.9 and 4.3.10 for Sections 4(f) and 6(f) regulatory requirements.

At the state level, the following legislation applies:

Massachusetts

- Article 97: Constitution of the Commonwealth of Massachusetts. Article 97 ensures that lands acquired for conservation purposes are not converted to other inconsistent uses.
- Use federal standards

New Hampshire and Vermont:

- Use federal standards

Methodology

The Study Team located federal, state, county, municipal and private parks, recreational areas, open spaces and National Wildlife Refuges within a 300 feet distance from the rail centerline (NNEIRI Study Area for recreational resources) along the Corridor using GIS data sets, including Massachusetts “Protected and Recreation Open Space”, New Hampshire “nhrec” and Vermont “Cadastral Conspub and ESRI “School”⁷⁰. Only parks, open spaces and recreational areas that do not meet the Section 4(f) and Section 6(f) criteria were included for the analysis. More information about Section 4(f) and 6(f) properties is provided in Appendices G and H. Additionally, there are several parks and recreational areas outside of the 300-foot buffer zone, which are not included in this EA.

Existing Conditions

The Study Team conducted an inventory of protected natural areas such as local, state and national parks, forests and refuges within a 300-foot buffer zone of the Corridor to identify specific areas where train activity could interfere with the visual and aesthetic quality of the user experience in those areas. Massachusetts, New Hampshire and Vermont have extensive recreational resources however, only a limited number lie in close proximity to the Corridor. In addition, many of those resources identified within the NNEIRI Study Area are separated from the rail line by buildings or roadways, while others lie a sufficient distance from the rail line as to limit any impacts. In each segment, however, there are parks and recreation areas that are immediately adjacent to the Corridor, are bisected by the railroad ROW, or that abut active stations and railroad line.

Based on the GIS mapping, the Study Team identified approximately 108 parks, recreational areas, national wildlife refuges, forests, playgrounds, cemeteries and open spaces within the 300 feet distance from the rail centerline in the Boston to Springfield segment. This segment generally includes state and city parks, conservation areas, wildlife management areas,

⁷⁰ GIS layers include: Massachusetts “Protected and Recreation OpenSpace,” updated 2013; New Hampshire “nhrec,” updated 2010; Vermont “Cadastral Conspub,” updated 2009; and ESRI “Schools,” updated 2012.

reservoirs and recreational areas. Of these resources, less than half (approximately 43%) are Section 4(f) properties and only six (6%) are potential Section 6(f) properties.

The Study Team identified approximately 28 parks, recreational areas, wildlife refuges, forests and open spaces within the 300 feet distance from the rail centerline in the East Northfield to Canadian segment. This segment generally includes state forests, national wildlife refuges and wildlife management areas. Of these resources, eleven (39%) are potential Section 4(f) properties and only three (11%) are Section 6(f) properties. In addition to these, there are at least 13 potential Section 4(f) and one Section 6(f) property within the 300-foot buffer zone in this segment that were not identified on the GIS map but were found during internet search and are included in Appendix H.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to recreational opportunities within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

Knowledge Corridor/ Restore Vermonter and the NHHS EAs identified no impact to recreational resources as both of these projects would not use land from recreational areas.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

Under the Build Alternative, railroad tracks and alignment would be upgraded so that speeds up to 79 mph would be possible throughout the Corridor. Although track improvements would be undertaken, including minor realignments and double-tracking, all work would take place within the existing ROW and there would be no change to land use. No layover facilities are proposed beyond those outlined under the No-Build Alternative. Therefore, no negative impacts to the recreational opportunities are anticipated. Additionally, although there would be additional trains under the Build Alternative, the frequency of the trains is relatively low therefore, the Study Team does not anticipate any potential indirect impacts along the Corridor due to increase in service levels. The Study Team anticipates increased recreational opportunities due to improved access to recreational facilities in the vicinity of NNEIRI stations.

4.3.12 Transportation

This section discusses the affected environment in relation to transportation modes and the environmental consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to evaluate transportation impacts and the relevant regulatory requirements.

Regulatory Requirements

NEPA requires federal agencies to examine the impacts of federal actions on transportation. There are no direct additional applicable laws pertaining to railroad operation capacity analysis. The Study Team followed FRA's "*Railroad Corridor Transportation Plans: A Guidance Manual (Revised in July 2005)*" to assess railroad operating impacts. There also are no direct applicable laws pertaining to traffic operation capacity analysis. At the federal level, laws relating to pedestrian access routes and parking spaces for persons with disabilities (quantity and configuration) include the Americans with Disabilities Act of 1990, as amended, and associated regulations and guidance, and 2006 USDOT's Americans with Disabilities Act of 1990 (ADA) Standards for Transportation Facilities.⁷¹ DOT's ADA standards apply to facilities used by state and local governments to provide designated public transportation services, including bus stops and stations, and rail stations. They apply to new construction and alterations.

At the state level, the following legislation applies:

- Use federal standards for Massachusetts, New Hampshire, and Vermont.

Methodology

Passenger rail service is part of the larger transportation network in a region. Within the four-state, two country NNEIRI Corridor, the transportation network includes interstates and major highways, intercity passenger rail service, commuter rail service, airports, and intercity bus service along with local roadways and local bus services.

Railroad Operations Methodology

The Study Team conducted a detailed train operations model performance simulation to determine the projected performance of the future freight and passenger service as compared to the existing service. The following cases were evaluated:

- Existing No-Build condition: no change in existing track configuration and existing service;
- Future No-Build condition: no change in existing track configuration and existing passenger service, growth in freight service; and

⁷¹ U.S. Department of Transportation. Americans with Disabilities Act (ADA) Standards for Transportation Facilities. 2006. <http://www.access-board.gov/guidelines-and-standards/transportation/facilities/ada-standards-for-transportation-facilities/single-file-version#a2>

- Build condition: based on projected growth in freight service and the NNEIRI SDPs

A description of the modeling assumptions and the details of the findings are included in the NNEIRI SDPs. All of the connecting lines affecting the operation on the NNEIRI Corridor are included in the model as boundary conditions.

All of the passenger and freight railroad operators operating in the Corridor and the boundary were included in the simulation. Additional passenger trains would be coordinated with existing freight service in order to minimize conflict.

Traffic Analysis

The Study Team qualitatively reviewed traffic impacts at local streets near stations as well as selected road/rail at-grade crossings in the following manner. First, the 2035 annual ridership estimates (boardings) by station for Build Alternative were converted from annual to daily boardings per station. Second, daily boardings were converted to average or peak boardings per train, based upon the availability of existing passenger data or temporal distribution standards. Finally, engineering judgment was used to determine whether the resulting volume would be high enough to noticeably affect traffic operations at intersections adjacent to station locations. This review was used to determine if further data collection and analysis would be required as a Tier 2 activity to assess the traffic impacts resulting from increased passenger service at stations.

Transit Services and Facilities

The Study Team studied transit schedules and routes for transit services to existing and proposed rail stations to compare the arrival and departure of the trains and transit.

Highways, Bridges and Tunnels

The Study Team identified interstates, major highways, bridges and tunnels for each of the Corridor segments. The Build Alternative was reviewed to identify any potential significant impacts to existing and planned interstates, major highways, bridges, and tunnels for each corridor segment.

Airports and Aviation Facilities

The Study Team identified major airports and aviation facilities for each of the Corridor segments and summarized location, airport type, hub size and passenger enplanements for each of the airport. The Build Alternative was reviewed to identify any potential significant impacts to existing and planned airports and aviation facilities.

Parking

The Study Team used ridership forecasts for analysis year 2035 to determine the number of passenger boardings and modal splits at each station. Engineering judgment, industry standards and previously collected data, if available, were used to determine the number of riders arriving by automobile and, in turn, the number of parking spaces needed for kiss-n-ride and all day parking.

Freight Corridors

The Study Team identified freight railroads utilizing the Corridor and reviewed the Build Alternative to identify any potential significant impacts to existing and planned freight corridors.

Existing Conditions

This section describes the existing regional transportation network in the Corridor, highway crossings, and freight, commuter, and intercity passenger rail.

Boston to Springfield

The transportation network in this segment is dense with major roadways, intercity rail services, intercity bus services, commuter rail and commuter bus services, as well as local bus services.

Railroad Operations

Infrastructure: The NNEIRI Corridor is about 470 miles. The Boston to Springfield corridor segment is about 99 miles. The existing track configuration is illustrated in Figure 4-1 and consists of primarily double tracks with some segments of single-track operation, potentially limiting operation in certain segments. The NNEIRI Corridor is owned by the Commonwealth of Massachusetts from Boston to Worcester and CSX from Worcester to Springfield and beyond.

Freight Service: Freight on the Boston to Springfield segment is operated by CSX on the Boston Line. The Boston Line begins in Boston, Massachusetts and continues to West Springfield, Massachusetts. In West Springfield, the line connects to the Berkshire Line, which continues to the Selkirk Yard, located eight miles south of Albany, New York. CSX operates 2-3 weekday roundtrips between Boston and Worcester Intermodal Terminal and 25 weekday roundtrip trains from Worcester to Springfield.

Passenger Service: Amtrak Northeast Regional (Springfield) and Amtrak Lake Shore Limited (Boston) services provide intercity rail service between Boston and Springfield Union Station (with continued service to Albany and Chicago), with one train per-day in each direction. In 2014, Amtrak stations along the Corridor in Massachusetts served 2,203,800 passengers. Boston South Station is the sixth busiest station in the national Amtrak network.⁷²

Outside of the Corridor, Amtrak Acela Express service connects Boston to major cities in the Northeast as far south as Washington DC. Amtrak Downeaster service connects Boston to Portland and Brunswick Maine.

Figure 4-1 illustrates the existing and the conceptual cross section where a second track is proposed in areas that were historically double tracked. Additional conceptual cross sections are provided in Appendix A.

⁷² Amtrak. Amtrak Fact Sheet, Massachusetts, 2014.
<http://www.amtrak.com/pdf/factsheets/MASSACHUSETTS14.pdf>

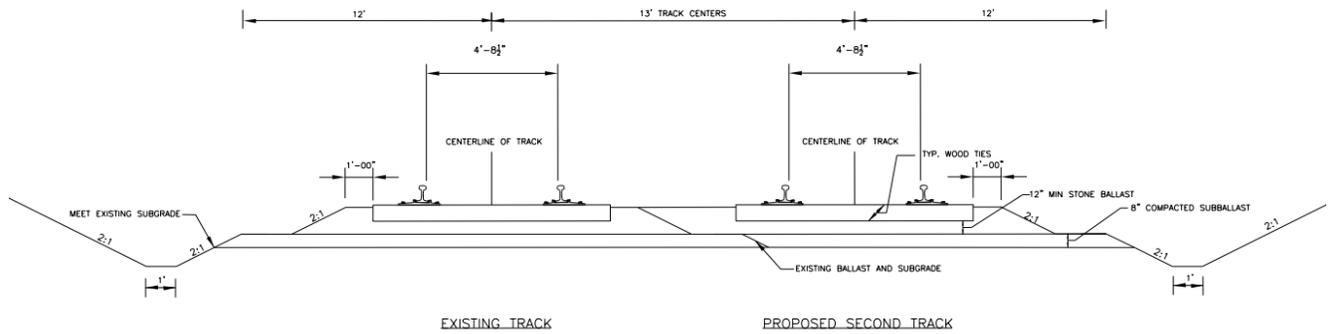


Figure 4-1. Conceptual Cross Section of Second Track

Transit Services and Facilities

Greyhound, Peter Pan, Megabus and Amtrak Thruway operate intercity bus service in the corridor segment. The Massachusetts Bay Transportation Authority (MBTA) operates commuter rail and bus as well as local bus and subway services in the Boston metropolitan area. MBTA operates commuter rail service between Boston and Worcester with 24 local and express roundtrip trains each day. Currently, no commuter rail service exists between Worcester and Springfield. Outside of the Boston metropolitan area, other Massachusetts regional transportation authorities operate local bus services including the Worcester Regional Transit Authority (WRTA), the MetroWest Regional Transit Authority (MWTA) in Framingham, and the Pioneer Valley Transit Authority (PVRTA) in the Springfield metropolitan area.

Highways, Bridges, Tunnels

The Massachusetts Turnpike (I-90) connects Boston and Springfield. Interstate 95 runs through Boston north-south. Interstate 93 operates from Boston north. Route 128 bisects the Corridor west of Boston, as do Interstates 495 and 290/395. Interstate 84 branches off the Massachusetts Turnpike in Sturbridge and connects to Hartford. Interstate 91 connects Springfield to Hartford and New Haven to the south and to New Hampshire and Vermont to the north.

Within this corridor segment in Massachusetts there are 964 bridges. Of these, 23 are railroad bridges. The remainder carries roadways, bicycle/pedestrian pathways, and other structures.

Airports, Aviation Facilities

In this segment of the Corridor, the only airport is the General Edward Lawrence Logan International Airport. In 2012, it had 14,293,695⁷³ passenger enplanements and is the only airport in the Corridor listed as having severe congestion⁷⁴.

⁷³ Federal Aviation Administration (FAA), 2012.

⁷⁴ National Plan of Integrated Airport Systems through Esri.

Freight Corridors

Massachusetts is served by one Class I carrier, CSX, and 10 other railroads (3 regional, 4 local, and 3 switching and terminal). The major freight operations run east-west from Boston to New York City via Springfield and from Boston to Providence. Both of these rail lines are shared with Amtrak and MBTA passenger rail operations. In 2011, 1.9 million tons of freight originated in Massachusetts and 6.7 tons terminated in Massachusetts on 892 miles operated.⁷⁵ CSX has terminals in Worcester and Springfield. Boston is also a major seaport.

Parking at Existing Stations

Parking spaces available at the existing stations are provided below.

Table 4.3-18. Parking Spaces at Existing Stations - Boston to Springfield

Station	Vehicle Parking ^a	
	Parking Available/Accessible Parking	No of Parking Spaces/ No. of Accessible Parking
South Station	Yes/Yes	223/8
Back Bay	Off-site/Off-site	0
Framingham	Yes/ Yes	166/ 4
Worcester	Yes/ Yes	500/ 9
Springfield	Yes/ NA	NA

Source: NNEIRI, April 2014, Station Site Assessment & Guidelines.

Note: ^a NA: Not Available

Springfield to Canadian Border

The transportation network in this segment includes major roadways, intercity bus services, regional bus services, as well as local bus services.

Railroad Operations

Infrastructure: The Springfield to Canadian Border corridor segment is about 259 miles. The existing track configuration is illustrated in Figure 4-1 and consists of primarily single tracks. This segment has numerous sidings and passing tracks. Service on this segment would operate utilizing the MassDOT and New England Central Railroad (NECR) rail lines.

Freight Service: NECR and PAS operate regular freight services along this segment. Several other railroads have operating rights in the corridor segment including Canadian National (CN), Vermont Railway, Washington County Rail Corporation (Vermont Rail Systems), and Claremont Concord Railroad Corporation. Two PAS and one NECR freight trains operate daily

⁷⁵ Association of American Railroads, 2011.

between Springfield and East Northfield. NECR owns and operates along the Palmer and Roxbury Subdivisions from East Northfield, Massachusetts north to St. Albans, Vermont. Approximately two NECR freights operate daily between East Northfield and St. Albans. CN and NECR freight trains operate from St. Albans, Vermont to Montreal, Canada. NECR dispatches up to the Canadian border where they interchange with CN into Montreal. Approximately two CN freight trains operate daily from St. Albans to Montreal.

Passenger Service: Amtrak Vermonter service connects Springfield to Saint Albans, Vermont via White River Junction, Montpelier, Waterbury and Essex Junction (Burlington). Amtrak operates a single roundtrip train, daily from Washington, D.C. to St. Albans, Vermont. In New Hampshire, the Vermonter serves the Claremont Station and in 2014, had station activity of 2,117.⁷⁶ In Vermont, Amtrak stations within the Corridor served 86,405 passengers.⁷⁷ With the reconstruction of the Connecticut River Line completed in December of 2014, the Vermonter now makes additional stops at Greenfield and Northampton. A station stop in Holyoke was added in August 2015 as part of this project.

Outside the Corridor, Amtrak Adirondack service operates to the west of the Vermonter service from New York City through New York State to Montreal. Amtrak Ethan Allen Express service connects Rutland Vermont to New York City via Albany New York.

Transit Services and Facilities

Greyhound and Megabus provide intercity bus service in this corridor segment. Chittenden County Transportation and Green Mountain Transit Agency provide local and regional bus service between Montpelier and Saint Albans and beyond as well as in Burlington and Waterbury Vermont. In the I-91/Connecticut River area, transit service is provided by Connecticut River Transit, in White River Junction it is by Advance Transit and in Randolph area it is by Stagecoach Transportation Services.

Highways, Bridges, Tunnels

Interstate 91 to Interstate 89 at White River Junction on the Vermont/Canadian border (via Route 133 and then A35 in Canada) connect Springfield to Montreal, as do Interstate 90 to Interstate 87 in Albany, New York on to the New York/Canadian border (via Route 15 in Canada) to Montreal.

Within this corridor segment, there are 538 bridges in New Hampshire (97) and Vermont (441). Of these, 30 carry tracks. The remainder carries roadways, bicycle/pedestrian pathways, and other structures.

Airports, Aviation Facilities

The major airport in this segment of the Corridor is Burlington International Airport. All of the aviation facilities in the corridor segment are listed in Table 4.3-19.

⁷⁶ Amtrak. Amtrak Fact Sheet, New Hampshire, 2014

⁷⁷ Amtrak. Amtrak Fact Sheet, Vermont, 2014

Table 4.3-19. Airports, Springfield-to-Canadian Border

Airport	Location	Airport Type	Hub Size	Passenger Enplanements (2012)
Northampton	Northampton, MA	general aviation field	not a hub	7
Westover Air Reserve Base - Metropolitan Airport	Springfield, MA	general aviation field	not a hub	1,302
Claremont Municipal Airport	Claremont, NH	general aviation field	not a hub	N/A
Lebanon Municipal Airport	Lebanon, NH	primary commercial service	not a hub	10,191
Burlington International Airport	Burlington, VT	primary commercial service	small	615,026

Source: Federal Aviation Administration (FAA), 2012

Freight Corridors

Eight freight railroads operate in Vermont and nine operate in New Hampshire. In 2011, 0.7 million tons of freight originated in New Hampshire and Vermont and 2.4 million tons terminated in the two states. In New Hampshire, the two regional and seven local railroads operated 344 miles in 2011. In Vermont, the three regional and five local railroads operated 590 miles.^{78, 79}

Parking at Existing Stations

Parking spaces available at the existing stations are provided below.

⁷⁸ Amtrak. Amtrak Fact Sheet, New Hampshire, 2012

⁷⁹ Amtrak. Amtrak Fact Sheet, Vermont, 2012

Table 4.3-20. Parking Spaces at Existing Stations - Springfield to Canadian Border

Station	Vehicle Parking ^a	
	Parking Available/Accessible Parking	No of Parking Spaces/ No. of Accessible Parking
Brattleboro	No/ No	0
Bellows Falls	Yes/ Yes	10/ NA
Claremont	Yes/ Yes	15/ NA
Windsor	Yes/ No	NA/ 0
White River Jct.	Yes/ Yes	16/ NA
Randolph	Yes/ Yes	NA
Montpelier	Yes/NA	NA
Waterbury	Yes/ Yes	NA
Essex Junction	Yes/ No	8/ 0
St. Albans	Yes/ No	14/ 0

Source: NNEIRI, April 2014, Station Site Assessment & Guidelines.

Note: ^a NA: Not Available

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in direct or indirect impacts to transportation within the Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/Restore Vermonter EA identified beneficial impact on passenger rail transportation with the new service between White River Junction, Vermont and Springfield, Massachusetts on the MassDOT Connecticut River Line. Based on the EA, the project would also have beneficial impacts on freight movements between Massachusetts and Connecticut and on vehicular transportation in the I-91 corridor. The project would require passengers currently using the Amherst station to reroute their trip to Northampton station by traveling on Route 9 from Amherst to Northampton station however, the EA has identified no adverse impact to local traffic patterns. Additionally, both Greenfield and Northampton have identified plans to expand bus service in their municipal transportation plans in order to further facilitate inter-modal transportation.

The NHHS EA identified beneficial impacts to passenger and freight rail services. The project would have increased congestion at nine grade crossings and two intersections, however, the major roadways within the NHHS study area would have an overall reduction in VMT. According to the EA, traffic congestion would be mitigated through roadway and signal

improvements and parking would be increased at the existing stations to support the projected ridership.

The SSX DEIR identified potential impacts resulting from congestion, poor pedestrian LOS, including projected pedestrian congestion on at-grade rail platforms and within the rail head concourse, and increased vehicle trips at the South Station site. The proposed mitigation measures include providing improved pedestrian circulation accommodations, consideration of elevated intercity and commuter rail concourse level, and improving signals, intersection and roadways to address LOS deficiencies, improve traffic flow, reduce queuing and increase pedestrian and bicycle mobility.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

Traffic Analysis

Table 4.3-21 summarizes anticipated traffic movements based upon the above-mentioned methodology. The results provided in the table indicate that the number of traffic movements associated with the NNEIRI service is unlikely to affect traffic operations in the vicinity of the stations. Based upon the assumptions identified in the table notes, the highest peak traffic volume of 30 vehicles (Boston-South Station) should be unnoticed (approximately one vehicle every two minutes in the peak hour) and able to be accommodated by the local roadway system serving the stations.

Table 4.3-21. Projected NNEIRI Traffic Movements

Station	Station Type	2035 Baseline Condition Projected Yearly Ridership	2035 Build Alternative			
			Projected Incremental Increase in Yearly Ridership	Daily Ridership	Daily Vehicle Trips	Peak Hourly Vehicle Trips*
Boston-South Station, MA	Urban Hub**	2,410	117,922	323	121***	30
Boston - Back Bay Station, MA	Urban Hub**	906	23,835	65	24***	6
Framingham, MA	Suburban Hub	262	24,541	67	42	14
Worcester, MA	Urban Intermediate**	1,444	50,126	137	86	28
Palmer, MA	Rural Intermediate	0	9,627	26	16	5

Springfield, MA	Urban Hub**	6,566	33,469	92	57	19
Holyoke, MA	Urban Intermediate**	NA****	28,067	77	48	16
Northampton, MA	Urban Intermediate**	NA****	42,970	118	74	24
Greenfield, MA	Urban Intermediate**	NA****	17,153	47	29	10
Brattleboro, VT	Urban Intermediate**	8,858	16,837	46	29	9
Bellows Falls, VT	Rural Intermediate	2,252	3,607	10	6	2
Claremont, NH	Rural Intermediate	1,015	1,244	3	2	1
Windsor, VT	Rural Intermediate	459	1,203	3	2	1
White River Jct., VT	Urban Intermediate**	6,613	10,225	28	18	6
Randolph, VT	Rural Intermediate	888	1,771	5	3	1
Montpelier, VT	Rural Intermediate	3,219	2,718	7	5	2
Waterbury, VT	Rural Intermediate	2,430	2,934	8	5	2
Essex Junction, VT	Urban Intermediate**	8,841	10,602	29	18	6
St. Albans, VT	Rural Intermediate	1,673	1,727	5	3	1

* Peak hour represents peak boardings representing 25% of total daily boardings

- Automobile occupancy rate of 1.2 persons per vehicle for all assumptions
- Regional Rail (Amtrak)
 - 75% arrive by auto – 25% arrive by other transit
 - Of the auto travelers, 70% private automobile – 30% drop off/pick up
 - No walk or bike
 - Total private automobile – 52.5%
- Given the dynamics of New England rail travel, an estimated 60% of vehicles would stay overnight for an average of two nights.

** Urban Hub and Urban Intermediate stations will exhibit different vehicle trip characteristics due to central city locations, which allow for better accessibility by pedestrians, transit users, high occupancy vehicles, and bicyclists.

*** Vehicle trips for the two Boston stations represent drop off component only.

**** Greenfield, Northampton and Holyoke Stations were not yet open at the time ridership forecasting was prepared.

Parking

The Study Team used ridership forecast for 2035 to determine the number of passenger boardings and modal splits at each station. Engineering judgment, industry standards and previously collected data, where available, were used to determine the number of riders arriving by automobile and, in turn, the number of parking spaces needed for kiss-n-ride and all day parking. Table 4.3-22 summarizes the projected parking requirements for NNEIRI service.

Table 4.3-22. Projected NNEIRI Parking Requirements

Station	Station Type	2035 Baseline Condition Projected Yearly Ridership	2035 Build Alternative				Notes
			Projected Incremental Increase in Yearly Ridership	Existing Spaces	Projected Daily Parking for NNEIRI Services*	Projected Additional Parking Required	
Boston-South Station, MA	Urban Hub**	2,410	117,922	223	NA	None	None
Boston - Back Bay Station, MA	Urban Hub**	906	23,835	220	NA	None	None
Framingham, MA	Suburban Hub	262	24,541	166	66	None	Additional spaces not required. Currently, the average daily utilization of Framingham is 120, with an additional 46 spots needed for NNEIRI services, the parking lot would meet capacity.
Worcester, MA	Urban Intermediate**	1,444	50,126	500	NA	None	None
Palmer, MA	Rural Intermediate	0	9,627	NA	35	35	A new station would need to include sufficient parking to accommodate NNEIRI services.
Springfield, MA	Urban Hub**	6,566	33,469	0	NA	None	None
Holyoke, MA	Urban Intermediate**	NA****	28,067	0	NA	None	None

Northampton, MA	Urban Intermediate**	NA****	42,970	0	NA	None	None
Greenfield, MA	Urban Intermediate**	NA****	17,153	0	NA	None	None
Brattleboro, VT	Urban Intermediate**	8,858	16,837	0	NA	None	None
Bellows Falls, VT	Rural Intermediate	2,252	3,607	6	10	4	Four additional spaces are required to accommodate future intercity rail services. The existing parking lot could be signed to increase the number of spaces for rail users.
Claremont, NH	Rural Intermediate	1,015	1,244	10	5	None	None
Windsor, VT	Rural Intermediate	459	1,203	10	5	None	None
White River Jct., VT	Urban Intermediate**	6,613	10,225	8	NA	None	None
Randolph, VT	Rural Intermediate	888	1,771	0	6	6	A dedicated station parking lot would need to be built to accommodate NNEIRI services with at least 6 spaces.
Montpelier, VT	Rural Intermediate	3,219	2,718	10	8	None	None
Waterbury, VT	Rural Intermediate	2,430	2,934	10	8	None	None
Essex Junction, VT	Urban Intermediate**	8,841	10,602	5	NA	NA	
St. Albans, VT	Rural Intermediate	1,673	1,727	7	6	None	None

* Parking requirements for the NNEIRI were determined based on assumptions outlined for intercity rail service in California through the Anaheim Parking Demand Analysis.⁸⁰ The program includes:

- Automobile occupancy rate of 1.2 persons per vehicle for all assumptions

⁸⁰ Parsons Brinckerhoff. Anaheim Regional Transportation Intermodal Center (ARTIC) Parking Demand Analysis. April 11, 2012.
http://www.anaheim.net/docs_agend/questys_pub/MG37952/AS37991/AS37996/AS37998/AI39313/DO39336/DO_39336.pdf

- *Regional Rail (Amtrak)*
 - 75% arrive by auto – 25% arrive by other transit
 - Of the auto travelers, 70% private automobile – 30% drop off/pick up
 - No walk or bike
 - Total private automobile – 52.5%
- *Given the dynamics of New England rail travel, an estimated 60% of vehicles will stay overnight for an average of two nights.*

*** Urban Hub and Urban Intermediate stations do not require dedicated station parking due to central city locations, which allow for better accessibility by pedestrians, transit users, high occupancy vehicles, and bicyclists.*

***** Greenfield, Northampton and Holyoke Stations were not yet open at the time ridership forecasting was prepared.*

4.3.13 Use of Energy Resources

This section discusses the impacts to energy resources and consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to energy resources and the relevant regulatory requirements.

Regulatory Requirements

FRA's Procedures for Considering Environmental Impacts states that evaluation of environmental impacts should include a consideration of use of energy resources. Therefore, the Study Team evaluated the proposed NNEIRI transportation improvements to ensure they are consistent with federal and state initiatives to reduce energy consumption.

The applicable state requirements are listed below:

Massachusetts

- 310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation

New Hampshire

- The U.S. Department of Energy's (DOE) State Energy Program (SEP). The Policy, Planning and Energy Security program
- The Electric Power and Renewable Energy program

Vermont

- Title 30 V.S.A Chapter 5, Section 202a: State Energy Policy and 202 b: State Comprehensive Plan.
- Title 30 V.S.A Chapter 89: Renewable Energy Programs
- Vermont's Energy Future - 2011 Comprehensive Energy Plan (CEP)

Methodology

The Study Team estimated diverted vehicle miles traveled (VMT) for the Build Alternative compared to the No-Build service for the analysis year 2035 and used the diverted VMT for estimating the associated change in fuel consumption. Additional train sets utilizing the Corridor would likely be powered by diesel locomotives resulting in the use of diesel fuels. The Study Team estimated the increase in fuel usage associated with the additional passenger train service and reduction in motor vehicle fuel consumption at magnitude level from mode shift information available from the travel demand model.

Existing Conditions

This section summarizes existing conditions along the Corridor. Amtrak’s “Monthly Performance Report for February, 2015” (03/31/2015) calculates the latest fuel usage rate at 2.3 diesel gallons per train mile. Applied to each route segment, the average fuel usage per trip yields the following results:

- Boston to Springfield: 98.7 miles x 2.3 diesel gallons per mile = 227 diesel gallons per trip
- Springfield to Canadian Border: 258.5 miles x 2.3 diesel gallons per mile = 595 diesel gallons per trip

Information contained in the latest edition of the Oak Ridge National Laboratory Data on Fuel Efficiency – *Transportation Energy Data Book (Edition 33, July 2014, Table 2.12)*⁸¹ provides the following comparative energy data for Amtrak passenger miles and personal vehicle (automobile) passenger miles:

- Intercity (Amtrak) British thermal unit (Btu) per passenger-mile: 2,214
- Automobile Btu per passenger mile: 3,193

The implications of this data are that improved and increased Amtrak service would increase the number of rail passengers and decrease the number of automobile passengers, resulting in future energy savings. The application of these rates to project-specific service improvements, passenger increases and automobile vehicle miles traveled decreases would yield a clearer picture of potential energy usage and benefits associated with the proposed project.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in any additional direct or indirect impacts to energy use along the existing Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor/ Restore Vermonter EA did not evaluate impacts to energy use.

⁸¹ Oak Ridge National Laboratory. Transportation Energy Data Book. Edition 33, July 2014, Table 2.12.

The NHHS EA identified no adverse impacts to energy use. According to the EA, the project would have a positive impact on energy requirements, as increased regional rail ridership would result in a reduction in personal automobile usage and reduced fossil fuel consumption with increased regional rail ridership, particularly during peak hours of travel.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

The proposed NNEIRI service would have a positive impact on energy resources as the improved and increased intercity passenger rail service would increase the number of rail passengers and decrease the number of automobile passengers, resulting in future energy savings.

The Study Team used the diverted vehicle miles traveled (VMT) to estimate the total reduction in energy use as a result of NNEIRI service. Diverting trips from vehicles to passenger rail would reduce the overall VMT and greenhouse gas emissions. To calculate the energy reduction in Btu, the Study Team subtracted the energy used by passenger mile utilizing intercity train service by the amount that would be used if all diverted trips were completed by vehicle (See Table 4.3-23). The Study Team assumed that the reduction in VMT is equal to the increase in intercity rail passenger miles.

NNEIRI service is anticipated to increase ridership on the Corridor by 875,000 passengers per year (an increase of 795,100 riders over Baseline condition), resulting in 113,847,700 diverted vehicle miles traveled. The Build Alternative would result in an estimated energy reduction 111,457 million Btu.

Table 4.3-23. Diverted Vehicle Miles Traveled (VMT) and Reduction in Energy Use

Name	Baseline (current service)	Build Alternative
Total Annual Ridership*	79,900	875,000
Incremental Ridership**		795,800
Total Annual VMT Diverted*		113,847,700
Annual Energy Use Decrease (Million BTUs)		111,457

Notes:

* Only includes ridership in markets north/east/thru Springfield; trips south of Springfield (including all trips within Connecticut and trips between Springfield, Connecticut, and New York/NEC) are NOT included.

** Relative to Baseline (current service only).

During construction, the project would consume energy through the processing of materials and construction activities. Construction impact analysis would be conducted in Tier 2 project level analysis.

4.3.14 Use of Other Natural Resources, Such as Water, Minerals, or Timber

This section discusses the impacts to natural resources, such as water, minerals, or timber and consequences associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to analyze potential impacts to other natural resources, such as water, minerals and timber and the relevant regulatory requirements.

Regulatory Requirements

FRA's Procedures for Considering Environmental Impacts states that evaluation of environmental impacts should include a consideration of use of other natural resources, such as water, minerals or timber assessing any likely irreversible or irretrievable commitments of these resources.

At the state level, the following legislation applies:

Massachusetts

- M.G.L. Title 19 Chapter 132, Section 40

New Hampshire

- New Hampshire Statutes. Title 19-A: Forestry, Chapters 227-G – 227-M

Vermont

- Title 10 V.S.A Chapter 151: State Land Use and Development Plans (Act 250 Statute)

Methodology

Track construction would necessitate the usage of some natural resources including stone ballast, and timber ties. The project proposes the addition of double track and passing sidings in several locations through the Corridor. The Study Team calculated linear miles of the proposed additional track to estimate the usage of natural resources.

Existing Conditions

The existing Corridor uses natural resources in the form of wooden ties, stone ballast, and subgrade materials.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore they would not result in any additional direct or indirect impacts to natural resources along the existing Corridor.

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/ Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor /Restore Vermonter EA did not evaluate impacts to natural resources.

The NHHS EA identified no impacts to irreversible and irretrievable commitment of natural resources.

Build Alternative Consequences

The Build Alternative proposes the addition of a second track or passing siding in several locations throughout the Corridor in order to increase capacity to accommodate additional passenger service. The Build Alternative would provide one new daily round trip between Boston and Montreal, eight new daily round trips between Boston and New Haven and one additional daily round trip between Montreal and New Haven (for a total of two daily round trips).

New track construction typically requires the use of natural resources in the form of wooden ties, stone ballast, and subgrade materials. Use of these resources would be limited to locations where a second track would be added; totaling approximately 69 miles of the 470 mile NNEIRI Corridor.

The majority of second track locations were historically double tracked; the second track was removed at some point in the 20th Century. This significantly diminishes the amount of fill material that would be required for construction since the track is to be restored in its historic location.

Wooden crossties typically have a center to center spacing of approximately 19.5 inches adding up to 3,249 ties per mile.⁸² Therefore, track construction is anticipated to include approximately 225,000 wooden crossties, which are a renewable resource. Stone ballast would be used along the Corridor for the construction of the track; however, its use is not an irreversible or irretrievable commitment of the resource as it is often cleaned and reused in the railroad industry

4.4 CONSTRUCTION PERIOD IMPACTS

This section discusses the potential construction impacts associated with the No-Build and Build Alternatives.

Methodology and Regulatory Requirements

This section summarizes the methodology used to evaluate construction period impacts and the relevant regulatory requirements.

Regulatory Requirements

NEPA and FRA's procedures require consideration of the construction period impacts. Other statutes or guidance applicable to impacts to the various individual environmental resources are identified in this EA and are applicable to construction of the proposed project.

Methodology

Construction period impacts will be more thoroughly described in Tier 2 analysis when actual locations of construction activities are known and engineering and design information is available. The potential construction period impacts of a Tier 2 project following from the Tier 1 NNEIRI Study include train speed restrictions, temporary increase in noise, air quality, water quality, disposal of construction waste, contaminated soils, and utility impacts. These impacts would be temporary and limited to areas where track and station construction would occur.

Potential construction period impacts were assessed for each of the resource categories and were based on construction activities, duration, methodology and sequencing of the construction activities, and construction equipment and use of on-track construction approaches.

No-Build Alternative Consequences

Under the No-Build Alternative, the proposed NNEIRI improvements would not occur, and therefore the project would not result in direct or indirect construction period impacts within the Corridor.

⁸² Railway Tie Association (RTA). Frequently Asked Questions. Webpage accessed in April 2015.
<http://www.rta.org/faqs>

Foreseeable improvements in the Corridor under the No-Build Alternative include the completion of construction activities to support the Knowledge Corridor/Restore Vermonter, the NHHS and the SSX projects.

The Knowledge Corridor /Restore Vermonter EA identified some short-term construction period impacts related to construction phasing, air quality, traffic, noise, utilities, water quality and freight rail traffic. These impacts would be minimized or mitigated through complying with applicable laws, regulations and standard specifications.

The NHHS EA identified some temporary construction period impacts, including fugitive- dust emissions; light pollution during any nighttime construction activity; erosion and sedimentation of wetlands, waterways and reduced quality of surface and ground waters; contaminated materials exposure; business disruptions; and localized increases in traffic volumes, parking relocation and detours to typical traffic patterns. The construction period impacts would be minimized or mitigated through design- and construction-related measures and controls and implementation of plans developed in compliance with applicable state and federal requirements.

The SSX project would have potential construction period related air quality, noise and vibration, site contamination and hazardous material and utility impacts. The demolition and construction activity associated with the SSX project would impact 245 Summer Street and the South Station headhouse. The project will prepare a Construction Management Plan (CMP) that will identify potential BMPs and mitigation measures.

Build Alternative Consequences

Construction-related impacts would be temporary at any given location along the NNEIRI Corridor. Construction duration for track and signal work for rail line, bridge and culvert repairs and station improvement would depend on project scope.

Anticipated Scope of Infrastructure Improvements and Stations

The infrastructure improvements are not anticipated to require significant changes on the existing line between Boston and Worcester. Beginning in Worcester, upgrades would be necessary to accommodate passenger operations and existing freight traffic. Track and other rail infrastructure improvements include the following:

- Ensuring the Corridor includes modern signal and grade crossings systems;
- Track Improvements: Tracks would be upgraded to allow for FRA Class 4 train operations between Worcester and Springfield and Springfield and the Canadian Border, allowing passenger trains to operate up to 79 mph where track geometry allows. The Build Alternative proposes 2 miles of new track, 3 new turnouts, and 1 railroad crossing upgrade.
- Track Capacity Upgrades:
 - The ROW between Worcester and Springfield was historically a double track corridor. However, most of the second track was removed in the mid-20th century. The additional NNEIRI services would require the reconstruction of the second track between Worcester and Springfield in all locations currently single tracked. In addition, one double track location in this segment (Spencer to East Brookfield,

Milepost 59.3 – 63.3) would require an additional siding to accommodate NNEIRI services;

- To accommodate increased passenger service in Vermont, double track would be provided from Brattleboro to Bellows Falls and from St. Albans to Swanton.
- To allow for efficient operations of passenger and freight services, additional passing sidings would be provided in Massachusetts in East Northfield, extending into Vernon, Vermont, and in Roxbury and Randolph in Vermont.
- Installation of Signals: Centralized Traffic Control (CTC) would be added over the areas of the NECR that are currently under Track Warrant Control (TWC). This includes the section from East Northfield, Massachusetts to West River (located in Brattleboro, Vermont) and from White River Junction, Vermont to the Canadian border at Alburgh, Vermont.
- Improvements at existing or new stations in the Corridor include the following:
 - Worcester Union Station: An additional platform would be built to accommodate NNEIRI services. Access from the station to the platform would occur via new vertical access to an existing pedestrian tunnel. New interlockings would be added, tracks would be re-configured and a controlled siding in Worcester would be taken out of service to accommodate the new platform and track configuration;
 - Palmer Station: Potential service to Palmer, Massachusetts would require construction of a new station in the town. The exact location of the station would be determined upon further refinement subsequent to the NNEIRI evaluation process.

Infrastructure improvements that are part of CTDOT's plan for NHHS service between Springfield and New Haven would be utilized as part of the NNEIRI services.

Construction Phasing, Equipment and Staging

Construction work would be staged during nighttime, weekends, or off-peak hours to minimize service outages and disruptions to the traveling public. Transportation agencies, freight companies, and users would be coordinated about any interruptions in service.

Prior to beginning construction, the Contractor would install silt fence along the perimeter of the site where the elevation of the site is higher than the adjacent property. Silt sacks would be installed in the existing catch basin down gradient from the work area.

Trackwork (replacement of ties, etc.) would largely be sited within the existing rail ROW using rail-mounted equipment, which should not involve large quantities of earthwork. Operation of construction vehicles and equipment has the potential to create dust and emit increased levels of noise when earth moving or clearing is required. These vehicles and construction activities also have the potential to emit increased levels of noise that might disturb any adjoining sensitive land uses, such as residential neighborhoods.

Construction work may require temporary use of adjoining parcels of land for staging and storage of construction equipment and materials, if the available ROW is not sufficient. Permits would be obtained for any temporary construction easements and permanent easements on adjoining properties.

Earth-disturbing construction adjacent to water resources and wetlands has the potential to temporarily disturb soils and create siltation in adjoining waterways, which could then

indirectly affect aquatic habitats and water quality. Work in or adjacent to waterways would be closely coordinated with the U.S. Army Corps of Engineers and other regulatory and resource agencies with jurisdiction.

Use of construction equipment in the vicinity of waterways, sensitive water supplies, and aquatic/wildlife habitats would include appropriate safeguards. For instance, spill prevention measures may include use of buffers around protected resources to minimize the possibility of contamination from accidental spills or incidents and appropriate restrictions on locating (or use of secondary containment for) storage of fuels and other potential contaminants. In protected habitats, worker training and education may be warranted to facilitate sightings and protection of rare species.

Though road closures and detours are not anticipated, park officials would be consulted regarding construction activities about temporary closures and detours in the vicinity of parks, trails, and other types of recreational areas to minimize impacts to accessing these resources. Similarly, work affecting agricultural farm fields and uses would be closely coordinated with the property owners to minimize the extent of impacts on agricultural operations and yields.

4.5 INDIRECT AND CUMULATIVE IMPACTS

This section discusses the potential indirect and cumulative impacts associated with the No-Build and Build Alternatives. It summarizes other projects, including a summary of past, present, and reasonably foreseeable future projects (transportation and others) in the Corridor, the actual or potential direct environmental impacts of those projects, and how those impacts combined with potential direct impacts of the NNEIRI Study may contribute to a cumulative effect on a particular resource or area of concern.

Methodology and Regulatory Requirements

This section summarizes the methodology used to evaluate indirect and cumulative impacts and the regulatory requirements.

Regulatory Requirements

NEPA requires federal agencies to consider the indirect and cumulative impacts of federal actions. Indirect effects and cumulative impacts are defined in CEQ regulations in, respectively, 40 CFR 1508.7 and 1508.8, as follows:⁸³

“Indirect effects, are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”

⁸³ Council of Environmental Quality Regulations for Implementing NEPA, 40 CFR 1508.7 and 1508.8, December 21, 1984.

"Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Thus cumulative impacts include the direct and indirect impacts of a project together with the impacts from reasonably foreseeable future actions of other projects.

Methodology

The indirect impacts were qualitatively addressed for the program on a generalized basis. The baseline for evaluating potential indirect impacts is the existing and reasonably foreseeable expected environment, which is described in the No-Build Alternative. The indirect impacts for the project were identified for each resource in the corresponding section for the particular resource.

Cumulative impacts need to be analyzed in terms of the specific resource or ecosystem being impacted. The Study Team conducted the cumulative impact assessment by identifying the environmental resources that are likely to have potential beneficial or adverse direct and indirect impacts from NNEIRI Build Alternative. Then the Study Team researched state and federal transportation plans and projects in the NNEIRI Corridor. The projects that are recently completed or underway under No-Build Alternative were included for cumulative impacts analysis. The environmental resources on which the NNEIRI program would have no direct or indirect impact are not considered in the analysis as they would not contribute to a cumulative impact along the Corridor.

No-Build Alternative Consequences

The No-Build Alternative would result in a slight secondary impact. The lack of increased passenger rail service would reduce the economic competitiveness of the municipalities within the Corridor and would not contribute to economic development. Mobility and mode choice would not be improved, resulting in a stagnation of transportation options and maintaining the need for many to drive single-occupant passenger vehicles that contribute to greater congestion and emissions. Potential land use changes designed to encourage transit-oriented development or, at a minimum, higher density/less sprawl, would be thwarted. Healthy transportation options associated with these measures would not be supported by the No-Build Alternative. Healthy transportation options as defined by MassDOT's GreenDOT Policy are walking, bicycling and taking public transit.⁸⁴

Build Alternative Consequences

This section discusses the potential indirect and cumulative impacts associated with the Build Alternative.

⁸⁴ Safer People, Safer Streets: Pedestrian and Bicycle Safety Initiative. 10.28.15.
<https://www.transportation.gov/safer-people-safer-streets>

Indirect Impacts

The Build Alternative would result in beneficial indirect impacts by creating opportunities for communities to implement healthy transportation options (walking, bicycling, and taking public transit as defined by USDOT’s Safer People, Safer Streets: Pedestrian and Bicycle Safety Initiative) associated with transit-oriented development, increased mode choice and reduction of dependence on single-occupant passenger vehicle use. Byproducts of these opportunities include reduced traffic congestion and reduced vehicle emissions. Increased service would provide flexibility for workers with non-traditional schedules, for visitors and tourists, and would provide potential economic benefits to businesses serving those populations.

Cumulative Impacts

Cumulative impacts of the Build Alternative include benefits attributed to a further strengthened transportation network. NNEIRI implementation would build on a number of improvements (listed below) that together extend mobility improvements and mode choice options through a large area of New England. The increased opportunities for communities to encourage smart growth land use patterns, transit-oriented development and healthy transportation options (walking, bicycling, and taking public transit as defined by MassDOT’s GreenDOT Policy) would translate to stronger economic development in locations throughout the Corridor. Taken together, these improvements would reduce regional congestion, vehicle emissions, and reduce the need for infrastructure improvements associated with single-occupant vehicle travel and land use sprawl.

The Study Team reviewed state and federal transportation plans and projects to identify those with the potential to contribute to cumulative impacts within the NNEIRI Study Area. A summary of recent past, ongoing, and reasonably foreseeable future plans and projects (transportation and others) is provided below (Table 4.5-1). They include intercity and commuter rail, transit, and freight rail. Several of the projects were the subject of separate environmental reviews recently completed or underway at the time of this EA. Many of the projects are included in the NNEIRI No-Build Alternative and provide infrastructure and services supportive of the NNEIRI Build Alternative.

Table 4.5-1. Other Transportation Plans and Projects in the Corridor

Project	Description	Current Status
State Level Transportation Plans and Projects		
South Station Expansion Project, Boston, MA	Addition of seven new tracks and four new platforms, reconfiguration of several existing tracks and platforms, interlockings, train layover facilities, and passenger waiting space. ⁸⁵	DEIR was submitted on October 31, 2014 and MEPA Certificate was issued on December 31, 2014. MassDOT received a FY11 grant under FRA’s High Speed Intercity Passenger Rail (HSIPR) Program to complete preliminary

⁸⁵ South Station Expansion Project, Boston, Massachusetts. DEIR. October 2014.

Project	Description	Current Status
		engineering and environmental analysis for expansion at South Station to address anticipated capacity needs for intercity rail operations; an EA is currently being prepared.
Boston Landing Commuter Rail Station, Allston, MA	A new commuter rail station associated with a 1.4 million square foot development in Allston, MA is being constructed along the line for use by the MBTA Worcester Line service.	Construction is underway with a station opening anticipated in late 2016.
Boston-Worcester Commuter Rail Service, Massachusetts	Improve frequencies on the line by adding 20 new weekday commuter rail trips to Worcester. ⁸⁶ Framingham/Worcester Commuter Rail Line would benefit from MBTA's plan to acquire new commuter rail equipment. The acquisitions include 75 new bi-level passenger coaches and new locomotives. ⁸⁷	Expanded commuter rail service on the line has been implemented in coordination with supportive projects completed or underway such as double tracking the main line through the former Beacon Park Yard.
New Haven-Hartford-Springfield (NHHS) Project, Connecticut and Massachusetts	Expansion of rail service on the 62-mile New Haven-Hartford-Springfield Corridor, 25 miles of double track, rebuilding and improving existing stations.	FRA, in coordination with CTDOT, completed a hybrid Tier 1/Tier 2 EA for the project and FRA signed a FONSI on August 9, 2012. Tier 2 NEPA compliance for Phase 3B of the project (between Windsor and Springfield) will be undertaken prior to the release of construction funding for this phase of the project. Similarly, site-specific compliance and documentation will be undertaken for four planned stations along the NHHS corridor. ⁸⁸ The Connecticut Department of Transportation is seeking a service provider to operate the Hartford Line Commuter Service beginning in late 2016.
Knowledge Corridor/ Restore the Vermonter	Improve passenger service to Amtrak's Vermonter service by restoring the route to	FRA, in coordination with MassDOT, completed an EA for

⁸⁶ Massachusetts State Rail Plan, Page 5-6. <https://www.massdot.state.ma.us/transit/RailPlan.aspx>

⁸⁷ Ibid.

⁸⁸ New Haven-Hartford-Springfield High Speed Intercity Passenger Rail Corridor Program. Finding of No Significant Impact (FONSI). <https://www.fra.dot.gov/Page/P0433> and NHHS project website: <http://www.nhhsrail.com/>

Project	Description	Current Status
Improvements, Massachusetts	the Connecticut River line, which is shorter and more direct.	the project and FRA signed a FONSI on February 15, 2011. Inaugural run of the Vermonter service on the Knowledge Corridor occurred on December 22, 2014.
Program for Mass Transportation (PMT) – MBTA’s long-range capital planning document	The Program for Mass Transportation (PMT) is the Massachusetts Bay Transportation Authority’s long-range capital planning document; defining a 25-year vision for public transportation in eastern Massachusetts. In addition to supporting regional planning, the PMT provides input into to the statewide, multimodal, long-range transportation plan developed by the Massachusetts Department of Transportation.	Development of the PMT, named Focus40, commenced in 2015.
MassDOT Regional Bus Buildout Plan	Intercity and commuter bus study, provide MassDOT with information related to what the future bus network shall be, focusing on routes that terminate, focusing on routes that terminate, derive from or pass through Massachusetts. It evaluates whether all Massachusetts municipalities are being served adequately with either intercity or commuter bus service. The study would develop a list of alternative routings and recommended improvements/changes.	Study commenced in 2015.
Statewide Freight Plan (Massachusetts Department of Transportation Freight Plan, September 2010) ⁸⁹	Analysis of the Commonwealth’s freight transportation system its operations, and effect on economic development and quality of life. The State Freight Plan is multi-modal (includes air, rail, truck and maritime transport) and intermodal (transportation by more than one mode, e.g. truck and rail) in its scope, analysis, and recommendations.	Completed in 2010.
Massachusetts Statewide Rail Plan (Massachusetts Department of Transportation Rail Plan, September 2010) ⁹⁰	The plan includes analysis of the Commonwealth’s overall rail system and guides its rail investments and programs, while serving as a vital tool for planners and legislators.	Completed in 2010. An update is expected to commence in 2015.
Union Station, Springfield,	The Springfield Redevelopment Authority (SRA) is restoring the main station building	FTA, in coordination with MassDOT, completed an EA for

⁸⁹ Massachusetts Department of Transportation Freight Plan, September 2010.
<https://www.massdot.state.ma.us/planning/Main/StatewidePlans/FreightPlan.aspx>

⁹⁰ Massachusetts Department of Transportation Rail Plan, September 2010.
<https://www.massdot.state.ma.us/portals/12/docs/RailPlan/MAStateRailPlanSeptember2010v4.pdf>

Project	Description	Current Status
Massachusetts	– including its central concourse and passenger tunnel – and creating new vertical access points between the tunnel and platforms. Additionally, a new bus terminal with intercity service and a parking garage would be integrated into the station.	the project and signed a FONSI on June 05, 2000. The project is now in the construction phase. Expected to open in the Fall of 2016.
Union Station Track and Platform Improvements, Springfield, MA	Massachusetts Department of Transportation is making accessibility improvements to the platforms and platform access at Union Station.	The project is in the final design stage, with construction anticipated in 2016.
VTrans Rail Initiative Studies (New England Central)	The State of Vermont improved track, roadbed, grade crossings, and bridges along a 190 mile-route in Vermont. The project has resulted in travel time savings, increased speeds, greater reliability, improved safety and freight capacity and the potential for more frequent trains in the future	Completed
NECR ARRA and TIGER improvements, Vermont	\$52 million American Recovery and Reinvestment Act (ARRA) funding grant to upgrade the NECR ROW through Vermont with approximately 140 miles of new continuous welded rail (CWR), new ties, rail crossing improvements, bridge improvements, and other upgrades between the Massachusetts/Vermont border and St. Albans, VT. In addition, the NECR received a \$7.9 million grant under the USDOT's TIGER 2012 Program to rehabilitate the 20 miles of railroad between St. Albans and the U.S./Canada border.	Improvement projects are completed or underway.
Federal Level Transportation Projects		
Northeast Corridor (NEC) Future Study	A comprehensive planning effort to define, evaluate and prioritize future investments in the Northeast Corridor, a route between Boston and Washington, and the most heavily traveled rail corridor in the U.S.	Tier 1 Draft EIS was published in November 2015. Tier 1 Final EIS and Record of Decision (ROD) are expected to be completed in 2016, followed by the SDP in 2017.

The environmental resources that are likely to have potential cumulative impacts due to the direct and indirect impacts from NNEIRI Build Alternative include:

- Air quality
- Noise and vibration
- Flood hazards and floodplain management
- Water quality
- Wetlands
- Land Use

- Ecological Systems, threatened and endangered species, and wildlife
- Socioeconomic and environmental justice
- Aesthetics and design quality
- Construction period impacts

Cumulative impacts relative to the NNEIRI Build Alternative associated with rail projects, including Knowledge Corridor/ Restore the Vermonter, NHHS and South Station Expansion projects are briefly discussed below and summarized in Table 4.5-2. These projects include improvements that are recently completed, underway or under development at various stages of planning.

The NNEIRI Build Alternative and these rail projects are occurring either in existing ROW or adjacent to existing ROW, and in areas that have been previously disturbed. Additionally, the impacts due to improvements on the NNEIRI Corridor are expected to be minor because most of the work is associated with restoration of the second track in a historically double tracked corridor. As a result, the cumulative impacts of the NNEIRI Build Alternative to the resources listed above are expected to be relatively small or negligible when considered with impacts from other projects in those areas. The study areas of the NNEIRI program, Knowledge Corridor/ Restore the Vermonter and the NHHS project are distributed over a very long distance, which further reduces the potential for cumulative impacts.

Collectively, the NNEIRI Build Alternative and the other projects would have beneficial cumulative impacts by improving overall air quality and reducing congestion. Additionally, there would be a beneficial impact on economic development and EJ population in the vicinity of the existing and proposed stations by improving mobility. South Station Expansion project would displace the USPS General Mail Facility jobs; however, many of those jobs are anticipated to be relocated within South Boston. The SSX project does not anticipate a net loss of USPS employment within the Boston area as MassDOT intends to include retail functions of the USPS facility in the terminal expansion.

Under the NNEIRI Build Alternative, the land use throughout the Corridor is likely to remain unchanged since no new layover and maintenance sites are proposed. The only area in the NNEIRI Corridor that may experience land use change is Palmer Station; however, the Study Team anticipates the location of Palmer Station to be consistent with the existing local land use and zoning. The NHHS project would have beneficial cumulative impact at station areas by complementing transit oriented development (TOD) and other improvements. South Station would have land use impact due to the demolition of the USPS General Mail Facility; however, some of the businesses are anticipated to be relocated within the expanded South Station facility.

The NNEIRI Build Alternative and the other projects together are not anticipated to result in significant cumulative impacts on aesthetic and design quality along the Corridor. The NNEIRI program includes one new station and one improved station along the Corridor between Boston and Springfield. The new station location is in Palmer, Massachusetts and all three of the sites being considered are unlikely to have significant impacts. The improved station is at Worcester,

Massachusetts where a new platform would be constructed at Worcester Union Station. The platform would be an island location between tracks and is not anticipated to have visual effects as it would be located in an area historically used for station platforms and would be connected to Worcester Union Station via an elevator and stair to the existing pedestrian tunnel beneath the platform. The NHHS project would have potential adverse impacts to the visual environment in the vicinity of the existing and proposed NHHS rail stations at Wallingford, Berlin, Newington and Windsor in Connecticut. The NHHS project anticipates mitigating the impacts through coordination and design reviews with the communities.

Cumulative impacts on resources such as floodplains, water quality, wetlands, endangered and threatened species, and construction period impacts are likely to be minor. Minimal negative cumulative impacts on noise and vibration would likely occur due to increase in the number and speed of trains. Most of the impacts are in the highly populated and heavily traveled Boston to Springfield segment.

Collectively, the NNEIRI Study and the other transportation projects are not anticipated to have significant cumulative impacts on environmental resources and therefore, the need for Tier 2 analysis for cumulative impacts is not anticipated.

Table 4.5-2. Cumulative Impacts from NNEIRI and Other Projects

Environmental Resources		NNEIRI Study	Other Projects		
			Knowledge Corridor – Restore Vermonter	New Haven Hartford Springfield Project	South Station Expansion Project
4.1.1	Air Quality	A shift to passenger rail expected to reduce VMT (nearly 46,800 metric tons of CO ₂) and improve regional air quality.	Beneficial effects on air quality. 28% decrease in overall air emissions from air pollutants.	Reduction in vehicle miles traveled and improvement of air quality with the shift to public transportation.	Air quality impacts associated with emissions generated by locomotives and intercity buses entering and leaving the Boston South Station terminal, layover facilities and vehicular traffic.
4.1.2	Noise and Vibration	Potential for a total of 435 severe noise impacts, 11,827 moderate noise impacts, and 2,234 vibration annoyance impacts. * Most of the impacts are in the highly populated and heavily traveled Boston to Springfield segment. <i>*Impacts based on worst case scenario, estimates would likely decrease when a more detailed analysis is performed.</i>	Moderate train-horn noise impacts to 203 receptors (mainly residential) and severe horn noise impacts to two residential receptors. Potential vibration impacts are not considered significant because of the limited number of train passing under the proposed alternative. Two noise and vibration benefits.	Severe train-horn noise impacts at 1,847 noise-sensitive receptors and moderate noise impacts at 2767 noise-sensitive receptors at grade crossings and existing and new rail stations. Severe wayside noise impacts to 7 residential receptors and moderate noise impacts to 214 residential receptors. Low to moderate noise impact to Springfield layover and maintenance facility.	Noise impacts at South Station site in Alternative 1 and at Readville Yard 2 layover facility. Typical vibration levels are below the FTA impact criterion.
4.1.3	Flood Hazards and Floodplain Management	Minor impacts possible. Additional track construction would take place within or adjacent to mapped floodplain for approximately 28 miles.	No potential impacts.	Potential impacts to floodplains (10.7 acres), floodways (1.0 acre) and SCELs (2.1 acres) in Connecticut. No impacts to floodplains in Massachusetts.	No potential impacts. All areas of floodplain occurring at the site are currently developed land.

Environmental Resources		NNEIRI Study	Other Projects		
			Knowledge Corridor – Restore Vermonter	New Haven Hartford Springfield Project	South Station Expansion Project
4.2.1	Water Quality	Minor impacts possible. Additional track construction would take place within or adjacent to water resources in MA and VT.	No potential impacts.	No potential impacts to ground water resources. Some potential adverse impacts associated with storm water.	No impacts to surface water quality. Some potential impacts associated with storm water.
4.2.2	Wetlands	Minor impacts possible. Additional track construction would take place within respective state’s mapped wetland buffer area for approximately 13 miles.	Would not result in any temporary or permanent impacts to wetlands.	Approximately 3.9 acres of wetlands along the NHHS rail corridor would be impacted. No wetland impacts are anticipated in Massachusetts.	Approximately 7.9 acres of 100-foot jurisdictional buffer to coastal bank at South Station site.
4.2.3	Ecological Systems, Threatened and Endangered Species, and Wildlife	Minor impacts possible. Additional track construction would take place within or adjacent to endangered species habitat for approximately 16 miles.	No potential impacts.	No potential impacts in Massachusetts. In Connecticut, as many as 18 Connecticut-listed species were identified	No potential impacts.
4.3.1	Land Use, Existing and Planned	No impacts anticipated due to use of existing rail corridor. Palmer Station likely to have beneficial impact on economic development.	No potential impacts.	Beneficial impact at station areas by complementing transit oriented development (TOD) and other improvements.	Limited direct land use impacts due to the project because of demolition of the USPS General Mail Facility.

Environmental Resources		NNEIRI Study	Other Projects		
			Knowledge Corridor – Restore Vermonter	New Haven Hartford Springfield Project	South Station Expansion Project
4.3.2	Socioeconomic and Environmental Justice	Potential beneficial impact on economic development and EJ populations in the vicinity of existing and proposed stations is anticipated.	Potential beneficial economic development impacts. Overall benefit to EJ populations in Greenfield and Northampton as a result of improved access.	Beneficial economic impacts due to job creation. Beneficial impact on EJ populations as the project provides new or improved access to regional rail service. Adverse impacts to EJ populations due to increased traffic congestion at several intersections and increased noise levels.	The project would displace approximately 1,000 USPS jobs, which are anticipated to be relocated within South Boston. Benefits to EJ populations by improving accessibility.
4.3.7	Aesthetic and Design Quality Impacts	No impacts anticipated. There may be potential visual impacts at Palmer due to construction of a new station.	NA	Potential adverse impacts to the visual environment at Wallingford, Berlin, Newington and Windsor in CT.	NA
4.4	Construction Period Impacts	Potential temporary impacts. Track work would largely be sited within the existing rail ROW using rail-mounted equipment, and should not involve large quantities of earthwork.	Some short-term construction period impacts related construction phasing, air quality, traffic, noise, utilities, water quality and freight rail traffic.	Some temporary construction period impacts.	Potential construction period related impacts.

4.6 NEXT STEPS

4.6.1 Avoidance, Minimization and Potential Mitigation Measures

The Study Team's efforts to identify potential avoidance, minimization and mitigation measures for impacts of the Build Alternative are summarized below:

Physical Environment

Air Quality

For air quality analysis at this Tier 1 level, the Study Team estimated change in regional VMT as a result of the Build Alternative (section 4.1.1). The analysis predicted that emissions associated with an increase in train frequency would be more than offset by a reduction in vehicle emissions due to motor vehicle trips diverted to NNEIRI service. Therefore, the Study Team anticipates a net benefit to regional air quality. Based on this assessment, mitigation requirements are not anticipated.

If the project advances to Tier 2, design details would be developed by the project proponent (i.e., transportation agency such as MassDOT or VTrans) and more detailed air quality analysis can be conducted. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would be required to comply with the EPA's Conformity Rule (40 CFR Part 93). If the Tier 2 project is not included in the State Implementation Plan (SIP), an applicability analysis would be conducted to determine if a general conformity analysis is required and would be undertaken in the future as part of the Tier 2 project analysis.

Additionally, hazard information related to climate change (i.e. temperature and precipitation) would be established in Tier 2 project analysis. Based on the results of the climate change impact analysis, potential recommendations may include protecting assets by diverting stormwater away from the infrastructure, elevating the infrastructure, and modifying the sizing of drainage infrastructure.

Noise and Vibration

The noise impact categories for both FRA and FTA guidelines are *no impact*, *moderate impact*, and *severe impact*, and the noise limits associated with these are on a sliding scale (changing with existing background levels). Moderate impacts are normally designated as warranting the consideration of noise mitigation and severe impacts are normally designated as requiring noise mitigation. Potential mitigation measures may include noise barriers, operational changes, stationary wayside horns at grade crossings, horn shrouds on locomotives, and resilient rail fasteners and ties.

The Study Team's analysis at the Tier 1 level included a conservative estimate of the Build Alternative's impacts to noise and vibration sensitive receptors along the Corridor based on the worst case scenario (section 4.1.2). If the project advances to Tier 2, design details would be developed by the project proponent (i.e., transportation agency such as MassDOT or VTrans) and more detailed noise and vibration analysis can be conducted. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the number of potential noise and vibration impacts that may require mitigation. The

Knowledge Corridor noise and vibration analyses were based on a proposed service with fewer trains and lower speeds than the NNEIRI, so this segment of the NNEIRI Corridor would need to be evaluated further during Tier 2.

Flood Hazards and Floodplain Management

During the Tier 1 analysis, the Study Team identified locations where construction activities are proposed within 100-year and 500-year floodplain (section 4.1.3). If the project advances to Tier 2, design details would be developed by the project proponent (i.e., transportation agency such as MassDOT or VTrans) and every effort would be made to avoid and minimize addition of fill material to floodplains that would result in a loss of flood storage capacity. Potential impacts to floodplains would require further assessment and agency coordination to determine whether mitigation measures are necessary. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the floodplain impacts that may require mitigation. This would occur at the Tier 2, or project level.

Mitigation measures would follow a hierarchy of avoidance, minimization, and compensatory mitigation for impacts to floodways and floodplains. Where adverse impacts cannot be avoided, mitigation would be developed in coordination with the MassDEP, VTDEC, and USACE during the Floodplain Management Certification (FMC) application. Where new structures or fill would result in loss of flood storage volumes, compensatory mitigation can be provided by constructing a detention/retention basin that provides enough storage capacity to handle runoff and any lost flood storage capacity.

Coastal Zone Management

The Study Team determined the Build Alternative would not result in any direct or indirect impacts to Coastal Zone Management Areas. Therefore, mitigation measures are not anticipated.

Biological Environment

Water Quality

The Study Team's Tier 1 analysis identified water quality resources in the vicinity of second track locations proposed under the Build Alternative. Potential impacts to groundwater supply protection areas and surface water protection areas were identified in Massachusetts and Vermont (section 4.2.1). All construction activities in these locations would comply with the applicable storm water quality manual and handbooks and erosion and sedimentation control guidelines to minimize and avoid potential water quality impacts. Best management practices for erosion and sedimentation control would be followed during the period of active construction to reduce water quality impacts.

During Tier 2, design details would be developed to avoid or reduce potential water quality impacts associated with the Build Alternative. The Tier 2 project proponent(s) (e.g., MassDOT, VTrans) would coordinate with VTDEC and MassDEP for final designs and permits. All construction activities would comply with the 2002 Vermont Stormwater Management Manual and the 2008 Massachusetts Stormwater Handbook. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine

the water quality impacts that may require mitigation. This would occur at the Tier 2, or project level.

Wetlands

The Build Alternative may impact wetlands in locations where a second track or passing siding is proposed. The Study Team identified locations where construction would take place within MassDEP and VTDEC defined wetland buffer areas (section 4.2.2). If the project advances to Tier 2, design details would be developed by the project proponent (e.g., MassDOT, VTrans) and every effort would be made to avoid and minimize wetland impacts. The Tier 2 project proponent(s) would coordinate with VTDEC and MassDEP for final designs and permits. A future Tier 2 Study Team would conduct wetlands assessment for construction of a new Palmer Station.

If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the wetland impacts that may require mitigation. If wetland impacts cannot be avoided compensatory mitigation measures would be required. The Tier 2 project proponent(s) would develop a wetland mitigation plan in coordination with USACE, MassDEP, and VTDEC following guidelines set forth in the USACE *New England District Compensatory Mitigation Guidance* (July 20, 2010). Compensatory mitigation measures include restoration, creation, and enhancement, preservation of wetlands and in lieu fee (preferred method of mitigation in Vermont) to compensate for the lost acreage, type and functions-values of the impacted wetlands.

Ecological Systems, Threatened and Endangered Species

The Study Team's Tier 1 analysis included the identification of endangered and threatened species and habitat in locations of proposed construction activities under the Build Alternative (section 4.2.3). These locations would be the focus areas for Tier 2 project level analysis, at which time the project proponent (i.e., transportation agency such as MassDOT or VTrans) would confirm records of federal- or state-listed species with the appropriate resource agencies (i.e., USFWS, NMFS, Massachusetts NHESP, New Hampshire Fish and Game Department, and VFWD) to determine if protected species or designated critical habitat are actually present in areas where NNEIRI project activities are proposed. Field surveys may also be necessary.

If protected species or habitat is present and impacts are identified, consultation with the appropriate agencies would be conducted. If federal funding is provided for Tier 2 NNEIRI projects, this would include consultation between FRA or another lead federal agency and USFWS and/or NMFS pursuant to ESA Section 7. This consultation may include the identification of ways to avoid, reduce, or mitigate impacts. Mitigation measures may include but are not limited to the following: pre- and/or post-construction monitoring of wildlife or plant populations, restoration or enhancement of habitat and habitat connectivity, and conservation of habitat through acquisition of development rights.

Human Environment

Land Use, Existing and Planned

Because the proposed improvements under the Build Alternative would occur within the existing rail corridor, the Study Team does not anticipate land use impacts. Therefore, mitigation measures are not anticipated for activities within the rail ROW.

During Tier 2, more details relating to the design of a new Palmer Station and a platform at Worcester Union Station would likely be developed by the project proponent (i.e., MassDOT, VTrans). Local and regional planning would be considered as the design progresses. The Tier 2 project proponent(s) would coordinate with the affected municipalities to ensure compatibility with present and future land uses.

Socioeconomic and Environmental Justice

The Study Team determined the Build Alternative would result in a positive impact to environmental justice communities in the vicinity of stations due to improved mobility option. The Study Team did not identify any negative impacts to EJ communities in the Tier 1 level analysis. Therefore, mitigations measures are not anticipated.

Upon completion of engineering plans, additional EJ analysis would be conducted by the project proponent. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the impacts to EJ communities. Any potential mitigation measures if required would be determined during the Tier 2 project level analysis. Until that time, the NNEIRI Study would continue to ensure that the level and quality of planned services would continue in a nondiscriminatory manner, no matter which alternative is progressed and promote full and fair participation in decision-making without regard to race, color, or national origin.

Possible Barriers to Elderly and Handicapped

The Study Team determined that the Build Alternative would not create any additional possible barriers to the elderly and handicapped persons therefore, the Build Alternative would not result in any potential direct or indirect negative impacts and that no potential mitigation measures are anticipated.

Public Health and Safety

The Study Team did not identify negative impacts to public health and safety as a result of the Build Alternative. The Corridor is a currently active railroad and has safety measures in place. The Build Alternative also includes improvements to some signals and grade crossings resulting in a benefit to public health and safety. Therefore, mitigation measures are not anticipated.

Hazardous Materials

The Study Team did not identify any currently active hazardous material waste sites in locations along the Corridor. However, if hazardous materials are encountered during construction, the project proponent (i.e., MassDOT or VTrans) would coordinate with the MassDEP and the VTDEC to comply with all applicable regulations. In Massachusetts, the Massachusetts Contingency plan would be followed, and in Vermont, the Vermont

Contingency Plan would be followed. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the impacts that may require mitigation. If required, mitigation measures may include soil samples to determine the nature and location of contaminated soil, contaminated soil storage techniques that contain run-off, use and distribution of material within final ROW that contains run-off, and requirements for transporting and disposing of unused contaminated materials.

Solid Waste Disposal

The Study Team determined the Build Alternative would not directly or indirectly impact landfill areas. Therefore, mitigation measures are not anticipated.

Aesthetic and Design Quality Impacts

Because the proposed improvements under the Build Alternative would occur within the existing rail corridor, the Study Team does not anticipate aesthetic or design quality impacts. Therefore, mitigation measures are not anticipated for activities within the rail ROW.

During Tier 2, more details relating to the design of a new Palmer Station and a platform at Worcester Union Station would likely be developed by the project proponent (i.e., MassDOT, VTrans). At that time, further analysis would be conducted to determine any adverse visual impacts. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the impacts that may require mitigation. If impacts are identified the FRA or other lead federal agency would determine mitigation strategies such as landscaping to screen views of adverse impacts or use of building materials consistent with the surrounding area.

Cultural Resources and Historic Properties

During Tier 2, once the design has advanced, additional data may be collected regarding properties that may be eligible for the National Register. These properties may include historic buildings, structures, sites, objects and districts not yet evaluated for National Register listing; railway infrastructure such as bridges, culverts, bridges, freight houses, signal towers, and wayside railroad features; and archaeological sites. A Programmatic Agreement may be developed between FRA, the Massachusetts Historical Commission, the Vermont Division for Historic Preservation, and the New Hampshire Division of Historical Resources, ACHP, and other consulting parties to specify the documentation requirements, review procedures, and scheduling and sequencing of decisions for compliance under Tier 2. If it is determined during Tier 2 that the NNEIRI program would result in adverse effects to National Register-listed or eligible properties, measures to avoid, minimize or mitigate the effects would be developed through consultation with the Massachusetts, New Hampshire and Vermont SHPOs and other consulting parties.

The Section 106 process would be followed if construction of the Build Alternative receives federal funding or permits. This would involve defining the project Area of Potential Effects (APE), further identification of historic properties, assessment of effects, and resolution of adverse effects by FRA or another lead federal agency in consultation with the MA, NH and/or VT SHPOs and other consulting parties as appropriate.

Use of 4(f) Protected Properties

During Tier 2, once the design has been advanced by the project proponent(s), additional data may be collected regarding 4(f) properties. These properties may include historic buildings, structures, sites, objects and districts not yet evaluated for National Register listing; railway infrastructure such as bridges, culverts, bridges, freight houses, signal towers, and wayside railroad features; and archaeological sites. Information may also be collected on the hours of operation, public programs, and use of potential 4(f) parks, recreation areas, and wildlife refuges.

If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine if a 4(f) use would occur. If it is determined that a 4(f) use would occur, a 4(f) Evaluation would be completed. If FRA determines that there is no prudent and feasible alternative, the project would include all reasonable measures to minimize harm to any 4(f) properties or mitigate impacts. Department of the Interior (DOI) and relevant state and local officials, including officials with jurisdiction as defined in the Section 4(f) regulations (e.g. SHPOs, refuge managers, park directors) would be coordinated for final determination of whether Section 4(f) properties would be affected. This assessment would occur in Tier 2.

Use of Section 6(f) Lands

If the project advances to Tier 2, design details would be developed by the project proponent(s) and additional data may be collected regarding Section 6(f) properties. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine if a 6(f) conversion would occur. If it is determined during Tier 2 that the NNEIRI-related projects would result in the conversion of a Section 6(f) property, a request for approval of that conversion would need to be submitted by the project proponent(s) to the National Park Service. The request would be made through the state agency with Section 6(f) oversight; in this case the Massachusetts Department of Conservation and Recreation (DCR) for properties located in Massachusetts; the Vermont Department of Forests, Parks and Recreation for properties located in Vermont; and the New Hampshire Department of Resources and Economic Development (DRED) for properties located in New Hampshire. Such request would include details of the proposal to substitute the converted Section 6(f) land with other property of equivalent usefulness and location and with equal or better fair market value.

Recreational Opportunities

Since there would be no impacts to the recreational opportunities, no mitigation measures are anticipated.

Transportation

Given the low numbers of traffic movements anticipated at each station, it is unlikely that traffic mitigation would be required. If the project advances to Tier 2, design details would be developed by the project proponent(s). A future Tier 2 Study Team would collect additional data and would conduct further traffic impact analysis around stations. If federal funding is

provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the impacts that may require mitigation.

All construction activities would be coordinated with impacted rail operators along the Corridor including CSX, NECR, MBTA, and MassDOT to minimize and avoid potential impacts.

Use of Energy Resources

Since the Build Alternative would not result in any adverse impacts, no potential mitigation measures are anticipated. If the project advances to Tier 2, design details would be developed by the project proponent(s) and construction impact analysis would be conducted.

Use of Other Natural Resources Such as Water, Minerals, or Timber

The Study Team determined the Build Alternative would not result in irreversible or irretrievable commitment of other natural resources. Therefore, mitigation measures are not anticipated.

Construction Period Impacts

If the project advances to Tier 2, design details would be developed by the project proponent(s) and the duration, sequence and extent of the construction activities, including the need for temporary road closures and detours would be identified and staging plans would be developed. If federal funding is provided for Tier 2 NNEIRI-related projects, FRA or another lead federal agency would more precisely determine the extent of construction period impacts that may require mitigation measures.

MBTA, Amtrak, CSX and NECR as well as state and local agencies, including MassDOT, MassDEP, VTrans, and NHDOT would be coordinated for developing appropriate construction-phasing plans to avoid, minimize or mitigate temporary impacts. Following construction, temporarily impacted natural resources would be restored to their pre-construction conditions, and construction staging areas would be graded to provide natural drainage and would be replanted.

During final design and construction, the project proponent(s) would follow the Best Management Practices (BMPs) for track restoration, construction of rail siding, bridge and culvert repair and replacement and station improvements. These BMPs include design features to properly manage storm water during and after construction, as well as temporary measures to minimize direct and indirect impacts during construction.

Potential construction related impacts and proposed mitigation measures to be employed are summarized in below:

Noise: Maintain mufflers on construction equipment, limit nighttime construction and keep truck idling to a minimum.

Vibration: Piles for structures installed using augered holes in lieu of pile drivers.

Dust and Odor: Dust control measures such as water and calcium chloride applied on a periodic basis to control dust and odors.

Nuisance: Limit noisy activities near residential neighborhoods to daytime and weekday hours to the extent possible.

Vehicle Emissions: Keep truck idling to a minimum.

Construction Debris: Require discarded material, rubbish or debris removed from the work site and disposed.

Construction-related Traffic: Multiple access points to the project site provided. Most of the project elements lie within a railroad ROW, apart from local traffic.

Indirect and Cumulative Impacts

Since there are no negative cumulative impacts from the NNEIRI Study along with reasonably foreseeable actions, no mitigation measures are anticipated.

4.6.2 NEPA Tier 2 Analysis

The NEPA analysis conducted for the NNEIRI Study is a Tier 1 Service Level EA. It concludes that the potential for significant adverse impacts in the Corridor is low, in large part due to the use of existing operating rail lines within existing rights of way, and the proposed infrastructure improvements being located within alignments that were in the past double or triple track. As individual projects are identified and refined, such as restoration of the second mainline track between Worcester and Springfield, a NEPA Tier 2 analysis would be necessary to identify project specific impacts. Potential project specific impacts are possible in key NEPA categories, including:

Physical Environment

- Air Quality – During Tier 2, additional analysis would be required to determine key air quality parameters. The analysis would include increased congestion close to stations, change in regional vehicle-miles-traveled, and impact of railroad sidings near sensitive receptors. The data collected and analyzed would determine the impacts on the quality of the air in the region and surrounding areas and identify if mitigation is required and what those measures would be.
- Noise and Vibration- In Tier 1, this category was evaluated with a mix of screening and general assessment analyses that would be further explored in Tier 2. The second analysis would include Category 1 receptors and the number of potential noise and vibration impacts that would require the consideration of mitigation measures.
- Flood Hazards- Impacts to floodplains would require further assessment and agency coordination to identify possible avoidance/minimization measures during Tier 2.

Biological Environment

- Water Quality - Resource agencies would be coordinated with regarding permits and design details about potential impacts that have to be assessed in Tier 2.
- Wetlands - Potential impacts to wetlands require further assessment at Tier 2 when precise location and design information is available, including the location of the

- proposed station in Palmer. Any compensatory mitigation measures, including restoration, creation and enhancement, would be subject to state and federal permitting requirements if potential wetland impacts have been minimized.
- Ecological Systems, Threatened and Endangered Species and Wildlife - In the areas that where the addition of a second track, the Massachusetts Natural Heritage and Endangered Species Program (NHESP) mapped the potential endangered species habitats adjacent to the proposed track. In areas where a second track is proposed, possible endangered species in the area were closely examined by the NHESP. The Study mapped out where the proposed track coincides with potential endangered species habitats, which determined that construction would have to be reviewed under the applicable state laws.

Human Environment

- Socioeconomic and Environmental Justice - The Tier 2 analysis would include a detailed evaluation of means to avoid or minimize impacts through design and mitigation strategies to offset remaining unavoidable impacts alongside a more detailed examination of potential impacts. It is not possible to determine if there would be significant impacts on the environmental justice communities until more detailed engineering plans are available. Potential mitigation measures, if necessary, would be considered in the Tier 2 project level analysis.
- Aesthetic and Design Quality Impacts - Potential visual impacts would be temporary and limited to the areas where construction would take place. Mitigation measures may include staging of work activities and removing waste as soon as the work is completed to minimize the visual impacts but would be further analyzed in the Tier 2 assessment at the project level.
- Cultural Resources and Historic Properties - The Section 106 process would be followed if construction of the Build Alternative receives federal funding or permits. This would involve defining the project Area of Potential Effects (APE), further identification of historic properties, assessment of effects, and resolution of adverse effects by FRA or another lead federal agency in consultation with the MA, NH and/or VT SHPOs and other consulting parties as appropriate.
- Use of Section 4(f) Protected Properties -The full Section 4(f) analysis would occur during Tier 2 project level analysis to determine impacts to publicly owned parks, recreation areas, wildlife and waterfowl refuges, and public or private historic sites. A 4(f) determination would be made at Tier 2.
- Use of Section 6(f) Lands - The Build Alternative does not anticipate conversion or change in the Section 6(f) properties because the railroad tracks were historically double-tracked and the work related to the Corridor would be conducted within the existing railroad ROW. Coordination with the U.S. Fish and Wildlife Services (USFWS) would occur in Tier 2 and potential mitigation measures would be considered as necessary.

- Transportation - Traffic impacts at local streets near stations as well as road/rail at-grade crossings were reviewed qualitatively based on ridership estimates at each station and annually. Given the low numbers of anticipated traffic movements anticipated at each station, it is unlikely that traffic mitigation would be required.
- Construction Period - During Tier 2, the duration of construction would be better defined and appropriate mitigation measures would be identified. The sequence and extent of construction would be identified and staging plans developed during the final design phases.

If federal funding is involved in specific Tier 2 projects, the lead federal agency would be required to conduct any necessary Tier 2 NEPA analysis.

4.6.3 Coordination

To successfully implement NNEIRI service, close coordination would be essential among the lead state agencies, MassDOT and VTrans, as well as other state or federal agencies providing funding, permits, or approvals.

Coordination during the planning process is essential because of the necessary involvement of five state governments and numerous local governments along the Corridor. These entities would need to coordinate and work together to define the future service in mutually agreeable terms. Massachusetts, Vermont, New Hampshire, Connecticut, and the Province of Quebec, Canada as well as the major cities where there are station stops should concur on the key aspects of governance, funding, and management of the proposed intercity passenger rail system and services.

5 COMMENTS AND COORDINATION

This section summarizes the three State resource coordination meetings, and the comments received from public and other agencies during study development. It discusses how these comments influenced development of the Build Alternative carried forward for analysis in this Tier 1 EA. Public feedback/support and names of local, state and federal agencies and organizations that attended meetings or provided comments are included.

5.1 AGENCY OUTREACH

This section discusses agency scoping and meetings held for the NNEIRI Study in Cambridge, Massachusetts. It summarizes the agency scoping process conducted by MassDOT, VTrans, and FRA.

5.1.1 Scoping

An interagency scoping was conducted by MassDOT, VTrans and FRA in Cambridge, Massachusetts on March 20, 2014. Agencies, including Army Corps of Engineers (USACE), Central Massachusetts Regional Planning Commission (CMRPC), Environmental Protection Agency (EPA), Franklin Regional Council of Governments (FRCOG), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), Metropolitan Area Planning Council (MAPC), Massachusetts Department of Transportation (MassDOT), Pioneer Valley Planning Commission (PVPC), and Vermont Agency of Transportation (VTrans) along with the Study Team participated in the meeting. All agency and Study Team representatives provided introductions. A copy of the Scoping Report and a meeting agenda were handed out to all in attendance.

Federal, state and regional agencies were invited to participate early in the development of the NNEIRI Study, prior to initiating the scoping process. The Study Team developed an overall strategy for Agency and Public Scoping in collaboration with FRA. The strategy included the study's key themes, the Purpose and Need, and the study goals and objectives. Feedback was solicited from federal and state resource agencies regarding their participation in the study process.

Scoping was conducted by taking into consideration that much work has already been completed, including improvements made through the MassDOT Knowledge Corridor - Restore Vermonter Project, improvements to the NECR line through Vermont, upgrades being made to the Springfield-New Haven segment of the Inland Route Service, and improvements planned for the MBTA's Worcester line segment of the Inland Route Service. These plans were inputs to the broader discussion regarding the best and most reasonable alternatives to the problem statement as stated in the Study Initiation Statement.

5.1.2 Milestones

FRA coordinated project milestones with agencies and stakeholders throughout the development of the Tier 1 Service Level EA. Agency input was solicited on Purpose and Need, alternatives development, alternatives to be carried forward for environmental and operations analysis, identification of the Build Alternative, and draft Tier 1 EA document.

FRA sent correspondence to two Cooperating Agencies (USACE and USEPA) on August 24, 2015 providing an update on the NEPA process for the NNEIRI Study.

FRA also sent information packages along with a copy of the cultural resources chapter of the draft Tier 1 EA describing the NNEIRI Build Alternative, and the preliminary APE to the Massachusetts, New Hampshire, Vermont, and Connecticut SHPOs on September 14, 2015. FRA's correspondence with SHPOs emphasized that this is a Tier 1 service level EA, which itself does not have the potential to affect historic properties. Should the study advance to Tier 2 with project activities having the potential to affect historic properties, the lead federal agency (FRA or otherwise) would consult with the appropriate SHPO(s) and other consulting parties pursuant to Section 106.

5.2 TRIBAL OUTREACH

Tribal outreach would be conducted should the study advance to Tier 2 with project activities having the potential to impact tribal land or resources or properties of significance to tribes.

5.3 STAKEHOLDER OUTREACH

A Stakeholder Committee was formed to provide oversight, direction and primary product review for the study. The committee is comprised of key members including MassDOT, Connecticut Department of Transportation, the Vermont Agency of Transportation, Québec Ministry of Transportation, New Hampshire Department of Transportation, the Federal Railroad Administration, Amtrak, the Massachusetts Bay Transportation Authority, Metropolitan Transportation Authority Metro-North Railroad (Metro-North), CSX, New England Central Railroad, Pan Am Southern, LLC (PAS), Canadian National Railway and thirteen regional planning commissions located in the Commonwealth of Massachusetts, State of Vermont, Connecticut and New Hampshire.

The Study Team used feedback from stakeholder meetings to develop the Build Alternative. Public participation was integrated into the study process through a Stakeholder Committee, public outreach meetings, a project website, newsletters/bulletins and coordination with other rail projects such as the New Haven-Hartford-Springfield Project, Vermont Rail Plan and Northeast Corridor Future.

Stakeholder outreach to the public was carried out with the following six major objectives:

- Identify a broad range of stakeholders from all geographic regions of the Corridor.
- Integrate public outreach activities and meetings with key study tasks and key milestones.

- Engage potentially affected communities, including minority and low-income populations, in compliance with the Title VI of the U.S. 1964 Civil Rights Act and Environmental Justice Executive Order 12898, requires targeted outreach.
- Provide written materials and communication to non-English speaking populations. Consider public input. Monitor public comments submitted through the NNEIRI Study website, emails and letters to staff, comment forms received at public meetings, and provide direct responses to questions posed by members of the public.
- Utilize many communication tools. Provide information in multiple formats to reach a broad spectrum of the public.

5.3.1 Outreach Tools

As public outreach tools, three rounds of public information meetings (with two meetings in the first two rounds and three meetings in the final round) were held for the NNEIRI Study to discuss the alternatives screening process and receive comments from the interested public. The public meetings were organized in two formats: (1) in-person open house meetings with formal presentations followed by questions and comments from the public and (2) on-line open house meetings where interested persons could view a presentation and submit comments to the Study Team. In each round, one meeting was held in the northern section of the Corridor (Vermont) and one or two meetings in the southern section of the Corridor (Massachusetts or Connecticut). These meetings were conducted by MassDOT and VTrans. Written communication materials (meeting flyers, media releases, paid newspaper advertisements, and project bulletins) were produced in English and Spanish. A Spanish interpreter was provided at all public meetings held in Massachusetts.

Public meetings were planned around these key study milestones and integrated into the outreach process.

- Meeting #1: Study Scoping
- Meeting #2: End of Alternatives Analysis; Conclusion of development of the Operating and Capital Plans
- Meeting #3: Conclusion of development of SDPs

5.3.2 Stakeholder Committee

Five (5) Stakeholder Committee meetings were conducted by MassDOT and VTrans between December 2013 and June 2015 (see Table 5.3-1). Topics included were review of study goals and objectives, Agency and Stakeholder Involvement Plan, the Existing Conditions Assessment, Purpose and Need, Station Site Assessment and Guidelines, and draft SDPs. In addition, the Study Team presented the Preliminary Service Options Performance Report, the Alternative Analysis Report as well as the Draft Build Alternative. Format for the Stakeholder Committee meetings included a presentation by the Study Team on these key topics in conjunction with questions and discussion by the committee. Attendance at Stakeholder Committee meetings ranged from 30-40 individuals.

The Stakeholder Committee supported the goals and objectives of the study and provided feedback through open discussion during the Committee meetings on all study documents produced, including the Existing Conditions Assessment, Purpose and Need, Station Site

Assessment and Guidelines, Alternative Analysis Report and draft SDPs. The committee was eager to learn about the analysis performed. They asked about assumptions used to project ridership, proposed speeds and frequencies, capital, operating and maintenance costs, how the study coordinated with other projects and studies, how increased passenger service would affect freight operations. Some committee members advocated for stops at specific stations along the designated route and noted the importance of re-establishing the connection to Montreal. Consensus on the Build Alternative was reached in February 2015. Comments received during the scoping meetings are summarized below in Section 5.3.4.

Table 5.3-1. Stakeholder Meetings

Dates	Location	Key Issues
December 18, 2013	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Overview of presentation • Role of the Stakeholders and Public Outreach • Review of Study Scope • Discussion of draft Purpose and Need • Project Schedule and Next Steps
May 7, 2014	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Public Outreach: public meetings, agency meetings, project coordination • Study Analysis Results: Train performance calculations, initial ridership analysis, station assessment • Alternative Development
October 22, 2014	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Upcoming public meetings • Overview of initial options • Alternatives Definition • Alternative Analysis
February 9, 2015	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Project Background • Purpose and Need • Initial Build Alternatives • Draft Build Alternative
June 25, 2015	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Project Development • SDPs

5.3.3 Public Information Meetings

Three rounds (3) of public meetings were held. There were two (2) meetings in each round, except for the third and final round in which there were three (3) public meetings. In January 2014, a meeting was held in White River Junction, Vermont and in Springfield, Massachusetts with approximately 40 and 115 attendees, respectively. In November 2014, a meeting was held in White River Junction, Vermont and in Worcester, Massachusetts, with each drawing

approximately 35 attendees. The final round of meetings occurred in September 2015, in Boston and Springfield, Massachusetts and White River Junction, Vermont. Each drew approximately 15, 50 and 30 attendees, respectively. Documents for the public meetings were made available through the NNEIRI Study website.⁹¹ Table 5.3-2 summarizes the dates, location and key issues of public information meetings.

Table 5.3-2. Public Information Meetings

Dates	Location	Key Issues
January 22, 2014	Hotel Coolidge, White River Junction, VT	<ul style="list-style-type: none"> • Overview of presentation • Discussion of draft Purpose and Need • Project Schedule and Next Steps
January 23, 2014	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Overview of presentation • Discussion of draft Purpose and Need • Project Schedule and Next Steps
November 17, 2014	Hotel Coolidge, White River Junction, VT	<ul style="list-style-type: none"> • Project Background • Initial Options Considered • Alternatives Definition • Alternative Analysis: service, costs, ridership, operations and revenue and environmental
November 19, 2014	Union Station, Worcester, MA	<ul style="list-style-type: none"> • Project Background • Initial Options Considered • Alternatives Definition • Alternative Analysis: service, costs, ridership, operations and revenue and environmental
September 16, 2015	Massachusetts Transportation Building, Boston, MA	<ul style="list-style-type: none"> • Project Background • Project Recommendations • Costs of NNEIRI service • Public Benefits and Next Steps
September 17, 2015	Pioneer Valley Planning Commission, Springfield, MA	<ul style="list-style-type: none"> • Project Background • Project Recommendations • Costs of NNEIRI service • Public Benefits and Next Steps
September 24, 2015	Hotel Coolidge, White River Junction, VT	<ul style="list-style-type: none"> • Project Background • Project Recommendations • Costs of NNEIRI service • Public Benefits and Next Steps

⁹¹ NNEIRI Study website: <http://www.massdot.state.ma.us/northernnewenglandrail/Home.aspx>

While there was public input specific to a region, such as advocacy for the preservation of the Claremont, New Hampshire train station and disappointment that the NNEIRI Study did not focus on increasing passenger service to the Berkshire Region of western Massachusetts, there were many common themes. Many attendees cited the need for more frequent trains, not high speed trains. Better connections to airports and intercity buses are also a critical need. Several people said more trains should be run on existing tracks as soon as possible while plans for track and train set upgrades are implemented. Assumptions used to project ridership and costs were discussed at the public meetings. Attendees offered the opinion that ridership projections were too low. Public views about the cost of establishing new rail service varied. Some thought the projected costs were too high while others thought they were too low because they believed the need to replace infrastructure such as bridges was underestimated.

5.3.4 Public Comments

Structured formats were provided for submitting comments. All comments were diligently logged and reviewed as they were received. Comments were logged in a timely fashion, both during and after the scoping meetings and throughout the scoping comment period, including all comments received through the various available medium including mail, fax, email website or hand deliver.

Twenty-seven (27) written comments have been received since the initiation of the NNEIRI Study. Several were submitted by members of the Stakeholder Committee or by attendees of the public meetings. Many of the comments reiterated themes expressed at previously held meetings such as advocacy for station stops, especially the Claremont, New Hampshire station and at Palmer, Massachusetts. Throughout the study, the Study Team explained how the NNEIRI service would serve these communities as analysis showed that intercity service within the Corridor yielded the majority of the ridership, not the longer end-to-end passenger trip. Members of the public in Southern Vermont advocated for better connections between Brattleboro, Vermont to Boston and to New York City. The NNEIRI service would increase the number of trains operating between these destinations. Several people supported the reconnection of service to Montreal. The NNEIRI service proposed the reconnection of this route. One person recommended extending Amtrak's Downeaster service from Boston to Worcester via the Grand Junction cut off tracks through Cambridge, Massachusetts, a route outside the scope of this study. Interstate bus carrier, Peter Pan Bus Lines, wrote a letter stating the study's "single-mode approach" of focusing only on rail ignores potential transportation improvements such as HOV lanes, Bus Rapid Transit systems, Bus-on-Shoulder lanes and improved park and ride locations.

5.4 FUTURE OPPORTUNITIES FOR INPUT

Additional opportunities for input would be identified as part of any subsequent Tier 2 NEPA review process.

6 REFERENCES AND ACRONYMS

6.1 REFERENCES

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6.2 ACRONYMS

Table 6.2-1. Acronyms

Acronyms	Definition
AAB	Architectural Access Board
Abfd	Architectural Barrier-Free Design
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADA	Americans with Disabilities Act of 1990
ADAAG	U.S. Department of Justice 2010 ADA Standards for Accessible Design
Amtrak	National Railroad Passenger Corporation
ANR	Agency of Natural Resources
APA	Aquifer Protection Areas
APE	Area of Potential Effect
ARRA	American Recovery and Reinvestment Act
ARTIC	Anaheim Regional Transportation Intermodal Center
AUL	activity and use limitation
BEA	Bureau of Economic Analysis
BLM	U.S. Department of the Interior Bureau of Land Management
BMP	best management practice
Btu	British thermal unit
CA	California
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CE	Categorical Exclusion
CEP	Vermont's Energy Future - 2011 Comprehensive Energy Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CMRPC	Central Massachusetts Regional Planning Commission
CN	Canadian National Railway Company
CO	carbon monoxide

Acronyms	Definition
CO ₂	carbon dioxide
Corridor	the entire NNEIRI Corridor
CP	Canadian Pacific
CSXT	CSX Transportation Company
CT	Connecticut
CTC	Centralized Traffic Control
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CWA	Clean Water Act
CWR	continuous welded rail
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
dBA	A-weighted decibels
DCR	Department of Conservation and Recreation
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EEA	Executive Office of Energy and Environmental Affairs
EIE	Environmental Impact Evaluation
EIS	Environmental Impact Statement
EJ	environmental justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	U.S. Endangered Species Act of 1973
ESRI	Environmental Systems Research Institute
et seq.	and the following
FAA	Federal Aviation Administration
FDPA	Flood Disaster Protection Act of 1973
FEMA	Federal Emergency Management Agency
FHWA	U.S. Department of Transportation Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FR	Federal Register
FRA	U.S. Department of Transportation Federal Railroad Administration

Acronyms	Definition
FRCOG	Franklin Regional Council of Governments
ft	foot or feet
FTA	Federal Transit Administration
GBV	Ground-Borne Vibration
GDP	Gross Domestic Product
GHG	(human-generated) greenhouse gas
GIS	Geographic Information System
HSIPR	High-Speed Intercity Passenger Rail
Jct.	Junction
Ldn	day-night average noise level
Leq	equivalent sound level
LOS	level of service
LRTP	long-range transportation plan
LWCF	Land and Water Conservation Fund
M.G.L.	Massachusetts General Laws
MA	Massachusetts
MA NHESP	Massachusetts Natural Heritage and Endangered Species Program
MACZM	Massachusetts Office of Coastal Zone Management
MAPC	Metropolitan Area Planning Council
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MBTA	Massachusetts Bay Transportation Authority
MBTA	Migratory Bird Treaty Act of 1918
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Protection Act
MHC	Massachusetts Historical Commission
MMC	Montreal Maintenance Center
MP	milepost
mph	miles per hour
MPO	metropolitan planning organization
MRLC	Multi-Resolution Land Characteristics Consortium
MSW	municipal solid waste
NAAQS	National Ambient Air Quality Standards
NDDB	Natural Diversity Database

Acronyms	Definition
NEC	New England Central
NECR	New England Central Railroad
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NH	New Hampshire
NHDES	New Hampshire Department of Environmental Services
NHDOT	New Hampshire Department of Transportation
NHHS	New Haven-Hartford-Springfield
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NLEB	northern long-eared bat
NMFS	National Marine Fisheries Service
NNEIRI	Northern New England Interactive Rail Initiative
NNL	National Natural Landmarks
NOAA	National Oceanic and Atmospheric Administration
NO ₂	nitrogen dioxide
NOFA	Notice of Funding Availability
NOI	notice of intent
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	U.S. Department of the Interior National Park Service
NRA	Natural Resources Atlas
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NRHP	National Register of Historic Places
NR	National Register
NRIS	Natural Register Information System
NTP	notice to proceed
NWI	National Wetlands Inventory
NY	New York
O&M	Operations and Maintenance Costs
O ₃	ozone
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons

Acronyms	Definition
PAR	Pan Am Railways
PAS	Pan Am Southern
Pb	lead
PCB	polychlorinated biphenyl
PEM	palustrine forested (wetland)
PEMF	palustrine emergent semi permanently flooded (wetland)
PFO	palustrine emergent (wetland)
PIP	public involvement plan
PL	Public Law
PM ₁₀	particulate matter less than 10 micrometers in diameter
PM _{2.5}	particulate matter less than 2.5 micrometers in diameter
PMT	Program for Mass Transportation
ppm	parts per million
PTC	Positive Train Control
PVPC	Pioneer Valley Planning Commission
RAO	Response Action Outcome
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
ROW	right-of-way
RSA	Revised Statutes Annotated
RTA	Railway Tie Association
RTC	Rail Traffic Controller
SDP	service development plan
SDWA	Safe Drinking Water Act
Section 106	Section 106 of the National Historic Preservation Act of 1996, as amended
Section 4(f)	Section 4(f) of the U.S. Department of Transportation Act of 1966
Section 404	Section 404 of the Clean Water Act, as amended
Section 6(f)	Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act
SEP	State Energy Program
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SSX	South Station Expansion Project
Study	Northern New England Intercity Rail Initiative

Acronyms	Definition
SWL	Solid Waste Landfills
SWPPP	Storm Water Pollution Prevention Plan
TBD	To be determined
T&E	threatened and endangered species
TIGER grant	Transportation Investment Generating Economic Recovery grant
Title VI	Title VI of the Civil Rights Act of 1964
TMDL	total maximum daily load
TOD	Transit Oriented Development
TPC	train performance calculator
TPD	tons per day
TPD	Trains Per Day
TSDF	treatment, storage, disposal facility
TSS	total suspended solids
TWC	Track Warrant Control
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VdB	Vibration Decibels
VFWD	Vermont Fish and Wildlife Department
VMT	vehicle miles traveled
VOC	volatile organic compound
V.S.A.	Vermont Statutes Annotated
VT	Vermont
VTDEC	Vermont Department of Environmental Conservation
VTrans	Vermont Agency of Transportation
WPA	Wellhead Protection Areas
WRD	Water Resources Discipline

6.3 GLOSSARY OF TERMS

Affected Environment- Physical conditions present within the project area that can be identified and would be changed by one or more of the project actions and/or alternatives.

Americans with Disabilities Act of 1990 (ADA)- Federal law prohibiting discrimination against people with disabilities. The legislation requires public entities and public accommodations to provide accessible accommodations for people with disabilities.

Aquifer- An underground layer of water-bearing permeable rock or unconsolidated materials from which groundwater can be extracted using a water well.

Attainment Area- A geographic area in which levels of a criteria pollutant meet the National Ambient Air Quality Standard (NAAQS) for the pollutant.

Best Management Practice (BMP)- A structural and/ or management practice employed before, during, and after construction to protect receiving water quality. These practices either provide techniques to reduce soil erosion or remove sediment and pollutants from surface runoff.

Build Alternative- Based on the alternatives analysis a Build Alternative was developed that meets the project purpose and need. The Build Alternative was used for Tier 1 Analysis.

Capital Costs- Fixed, one-time expenses incurred on the purchase of land, buildings, construction, and equipment in order to complete a project.

Categorical Exclusion (CE)- Actions which: do not induce significant impacts to planned growth or land use for the area; do not require the relocation of significant numbers of people; do not have a significant impact on any natural, cultural, recreational, historic or other resource; do not involve significant air, noise, or water quality impacts; do not have significant impacts on travel patterns; or do not otherwise, either individually or cumulatively, have any significant environmental impacts.

Centralized Traffic Control (CTC)- A form of railway signaling consisting of a centralized train dispatcher's office that controls railroad interlocking and traffic flows.

Clean Water Act of 1972 (CWA)- The Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

Council on Environmental Quality (CEQ)- Council on Environmental Quality coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives.

Cumulative Impacts- Impacts on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

Diverted Vehicle Miles Traveled (Diverted VMT)- The calculated reduction in miles traveled by passenger vehicle as a direct result of mode shift to the proposed train service.

Ecological System- An Ecological system (or ecosystem) is a collection of communities of organisms and the environment in which they live.

Endangered Species- Any species that is in danger of extinction throughout all or in a significant area of its range.

Endangered Species Act of 1973 (ESA)- The ESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found.

Environmental Assessment (EA)- A concise public document that provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It includes brief discussions of the need for the proposal, alternatives, the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

Environmental Impact Statement (EIS)- A document, required under the National Environmental Policy Act (NEPA), prepared for an action (i.e., project) that is likely to have significant impact. This document summarizes the major environmental impacts, outlines issues, examines reasonable alternatives, and arrives at a Record of Decision (ROD), identifying the selected alternative for the project.

Environmental Justice (EJ)- Environmental Justice refers to the fair treatment of minority and low-income populations in environmental decision-making. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994 requires all federal agencies to ensure that their programs, policies, and activities do not result in disproportionately high and adverse human health and environmental impacts on minority and low-income populations.

Finding of No Significant Impact (FONSI)- A document by a federal agency briefly presenting the reasons why an action, not otherwise excluded, would not have a significant effect on the human environment and for which an environmental impact statement therefore would not be prepared.

Floodway- The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Floodway Fringe- The area between the floodway boundary and the limit of the 100-year floodplain.

Federal Emergency Management Agency (FEMA)- A federal agency that regulated federal actions in floodplains.

Federal Railroad Administration (FRA)- Federal Railroad Administration is the agency within the U.S. Department of Transportation that administers financial assistance programs and regulates the operation and safety of freight and passenger rail throughout the United States.

Geographic Information System (GIS)- Data management software tool that enables data to be displayed geographically (i.e., as maps).

Grade Crossing- A location where a highway, road, or street, including associated sidewalks and pathways, crosses railroad tracks at the same level.

Gross Domestic Product (GDP)- One of the major economic indices of the socioeconomic development of a region. GDP is equal to the total of the added values in the regional economic industries, estimated as a difference between production and intermediate consumption.

HSIPR Program- High Speed Intercity Passenger Rail is a federal program that is designed to fund strategic investments in passenger rail corridors that connect communities across the country.

Impaired Waters- Rivers, lakes, or streams that do not meet one or more water quality standards and are considered too polluted for their intended uses.

Incremental Revenue- Increased income as a result of the Build Alternative excluding baseline revenue from the No-Build Alternative.

Incremental Ridership- Increase in number of passengers on the Corridor as a result of the Build Alternative excluding baseline ridership from the No-Build Alternative.

Indirect Impacts- Indirect impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. They may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Inland Route - The existing rail line connecting Boston, Springfield, and New Haven. Owners include the Massachusetts Bay Transportation Authority in eastern Massachusetts, CSX in central and Western Massachusetts, and Amtrak in Connecticut.

Interlocking- An arrangement of signal apparatus that prevents conflicting movements through an arrangement of tracks such as junctions or crossings.

Knowledge Corridor / Restore the Vermonter- Project to restore Amtrak's intercity passenger train service to its original route by relocating the Vermonter from the New England Central Railroad back to its former route on the Connecticut River Line owned and maintained by MassDOT between Springfield and East Northfield, Massachusetts. The NNEIRI Study proposes utilizing this route and takes advantage of recent improvements.

Mitigation- Actions that avoid, minimize, or compensate for potential adverse impacts.

National Ambient Air Quality Standards (NAAQS)- Standards established by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA) that prescribe the level of pollutants in the outside air that cannot be exceeded during a specified time in a specified geographic areas.

National Environmental Policy Act of 1969 (NEPA)- A law enacted in 1969 that established a national environmental policy requiring that any project using federal funding or requiring federal approval, including transportation projects, examine the effects the proposal and alternative choices have on the environment before a decision is made.

National Natural Landmarks (NNL)- Program that recognizes and encourages the conservation of sites that contain outstanding biological and geological resources, regardless of landownership type.

National Register of Historic Places (NRHP)- The official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966.

National Wetlands Inventory (NWI)- A program administered by the U.S. Fish and Wildlife Service (USFWS) for mapping and classifying wetland resources in the United States.

New Haven-Hartford-Springfield (NHHS) Project- Project headed by the Connecticut Department of Transportation to improve capacity, reliability and safety along the NHHS Corridor. The proposed NNEIRI Study would utilize this route and benefit from the improvements.

No-Build Alternative- Used as a benchmark for comparison of the Build Alternative and the determination of impacts. The No-Build includes all ongoing and currently planned improvements to the Corridor but does not propose any additional NNEIRI service.

Noise Receptor- Locations that may be affected by noise: sensitive receptors include residences, parks, schools, churches, libraries, hotels, and other public buildings.

Nonattainment Areas- A geographic area in which levels of a criteria pollutant fail to meet the National Ambient Air Quality Standard (NAAQS) for the pollutant.

Northern New England Intercity Rail Initiative (NNEIRI) Corridor- The NNEIRI Corridor (the Corridor) is 470 miles long and is comprised of two major rail Routes known as the Inland Route and the Boston-to-Montreal Route.

Northern New England Intercity Rail Initiative (NNEIRI) Study- The NNEIRI Study is a feasibility and planning study of intercity passenger rail service along the NNEIRI Corridor.

Northern New England Intercity Rail Initiative (NNEIRI) Study Area- The NNEIRI Study Area refers to the geographic limits of the review conducted for each of the resources during the Tier 1 EA.

Passing Siding- This is a section of track parallel to a through line and connected to it at both ends by switches. Passing sidings allow trains travelling in opposite directions to pass, and for fast, high priority trains to pass slower or lower priority trains going the same direction.

Peak Hour- The hour of the day in which traffic volumes are highest.

Positive Train Control Systems (PTC)- Positive Train Control (PTC) systems are integrated command, control, communications, and information systems for controlling train movements with safety, security, precision, and efficiency.

Programmatic Agreement- A document that spells out the terms of a formal, legally binding agreement between a state DOT and other state and/or federal agencies. It also establishes a process for consultation, review, and compliance with one or more federal laws.

Project Purpose and Need- A statement of Purpose and Need is the fundamental starting point of a transportation planning effort, and provides, at a minimum, a description of the transportation challenges and opportunities faced in the markets to be served by the proposed service, based on current and forecasted travel demand and capacity conditions. The Purpose and Need is required as part of a NEPA environmental review.

Quiet Zones- A quiet zone is a section of a rail line at least one-half mile in length that contains one or more consecutive public highway-rail grade crossings at which locomotive horns are not routinely sounded when trains are approaching the crossings.

Right-of-way (ROW)- Land, property, or interest therein necessary for transportation infrastructure.

Scoping- A formal coordination process used to determine the scope of the project and the major issues likely to be related to the proposed action

Section 106 of the National Historic Preservation Act (NHPA)- Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

Section 4(f) of the U.S. Department of Transportation Act- A special provision of the Department of Transportation Act of 1966 which stipulates that no Department of Transportation project can use lands from publicly owned parks, recreation areas, wildlife and waterfowl refuges, or historical sites unless there is no feasible alternative and the project includes all possible planning to minimize harm resulting from the use.

Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF)- Section 6(f) of the LWCF Act of 1965 stipulates that property acquired or developed with LWCF assistance shall be retained and used for public outdoor recreation. Any conversion of lands requires coordination with the Department of Interior. Usually replacement in kind is required.

Service-Level NEPA- Service NEPA (which CEQ refers to as programmatic) typically addresses the broader questions relating to the type of service(s) being proposed, including cities and stations served, route alternatives, service levels, types of operations (speed, electric, or diesel powered, etc.), ridership projections, and major infrastructure components. For a major rail corridor improvement program, this type of environmental review must be completed before any substantial investments in the corridor can be made.

Siding- A siding is a low-speed track section distinct from a running line or through route such as a main line or branch line or spur.

Sole Source Aquifers- A Sole Source Aquifer (SSA) is an aquifer that has been designated by the United States Environmental Protection Agency (EPA) as the sole or principal source of drinking water for an area.

Stakeholder Committee- The Stakeholder Committee of parties with a vested interest in the study including state and federal transportation agencies, railroads, and regional planning commissions. The committee was formed to provide oversight, direction and primary

Threatened Species- Any species that is likely to become an endangered species within the foreseeable future.

Tier 1 NEPA- A National Environmental Policy Act (NEPA) corridor-level analysis that may be completed for large studies that require certain broad questions to be answered before a more detailed study (a Tier 2 analysis) can be done.

Tier 2 NEPA- A National Environmental Policy Act (NEPA) project-level analysis focusing on specific sections of independent utility within the project's selected corridor.

Tilt Train Equipment- Mechanism that enables trains to tilt when rounding a curve in order to counteract its centripetal force. This allows acceptable levels of passenger comfort at increased speeds.

FRA Track Class- The U.S. Federal Railroad Administration's classification for track quality, which determines the maximum running speed limits for passenger and freight trains.

Track Warrant Control (TWC)- Track Warrant Control (TWC) is a verbal authorization system defined by the General Code of Operation Rules (GCOR), used to authorize trains to occupy Main Tracks outside of Yard Limits.

Trainset- A group of rolling stock that is permanently or semi-permanently coupled together to form a unified set of equipment.

Watershed- A region or area that contains all land ultimately draining to a water course, body of water, or aquifer.

Wellhead Protection Areas (WPA)- A wellhead protection area is a surface and subsurface land area regulated to prevent contamination of a well or well-field supplying a public water system. This program, established under the Safe Drinking Water Act (SDWA), is implemented through state governments.

Wetlands- Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

6.4 LIST OF PREPARERS

The Tier 1 EA document was prepared by FRA, MassDOT and VTrans with support from HDR Engineering Inc. (HDR), which is the lead consultant for the NNEIRI Study, and with assistance from a team of consulting engineers and planners from AECOM and Fitzgerald & Halliday, Inc. (FHI). The following table identifies the agency personnel, consultant staff, and their study role.

Table 6.4-1. List of Preparers and Their Study Role

Firm	Study Role	Team Members
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Vermont Agency of Transportation (VTrans)		<ul style="list-style-type: none"> • Scott Bascom, Planning Coordinator • Karen Songhurst, Policy Analyst • Jeff Ramsey, Environmental Specialist • Glenn Gingras, Environmental Biologist
HDR Engineering, Inc.	Study Management; QA/QC; NEPA; Station Assessment & Location; Civil/Design; Design Criteria Development; Route Alignment Assessment; Station & Facilities; Operations Modeling; Economic Assessment; Benefit/Cost Evaluation; Risk Assessment	<ul style="list-style-type: none"> • Ronald O'Brien, Senior Rail Project Manager • John Weston, AICP, Senior Transportation Planner • Stefanie McQueen, AICP, Senior Transportation Planner • Matthew Moran, Transportation Planner



AECOM

Study Management;
Demand Forecasting;
GIS;
Station Layout;
Environmental Evaluation;
Resources Identification;
Environmental Screening;
Existing Condition Assessment/Video;
Station & Facilities;
Benefit/Cost Evaluation;
Financial Planning

- James Doyle, AICP, Planning Group Manager
- David Derrig, Jr., AICP, Senior Transportation Planner
- Kalawati Gurung, AICP, Transportation Planner
- Kevin McCarthy, EIT, Civil Engineer
- Mike Przbyla, Senior Geospatial Analyst
- James Cowan, (INCE Bd. Cert.), Principal Engineer, Acoustics and Noise Control
- Laura McWethy, Transportation Consultant
- Jeffrey Roux, Senior Consulting Manager

Fitzgerald & Halliday, Inc.
(FHI)

Public Involvement;
Cultural Resources

- Stephanie Dyer-Carroll, AICP, Senior Project Manager, Cultural Resources Specialist
 - Jill Barrett, Senior Project Manager
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