NASHUA-MANCHESTER 40818 (CAPITOL CORRIDOR)

ENVIRONMENTAL ASSESSMENT

Prepared for:

New Hampshire Department of Transportation

January 2022 (DRAFT)

PRE-DECISIONAL

DRAFT

FOR INFORMATION ONLY

Prepared by:
AECOM

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Background / Project Description

The New Hampshire Department of Transportation (NHDOT), in conjunction with the Federal Transit Administration (FTA), has prepared this Environmental Assessment (EA), which examines the potential environmental impacts being considered for the proposed Nashua-Manchester 40818 (Capitol Corridor) Regional Commuter Rail project in New Hampshire and Massachusetts, which would extend the existing MBTA Lowell Line into southern New Hampshire. The EA is prepared consistent with the requirements of National Environmental Policy Act of 1969 (NEPA), as amended, 42 U.S.C. §§ 4321 et. seq. and its implementing regulation, 40 Code of Federal Regulations (CFR) 1500-1508, published at 85 Federal Register 43304 and in accordance with requirements of joint Federal Highway Administration/Federal Railroad Administration/Federal Transit Administration Environmental Impact and Related Procedures (23 C.F.R 771). The FTA concurred on June 23, 2021, that the appropriate class of action for the Project under the NEPA is an EA, per 23 CFR § 771.119 and 40 CFR § 1501.5. The EA is also prepared in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) 54 U.S.C. § 306108, and its implementing regulations under 36 CFR Part 800 (August 5, 2004).

Note: An Annotated Outline for the EA, identifying the structure and content of this document, was prepared for review and comment by FTA. The Annotated Outline was approved by FTA in April 2022, and the project was added to the USDOT Permitting Dashboard (https://www.permits.performance.gov/permitting-project/nashua-manchester-commuter-rail-capitol-corridor-project-ea). A general schedule of activities from project notice to issuance of a Finding of No Significant Impact (FONSI) was prepared to accompany the Annotated Outline. In addition, a parallel schedule for the Section 106 process was prepared: FTA initiated the process, including invitations to consulting parties and review and approval of the project Area of Potential Effect (APE).). A general schedule of activities from project notice to issuance of a Finding of No Significant Impact (FONSI) was prepared to accompany the Annotated Outline. In addition, a parallel schedule for the Section 106 process was prepared: FTA initiated the process, including invitations to consulting parties and review and approval of the project Area of Potential Effect (APE).

As of February 2023, the project is currently on pause on the USDOT Permitting Dashboard.

Task Objectives

EA Objectives

The EA includes the following objectives:

- To confirm which aspects of the proposed action have potential for social, economic, or environmental impact;
- To confirm alternatives and measures which might mitigate adverse environmental impacts;
- To identify other environmental review and consultation requirements which should be performed concurrently with the EA; and
- To summarize the results of agency coordination and public outreach.

Public Involvement Objectives

The public participation process will address applicable FTA requirements for public engagement in rail planning projects and enhance NHDOT practices as stated in the guidance document, "Public Involvement Process for New Hampshire Transportation Improvement Projects."[1] In addition, public and stakeholder involvement activities will be conducted in accordance with the National Environmental Policy Act (NEPA), Section 106 and Section 4(f) requirements.

1. Introduction

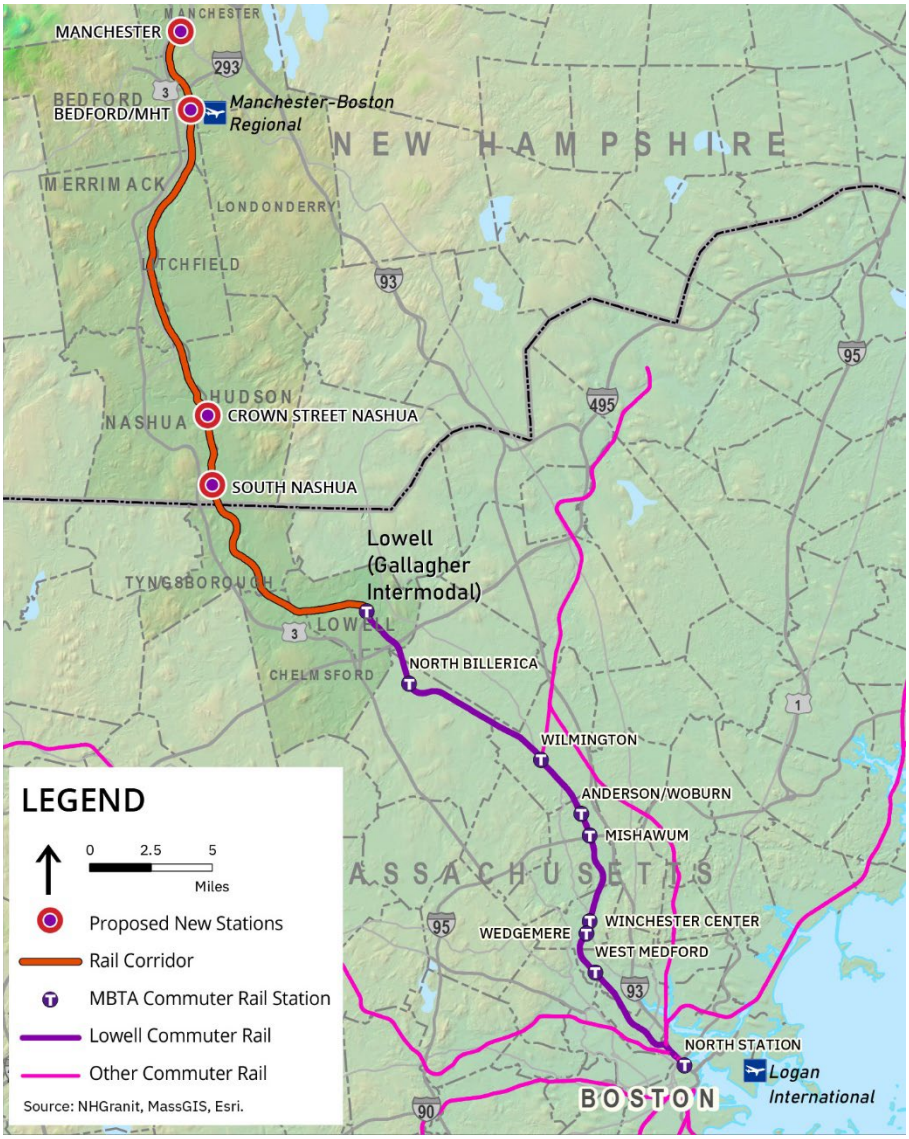
The Nashua-Manchester Regional Commuter Rail Project (the Project) would extend the Massachusetts Bay Transportation Authority (MBTA) commuter rail service approximately 30 miles northward from Lowell, Massachusetts (MA) to Nashua and Manchester, New Hampshire (NH) along the Massachusetts portion of the line owned by MBTA and the New Hampshire portion of the line owned by Pan Am Railways (PAR) and acquired in 2022 by CSX Transportation (CSX) (Figure 1). The Project is a collaborative effort led by New Hampshire Department of Transportation (NHDOT) as project proponent in coordination with the MBTA and Massachusetts Department of Transportation (MassDOT). Work within the approximately 9-mile Massachusetts component of the rail corridor would be limited to track and culvert improvements and implementation of a railway signal system within the existing railroad right-of-way. The New Hampshire component extends from the MA/NH state line approximately 21 miles to downtown Manchester, with proposed stations in South Nashua, Crown Street in downtown Nashua, Bedford/Manchester-Boston Regional Airport (Bedford/MHT), and a location south of Granite Street in downtown Manchester. A layover facility would also be provided at a location near the planned terminus in the City of Manchester.

The Project is included in the NH Approved 2021-2030 Ten Year Plan (7/24/2020), is the #1-ranked project in the Nashua Regional Planning Commission's (NRPC) Nashua Region Metropolitan Transportation Plan 2019-2045 (12/19/2018) and is included in the Southern New Hampshire Planning Commission's (SNHPC) 2021-2045 Metropolitan Transportation Plan (12/23/2020 draft). The Project is included as a regionally significant project with no identified funding source in the Northern Middlesex Council of Government's (NMCOG) Northern Middlesex Regional Transportation Plan FFY 2020-2040 (07/2019).

Figure 1 illustrates the study corridor map.

[1] NHDOT. Public Involvement Process for New Hampshire Transportation Improvement Projects. November 2012. https://www.nh.gov/dot/org/projectdevelopment/planning/documents/publicinvolvementprocess.pdf

Figure 1: Nashua-Manchester Study Corridor Map



2. Purpose and Need

This section summarizes the Project's Purpose and Need (P&N) and goals and objectives.

2.1 Purpose

The purpose of the Nashua-Manchester project (the Project) is to diversify mobility options that connect the southern New Hampshire region with the population, employment and commercial centers in the Greater Boston area, reduce congestion, emissions and travel time, and provide mobility options that promote equity and support demographic trends and preferences in the study area corridor.

2.2 Need

Investment in an improved transportation strategy is needed for several reasons:

- Projected population growth will result in increased roadway congestion;
- Southern New Hampshire's existing transportation network provides limited connections with dedicated transit facilities in Greater Boston;
- The regional economy is vulnerable to the effects of near-total dependency on roads for movement of goods and passengers;
- Improved transportation options are necessary to attract employers to New Hampshire and improve employment options for New Hampshire residents;
- New Hampshire is experiencing a positive net in-migration from Massachusetts, but losing residents in high-earning age cohorts;
- New Hampshire's growing senior population needs more mobility options other than passenger vehicle use;
- Traditional residential development patterns resulting from population growth may negatively impact the region's existing quality-of-life; and
- The existing transportation network cannot accommodate increased levels of demand without negative environmental consequences.

2.3 Goals and Objectives

To determine how well regional commuter rail within the Nashua - Manchester (Capitol Corridor) study area will address regional and corridor needs, a set of goals and objectives were developed. These goals and objectives build on work that has been completed or is ongoing within the corridor and region. Each goal reflects an understanding of the role that integrated transportation and land use planning can play in supporting an economically, environmentally, and socially sustainable community.

Transportation and Mobility: Leverage the existing transportation network to improve access and mobility within the study area corridor and throughout the region:

- Provide alternatives that consider roadway congestion and provide mobility options within the study area corridor;
- Expand transit network capacity;
- Increase transit ridership and mode share by expanding the existing ridership base and attracting new riders;
- Provide travel time savings; and
- Improve efficiency, convenience, and reliability.

System Integration: Invest in transportation improvements that complement the existing multimodal transportation network:

- Increase study area corridor modal connectivity;

- Provide connections to other corridors within the region;
- Increase access to the Manchester-Boston Regional Airport through additional transit service;
- Balance system capacity (MBTA, Boston Express, Regional Transit Authorities); and
- Ensure operating efficiency.

Economic Development and Land Use: Support the vision for growth laid out in local/regional development plans:

- Improve access to higher-paying jobs in greater Boston;
- Support development patterns/lifestyle choices that attract younger, highly educated professionals to New Hampshire;
- Leverage younger, highly educated employee base to attract new businesses/grow existing ones; Promote Transit-Oriented Development (TOD) to mitigate sprawl development patterns; and
- Improve the potential for additional freight rail business through infrastructure upgrades.

Sustainability: Support transportation investments that contribute to an environmentally, economically, and socially sustainable community:

- Leverage existing transportation infrastructure to qualify for federal transportation investment dollars;
- Mitigate potential adverse environmental impacts resulting from anticipated development;
- Support growth patterns that attract and retain residents from childhood through retirement; and
- Improve access to other tourism, recreation, and cultural attractions in greater Boston and NH.

Independent Action: Proceed in a timely fashion without depending on other components to be approved, and without precluding other potential transportation improvements:

- As an extension of existing service, includes a logical starting point and extends to a location that maximizes feasibility of success while addressing potential impacts;
- Can proceed as a stand-alone project without impacts to other potential improvements; and
- Does not preclude other potential transportation improvements if constructed.

3. Previous Studies

Federal Railroad Administration (FRA) EA

In 2014, an EA was published by Federal Railroad Administration (FRA) to address the potential effects of intercity rail service that would extend MBTA commuter rail from Lowell, MA to Nashua, Manchester and Concord, NH. The FRA EA was prepared based on guidance for Service-level NEPA under the High-Speed Intercity Passenger Rail (HSIPR) Program within the context of broader Boston-to-Montreal service and focused on intercity rail service options. A Finding of No Significant Impact (FONSI) from FRA was issued on July 23, 2015.

2014 Alternatives Analysis and Locally Preferred Alternative

The 2014 FRA EA was supported by a comprehensive Alternatives Analysis, wherein a full range of intercity and commuter rail and bus alternatives were developed to satisfy the Study's Purpose and Need. Including the No Build alternative, 12 alternatives were identified and initially screened by the Study team, with input from project stakeholders.

After extensive consultation primarily focusing on the fiscal constraints faced by the State of New Hampshire, seven intermediate alternatives were selected for more detailed definition and evaluation.

Review of the forecast performance indicated that the Manchester Regional Commuter Rail, while not the least expensive from a capital and operating cost perspective, would generate the greatest mobility and economic development benefits and the lowest unit costs per passenger mile and per passenger.

After the completion of the FRA EA, the New Hampshire Rail Transit Authority (NHRTA) voted in 2015 to recommend the Manchester Regional Commuter Rail option for advancement (Figure 2 in Chapter 5). The NHRTA disbanded in 2017.

4. Alternatives

This section summarizes the alternatives development and screening process and confirms and defines the No Build and Build Alternatives. This section also summarizes the alternative service plans and the sizes, types, and layouts of stations, facilities, and station access that were evaluated.

4.1 Screening of Alternatives / Alternatives Considered and Dismissed

Using updated demographic, journey to work, and other data in the study corridor, the Project Team re-evaluated the screening results associated with previous alternatives considered and dismissed to identify potential new or revised alternatives that may better satisfy the Project's Purpose and Need (P&N) and result in less environmental and socioeconomic impacts or provide greater benefits than those alternatives considered and selected for further analysis.

The Project Team used the most currently available data on corridor travel patterns and demographics, which confirmed that the access and mobility challenges identified in the *2014 New Hampshire Capitol Corridor Rail & Transit Alternatives Analysis Study* persist and, in some cases, had worsened. Therefore, the effort focused on those alternatives best able to meet the

P&N and goals of the Project, which are those associated with extending commuter rail from Lowell, MA to Manchester, NH.

The other two rail alternatives that were evaluated in the 2014 study: Nashua Minimum Commuter Rail and Concord Intercity 8 Rail Alternatives, were eliminated from further consideration. The Nashua Minimum Commuter Rail Alternative was eliminated because it would provide a minimal peak period-only commuter rail service with only one new station in South Nashua and would have lower ridership and less economic benefits to Southern NH. The Concord Intercity 8 Rail Alternative was eliminated because this alternative would be more expensive than the Manchester Regional Commuter Rail Alternative and would attract fewer passengers, resulting in relatively unattractive measures of efficiency compared to the Manchester Regional Commuter Rail.

The Project Team developed and evaluated various station location options, layover facility site options and operating plans for the Manchester Regional Commuter Rail Alternative. The two new potential station location options for South Nashua include Pheasant Lane Mall Station and Spit Brook Road Station sites, and two potential station location options for Manchester include Granite Street and Valley Street Stations. The Project Team also reviewed the station designs for Crown Street Station and Bedford/Manchester-Boston Regional Airport (MHT) Station based on the updated existing conditions for Crown Street Station and wetlands delineation study for Bedford/MHT Station.

The Project Team refined the 2014 preliminary service options and developed various new service options for the Manchester Regional Commuter Rail Project. The refined service options considered maximum allowable speeds for passenger rail service and clock face schedule at Lowell Station with fixed headways for peak periods and off-peak periods. The Project Team calculated station-to-station running times and peak and off-peak dwell times and established travel times between stations, updated timetables to reflect new times as well as to better manage single-track train meets and improve crew and equipment utilization.

4.2 No Build Alternative

The No Build alternative is required to be evaluated under NEPA as a baseline for comparing the impacts of the Build alternatives. Under the No Build alternative, the existing condition of the rail corridor would remain unchanged. Freight traffic would continue to serve the existing customers located on the New Hampshire Main Line (NHML), and intercity bus service in mixed traffic would continue to be the only passenger service option between Manchester, Nashua, and Boston. Population growth in the region and the demand for jobs in the greater Boston market would further negatively impact corridor traffic conditions. The No Build Alternative is defined as the existing transportation system with planned and programmed improvements as presented in the NHDOT's 2021-2024 State Transportation Improvement Program (STIP), MassDOT's 2022-2026 STIP, and MBTA's FY 2023-2027 Capital Investment Plan (CIP), as well as the regional fiscally constrained plans, including NRPC's Nashua Region Metropolitan Transportation Plan 2019-2045 and SNHPC's 2021-2045 Metropolitan Transportation Plan, but without the proposed Manchester Regional Commuter Rail project.

The No Build alternative does not satisfy the project's purpose and need because it fails to improve connectivity to and from Boston, the region's largest economic hub; it maintains single-mode reliance on roadways for the movement of people and goods (except for the freight rail deliveries); it does not increase mobility options that match emerging demographic trends and preferences in the corridor; and the region's high quality-of-life may deteriorate without strategic infrastructure investments.

The existing highway network, express commuter bus services, commuter rail, freight rail service, and planned and programmed transportation improvements are summarized below.

4.2.1 Existing Highway Network

Limited access highways that connect New Hampshire's major population centers to metropolitan Boston are I-93, US Route 3/F.E. Everett Turnpike, Route 128/I-95, I-293, and I-495. These highways cover 134 miles of limited access freeway facilities and interchanges shared between New Hampshire and Massachusetts.

U.S. Route 3/F. E. Everett Turnpike (Route 3/Everett Turnpike) serves as a major north-south expressway for residents, commuters, and tourists in the Nashua region. Route 3 passes through Tyngsborough, Lowell and Chelmsford in Massachusetts before continuing to Boston and is also a major commuting route between southern New Hampshire and Greater Boston.

Daniel Webster Highway runs from the Massachusetts State Line to Interchange 3 of the Everett Turnpike in Nashua and is the primary roadway for the South Nashua Commercial District.

I-93 is an interstate highway that runs through Massachusetts, New Hampshire and Vermont and is the primary interstate highway for commuting between Boston and Manchester. NHDOT recently completed the *I-93 from Salem to Manchester Widening & Improvement* project, which included reconstruction and widening of 19.8 miles of the I-93 highway to four lanes in each direction in New Hampshire between Exits 1 and 5 from the Massachusetts state line (Salem, New Hampshire) to Manchester.

The I-93 lane drop from four lanes to three lanes between the New Hampshire state line and Exit 35 (formerly Exit 41) in Wilmington, Massachusetts for approximately 11.5 miles has been a key choke point and source of congestion during weekday peak period commutes. Peak hour use of the shoulder for passenger vehicle use is allowed in this area on I-93 SB during the AM peak hour and I-93 NB during the PM peak hour.

4.2.2 Existing Local Bus Services

Local bus service within the New Hampshire study area is provided by the Nashua Transit System (NTS) and Manchester Transit Authority (MTA). The daytime service routes include ten routes, and the night service includes three routes. Local bus service in Massachusetts is provided within the study area by the Lowell Regional Transit Authority (LRTA). There are no interconnections between these local providers. LRTA Route 10 Dracut/Tyngsboro provides service through Lowell, Dracut and Tyngsborough and has the northernmost stop at Ayottes Market in Hudson, New Hampshire; however, there is no connection with the NTS service.

4.2.3 Existing Express Commuter Bus Services

Two intercity bus companies provide express commuter service within the study area in southern New Hampshire. Boston Express (BX) provides daily commuter service along Route 3 between Nashua (Exit 8) and Boston via Tyngsboro, MA (12 weekday round trips), and along I-93 to Boston via downtown Manchester (one peak inbound trip [towards Boston] and one outbound trip [towards Manchester] on weekdays. BX also provides 10 weekday round trips between North Londonderry, NH (I-93 Exit 5 located just outside Manchester) and Boston.

Concord Coach Lines is an intercity bus company based in Concord, New Hampshire that provides 18 weekday round trips to Boston via the same North Londonderry, NH park and ride location as BX. Concord Coach Lines does not service downtown Manchester or Nashua.

While Greyhound does provide service between Manchester, NH and Boston, MA the service does not meet the definition of commuter service due to infrequent trips.

In Massachusetts, the MBTA and the Merrimack Valley Regional Transit Authority (MVRTA) provide commuter service to Boston along I-93 from communities to the north.

4.2.4 Existing Commuter Rail on the MBTA Lowell Line

The study area in Massachusetts is served by the MBTA Lowell Line that provides commuter rail service between Lowell and North Station in Boston. On a typical weekday in 2022, Lowell is served by 43 MBTA revenue trains to and from Boston's North Station. The 25-mile trip serving up to five intermediate station stops takes 45 minutes of running time between Lowell and North Station with a maximum allowable speed of 70 mph. As noted above, none of these trips are accessible by local (NTS & MTA) or express (BX & Concord Coach) New Hampshire bus services, meaning that a rail user from New Hampshire is required to drive to Lowell Station for access.

In addition to the Lowell service, MBTA runs a limited number of trains to and from Haverhill along the Wildcat Branch via Woburn and Wilmington to avoid conflicts on the Haverhill line south of Lawrence. Most of these trains serve passengers at the Anderson Regional Transportation Center (Woburn) and Wilmington. Six southbound and one northbound train operate along the Wildcat Branch.

There is no layover facility for train overnight storage or routine maintenance (e.g., cleaning and fueling) in Lowell, which consequently requires significant deadheading of trains between Boston and Lowell as well as associated operating costs and environmental impacts. Currently, the Lowell Line commuter trains are stored overnight at North Station in Boston and maintenance of the trains is performed at the MBTA Commuter Rail Maintenance Facility (formerly known as the Boston Engine Terminal) in Somerville.

4.2.5 Existing Freight Rail Service

The existing freight rail service in the Corridor operates on the New Hampshire Main Line (NHML). In New Hampshire, the NHML is property of Pan Am Railways (PAR), acquired in 2022 by CSX. In Massachusetts, the southernmost 34.5 miles of the line was acquired by the MBTA in the 1960s. The southernmost 25.4 miles of the route between Boston and Lowell is heavily utilized by MBTA Commuter Rail and Amtrak Downeaster intercity passenger trains with some local freight services operated by CSX. The Amtrak Downeaster only uses the portion of the Lowell Line from Boston's North Station to south of the connection with the Wildcat Branch.

NHML was historically double tracked to Concord, NH and beyond. Today the railway is largely a single track north of Lowell with some passing sidings, a yard in Nashua, and numerous turnouts to customer sidings. There is an existing inactive rail yard west of the Manchester Transit Authority property between Queen City Avenue Bridge and the Northeast Delta Dental Stadium in Manchester.

The No-Build Alternative assumes the continuation of the freight rail service that currently operates on the Corridor. The freight operator of the rail line is CSX, which owns the rail line in NH and operates via trackage rights on the MBTA owned portion of the line in MA. There are four daily through freight trains from Lowell to North Chelmsford along three miles of shared

double track. Additionally, there is one daily local freight train from Ayer to Manchester and return, which serves all freight sidings between Lowell and Manchester, which also serves the Hillsboro Branch (via Nashua) daily.

4.2.6 Existing Airport Service

Manchester-Boston Regional Airport (MHT) is an important economic engine for New Hampshire and the region – creating jobs, facilitating commerce, and providing access to the global marketplace. Currently, Manchester Transit Authority (MTA) Bus Route #3 provides bus service to the MHT on weekdays only. MHT considers a rail passenger connection to greater Boston essential to maximizing the airport's growth potential in the region. MHT has been experiencing decreases in passenger enplanements since 2014. Passenger departures decreased by 17 percent over the six-year period between FY 2014 (1,048,128 enplanements) and FY 2019 (865,553 enplanements). The proposed Bedford/MHT Station site is well positioned at the interchange of the Everett Turnpike, Route 3, and Raymond Wieczorek Drive, and south of I-293.

4.2.7 Planned and Programmed Transportation Improvement Projects in the Study Corridor

Planned railway infrastructure upgrades and programmed transportation improvement projects in the study corridor are summarized below:

4.2.7.1. Planned Railway Infrastructure Upgrades

This corridor was previously operated by Pan Am Railways. CSX acquired Pan Am Railways in June 2022 following the approval of the federal Surface Transportation Board (STB) and has indicated it will maintain the line to at least FRA Class 2 standards. The rail line is currently in Class 2 condition and is expected to remain a Class 2 freight railroad in the No-Build alternative.

4.2.7.2. Programmed Transportation Improvement Projects in the Study Corridor

The No-Build Alternative is defined as the existing transportation system with planned and programmed improvements as presented in the NHDOT's 2021-2024 State Transportation Improvement Program (STIP) and MassDOT's 2022-2026 STIP but without the proposed Manchester Regional Commuter Rail project. The planned and programmed transportation improvement projects in New Hampshire and Massachusetts are summarized below:

- Everett Turnpike widening of 2-lane sections from Exit 8 Nashua to I-293 interchange in Bedford;
- I-293 (Everett Turnpike) Exits 6 and 7 Improvements (Manchester 16099);
- I-93 Exit 4A Project, Derry & Londonderry, New Hampshire;
- US 3 Widening from Hawthorne Drive North to Manchester-Boston Regional Airport (MHT) access Road, Bedford, New Hampshire project;
- Improvement to Bedford Mainline Toll Plaza to Institute Open Road or All Electronic Tolling (NRPC, SNHPC); and
- Exit 36 Interchange Project in Tyngsborough, MA and Nashua, NH.

The MBTA's FY 2023-2027 Capital Investment Plan (CIP) includes currently undergoing or planned MBTA major investments and programs that would benefit the Lowell Line. These investments and programs are summarized below:

- High Line Rail commuter rail bridge replacement along the Lowell Line in Somerville that runs over an access road, High Line and the railroad yard between North Station and West Medford;
- Rail Vision;
- Rail Transformation – Early Action Items that include addition of double tracks, interlockings, platforms, and turnbacks on Lowell Line and other commuter rail lines and key stations;
- North Station Draw 1 bridge structure replacement over the Charles River in Boston; and
- Upgrade of signal system at North Station Terminal, including new microprocessor technology, nine new signal houses, two new crossovers, and the relocation of critical signal equipment above the 500-year floodplain.

4.3 Build Alternative

The Manchester Regional Commuter Rail Alternative was carried forward as the Build Alternative/Locally Preferred Alternative (LPA) for detailed analysis (Figure 2). The Build Alternative includes four proposed stations in New Hampshire (South Nashua, Nashua Crown Street, Bedford/MHT, and Manchester) and one layover facility in Manchester. Within the Manchester Regional Commuter Rail Alternative, two station sites: Crown Street Nashua and Bedford/MHT were generally identified in the *2014 Nashua-Manchester (Capitol Corridor) Alternatives Analysis and Environmental Assessment Study.* The other two station sites (in South Nashua and Manchester) and the layover facility site were not identified in the previous study. The preferred alternative was developed to approximately the 15% level of design for the EA in order to reasonably identify potential impacts and measures to avoid, minimize or mitigate such impacts to the satisfaction of permit-granting agencies, have sufficient detail to complete the Section 106 and 4(f) processes, and identify potential property acquisition needs.

Figure 2: Manchester Regional Commuter Rail Alternative

This section summarizes the routes, potential station options, layover facility options, operating plans, ridership projections, and major infrastructure components associated with the Build Alternative as well as the comparison of capital and operating and maintenance (O&M) costs. It also summarizes the rationale behind selection of the preferred location for each station and the layover facility.

This section includes a description of the Financial Plan, addressing project costs and revenues and the intended sources of funds for construction and ongoing operations. The Financial Plan anticipates seeking FTA 5309 Capital Investment Grant (CIG) funding for a substantial portion of the capital costs combined with other federal sources such as FTA 5307 and 5337 formula funds, FHWA STP and CMAQ, and other federal grant and loan programs, as applicable. The project formed financial stakeholder groups in the cities of Nashua and Manchester and is working with them to identify sources of the non-federal share of project costs. Mechanisms being considered include joint development and district value capture through tax increment financing (TIF). Other sources of the non-federal share may include investments by the proposed operator (MBTA). The project is currently identified as an illustrative project in the NRPC and SNHPC Long-Range / Metropolitan Transportation Plans. The project is currently

included in the NHDOT 2021-2024 STIP (approved 12/1/2021) as project #40818 for design, environmental review and financial plan using FTA 5307 Capital and Operating Program and Toll Credit funds.

4.3.1 Route

The Build Alternative would provide expanded commuter rail service on the MBTA Lowell Line from Lowell Station in Lowell, MA to Manchester, NH. The Nashua-Manchester expanded service would stop at four new stations in southern New Hampshire at South Nashua, Crown Street Nashua, Bedford/MHT, and Manchester. Historically, the New Hampshire Main Line (NHML) was a double-tracked corridor along the entire length between Boston and Manchester, and the signal system on the line was deactivated and removed by the railroad several years ago. Currently, other than a few industrial sidings, the rail line is single-track north of Chelmsford, MA. Approximately 7 miles of second track would be installed in NH and 8 miles in the MA portion of the route, within the total 30 route miles between Lowell and Manchester. All track work would take place within the existing right-of-way (ROW).

4.3.2 Proposed Stations

The Project Team considered a range of sites and design alternatives for each of the proposed stations to best meet community and project needs. The station alternatives were defined and evaluated based on field inspections, collaboration with local officials, and review of previous studies.

The following provides a summary of the station locations.

4.3.2.1. South Nashua Station

Two alternative locations were considered for the South Nashua Station. In both cases, the station would be bordered by the Merrimack River on the east and have a single-full length high-level platform located on the west side of an upgraded single track serving both inbound and outbound trains from the same platform. Vehicular and pedestrian access would be from along the west side of the platform without the need for any pedestrian bridges or at-grade pedestrian crossings of the track. One potential location was at the southeast corner of the Pheasant Lane Mall and the other at the east end of Spit Brook Road. Both station options are located near Route 3 and Daniel Webster Highway offering convenient access to the regional highway network and portions of Nashua, Tyngsborough, and other adjacent towns. The potential South Nashua Station sites are currently served by existing NTS bus routes 6 and 6A. The potential South Nashua Station locations are described below:

Pheasant Lane Mall Station Option

The Pheasant Lane Mall Station option is located at the southeast end of the mall, with the rail line adjacent to the Merrimack River and the proposed platform adjacent to the mall perimeter road (Figure 3 and Figure 4). Parking would be provided on the existing underutilized surface parking areas adjacent to the station (and entirely in Massachusetts). Access would be via the main southern mall access road intersection at Daniel Webster Highway and the main northern mall access road intersection (Dan Chan Street) at its intersection with Daniel Webster Highway. Both access points connect to the mall perimeter road.

Figure 3: South Nashua - Pheasant Lane Mall Station Option

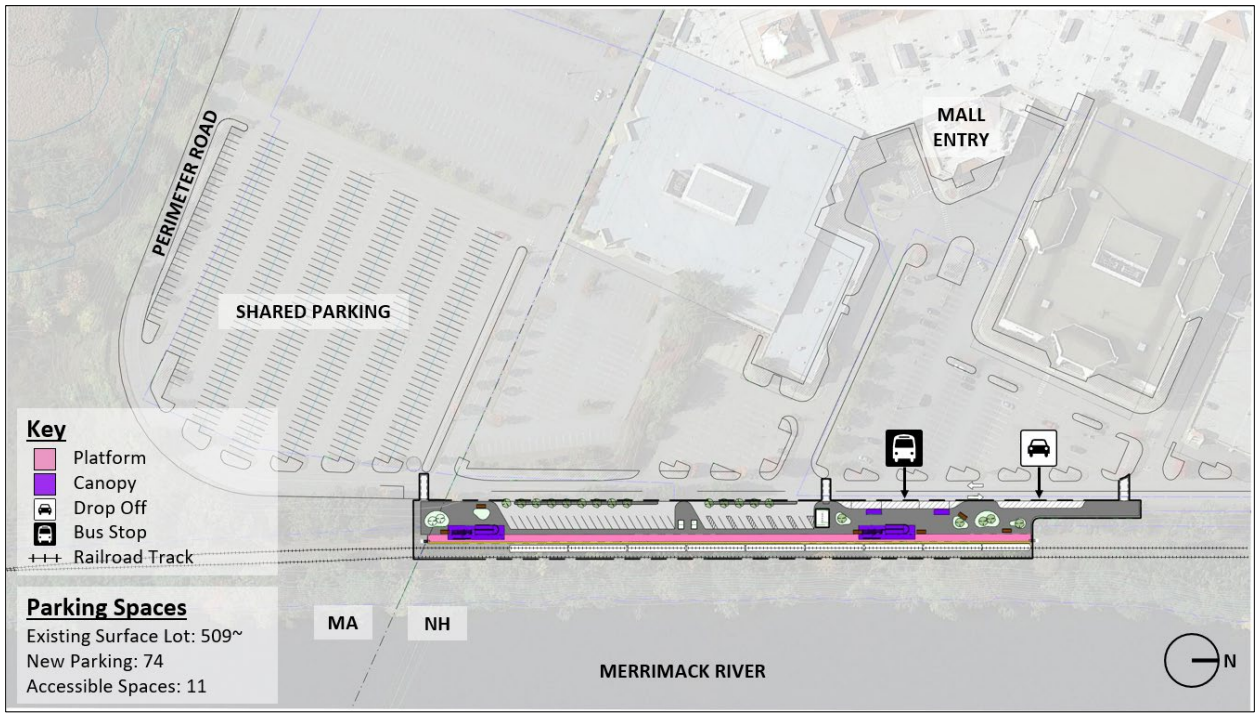
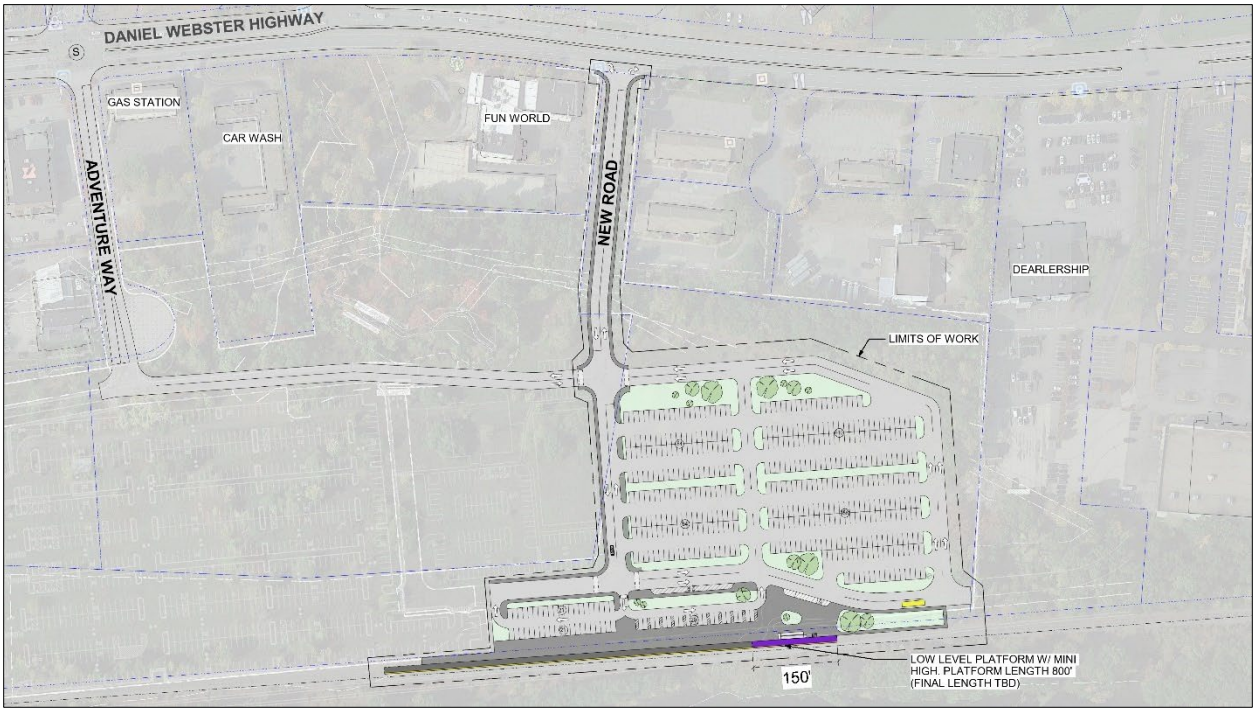


Figure 4: South Nashua - Pheasant Lane Mall Station Option Rendering

Spit Brook Road Station Option

The Spit Brook Road Station option is located within a larger development parcel for the proposed Landing at Nashua project at the northeast end of East Spit Brook Road (Figure 5). The station would be constructed at the northern end of the property on a subdivided lot known as the "donation parcel." The donation parcel is a hazardous materials remediation site with an Activity and Use Restriction (AUR) that limits the type of reuse that can occur on the parcel. Access to the site would be via a new connection to Daniel Webster Highway at Adventure Way (shared with the Landing at Nashua project), via a new right-turn in / right-turn out only connection to Daniel Webster Highway through an easement adjacent to the Fun World property, and via East Spit Brook Road using the Landing at Nashua access and perimeter drive. Surface parking would be constructed on the parcel to serve the station.

Figure 5: South Nashua - Spit Brook Road Station Option



Screening Process and Selection of Preferred South Nashua Station Alternative

A screening process was conducted to determine which of the two South Nashua station options would be selected as the preferred station alternative. Screening criteria were developed based on stakeholder input, effectiveness, environmental impacts, and cost considerations. The screening results identified the Pheasant Lane Mall site as the preferred location for the South Nashua Station.

4.3.2.2. Nashua Crown Street Station

This site is located on west side of the tracks north of the CSX rail yard, as shown in Figure 6 and Figure 7. It is the approximate location of Nashua's historic main line train station and is the only viable site near downtown that can accommodate the platform requirements. The proposed 800-foot long center-island high-level station platform would be located adjacent to the City of Nashua's recently constructed park-and-ride facility at 25 Crown Street. The City of Nashua

acquired the property in 2013 to redevelop the site into a park-and-ride facility. The accessory facility onsite is home to MakeIt Labs, New Hampshire's first makerspace, a non-profit community workshop and incubator. The park-and-ride facility construction was completed in 2020. The warehouse building adjacent to the railroad line was demolished as part of the park-and-ride project. The open field area south of the existing parking lot could be used for expansion of park-and-ride capacity should long-term demand warrant it. As Nashua's downtown station, this location would rely on pedestrian and bicycle accessibility, and so a new sidewalk would be necessary on the south side of Crown Street and east of Arlington Street to facilitate safe access to the site. As shown in Figure 6, the potential Crown Street Nashua Station can also be accessed via new access points at Gillis Street and Mill Street. The west side of the potential Crown Street Nashua Station site is served by existing NTS bus routes 3, 7 and 1. With minor route modification, these existing NTS routes could also directly connect with the Crown Street Station.

Figure 6: Nashua Crown Street Station

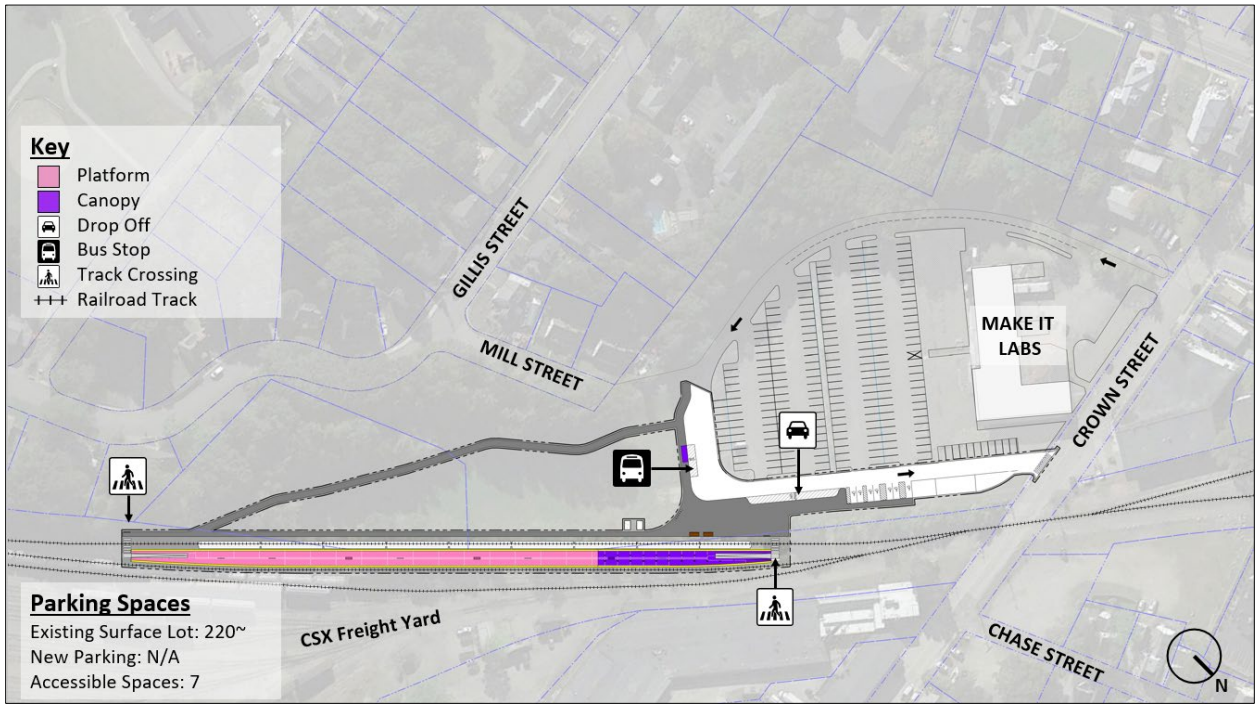


Figure 7: Nashua Crown Street Station Rendering

4.3.2.3. Bedford/MHT Station

The proposed Bedford/MHT station would serve as a regional park-and-ride for northern Hillsborough and southern Merrimack counties as well as provide a passenger rail connection for Manchester-Boston Regional Airport (MHT), see Figure 8 and Figure 9. The station site is located in Bedford along the existing rail line on west side of the Merrimack River, beneath the Ray Wieczorek Drive/Pearl Harbor Memorial Bridge that provides a direct connection between Route 3 and MHT. This site has also been proposed as a development node within the Town of Bedford. A dedicated airport shuttle bus would provide connecting service between the station and the airport for use by airline passengers and airport employees. The shuttle bus route would be approximately 2.3 miles one-way heading toward the airport from the station and 2.8 miles in the reverse direction, is estimated to take approximately six to eight minutes in each direction, and would be timed to meet scheduled trains. The station parking lot would be managed to prohibit overnight parking, avoid use by air passengers, and keep spaces available for rail commuters from Manchester, Bedford, and other nearby communities.

Figure 8: Bedford/MHT Station

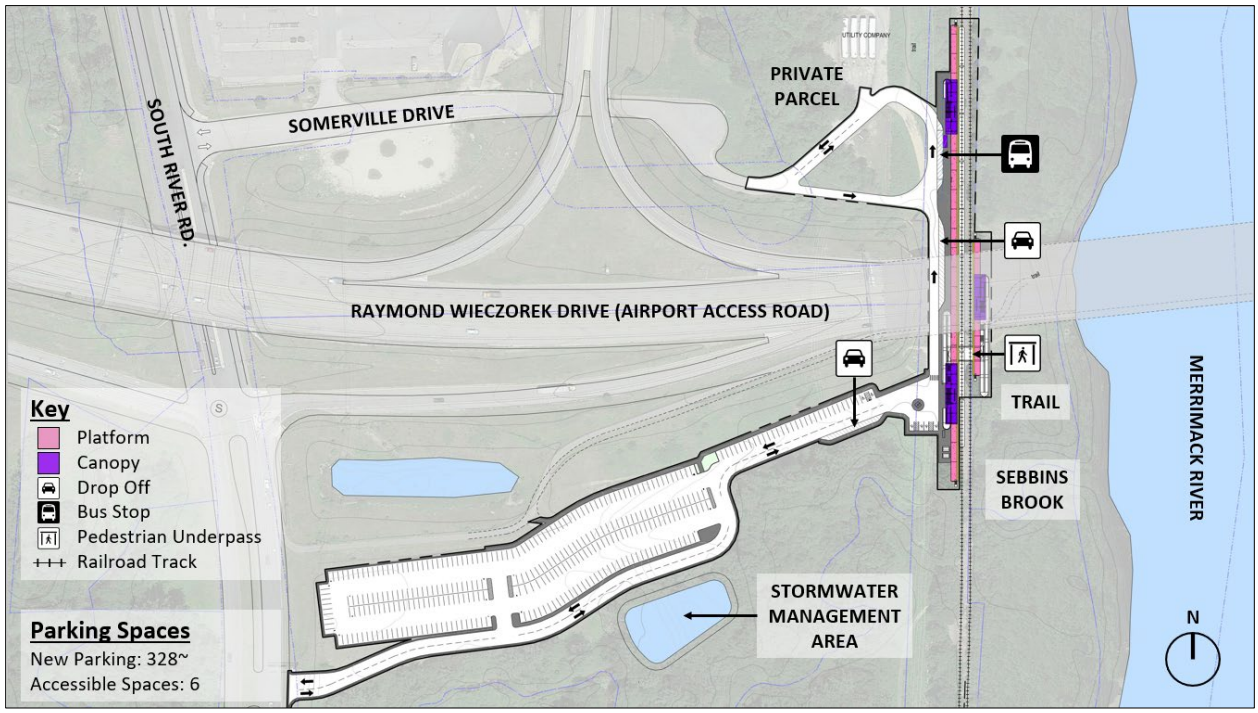


Figure 9: Bedford/MHT Station Rendering

4.3.2.4. Manchester Station

Initially, two preliminary station locations at Granite Street and Valley Street were considered for a potential Manchester Station site. Following a series of meetings with the City of Manchester and other stakeholders a Hybrid option was developed. The Hybrid option includes selected features from the Granite Street and Valley Street options and is located between the Valley Street and Granite Street sites. The Hybrid option can be expanded in the future to accommodate a larger passenger plaza and greater number of bus bays, if necessary.

In the Hybrid option, bus and drop-off/pick-up vehicular access to the site is provided through the south access road of the existing supermarket connecting with Elm Street. Pedestrian access to the station platform is provided from the east side via Canal Street and from the south side via new sidewalks connecting with Elm Street as well as a potential recreational trail. The Hybrid option also includes a pedestrian bridge overpass connecting the station plaza and platform with South Commercial Street. See Figure 10 and Figure 11. The Depot Street crossing will not be closed under this option and the city-owned parcel on the corner of Granite and Canal Streets will continue to be used as public parking. A two-track station option has been developed with a single high-level 800-feet long island platform serving the east and west station tracks. The freight mainline would be realigned to be adjacent to the west station track. This would enable the efficient operation of a terminal station and allow for unimpeded freight traffic to and from the north.

Figure 10: Manchester Station

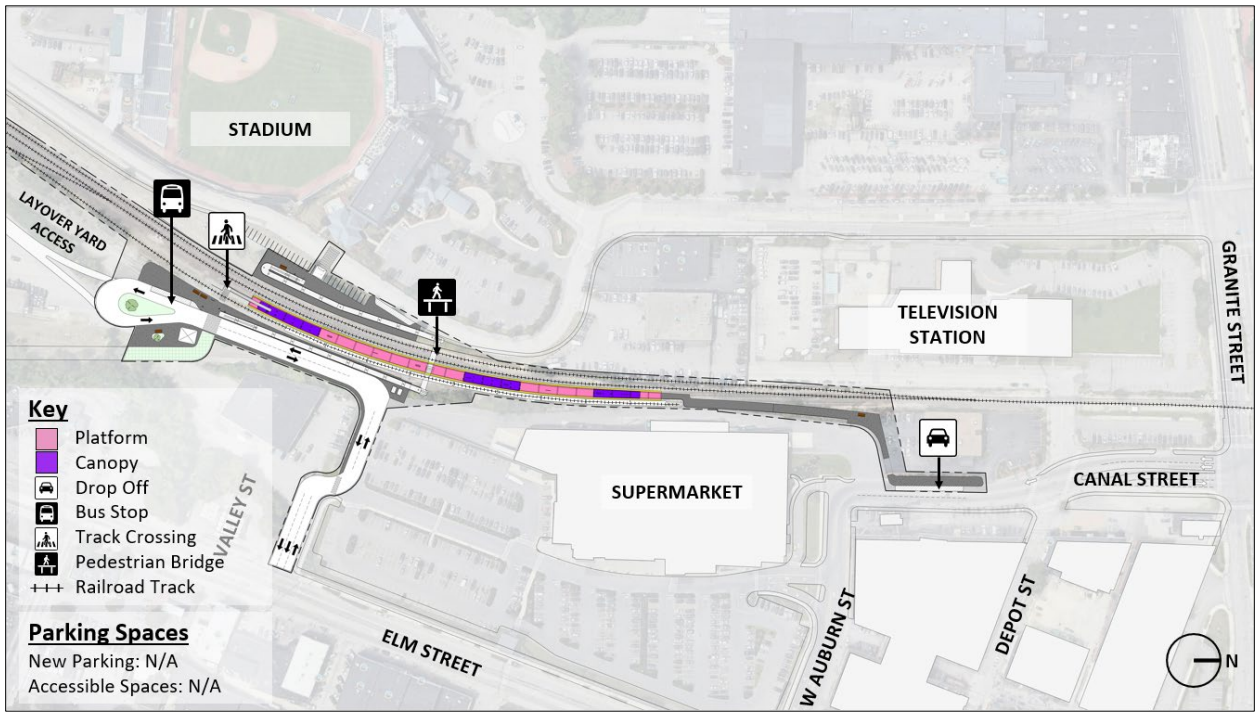


Figure 11: Manchester Station Rendering

Screening Process and Selection of Preferred Station Alternative

As with the South Nashua station, a screening process was conducted to determine which of the Manchester station options would be selected as the preferred station alternative. The station options were compared using a scoring system using various indicators, including stakeholder input, effectiveness, environmental impacts, and cost indicators. The screening results identified the Hybrid Station site as the preferred location for Manchester station.

4.3.3 Proposed Layover Facility

A layover facility at the outer end of a commuter rail line is essential to efficient railroad operations. Layover facilities primarily serve as points to store, restock, and perform light maintenance on the commuter rail trains (locomotive and coaches). Additionally, layover facilities provide crew quarters, including briefing rooms, locker rooms, and break rooms.

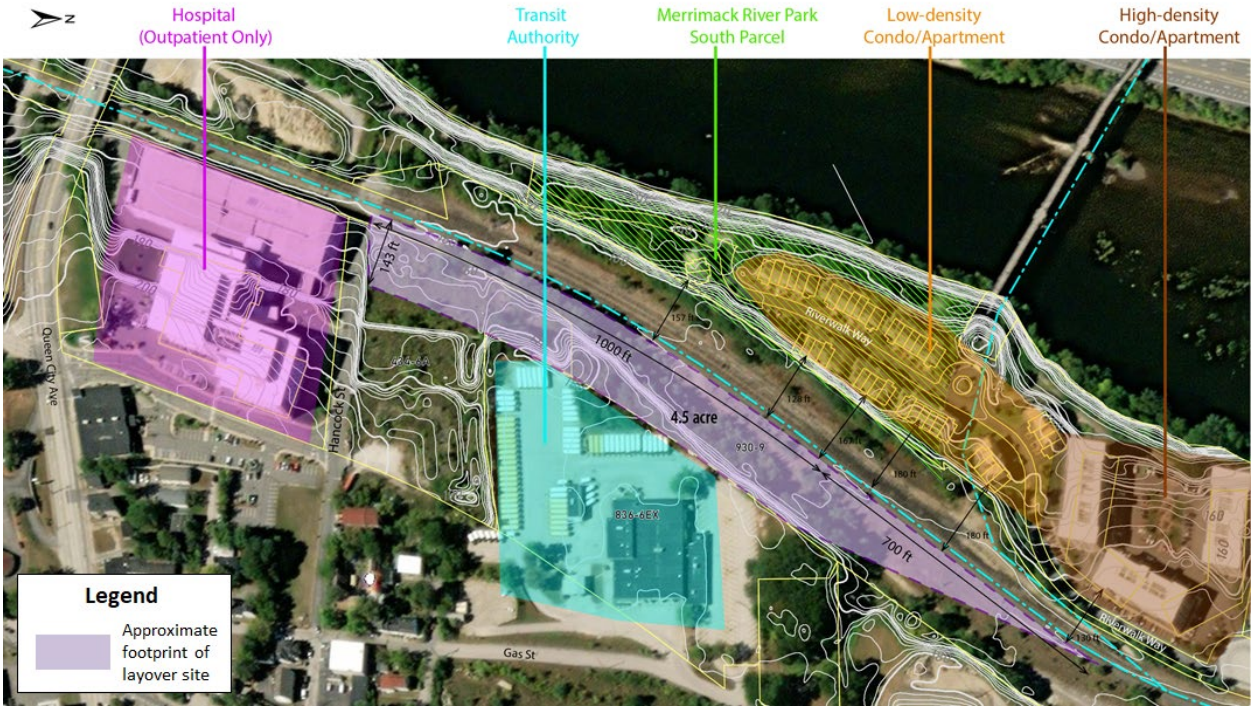
An initial list of eight sites was developed for review in 2014, with the current analysis addressing five sites: Pan Am North, Pan Am South, Cemetery South, Wastewater Treatment Plant, and Bedford U-Haul. Three sites (Pan Am North, Wastewater Treatment Plant, and Bedford U-Haul) were eliminated from detailed analysis due to fatal flaws pertaining to compatibility with surrounding land uses, ROW width, and the distance of the required deadhead movement between the layover site and the planned terminus of service at Manchester.

The remaining two sites (Pan Am South and Cemetery South) did not present fatal flaws and were advanced into more detailed evaluation/scoring to assess their merits. The Pan Am South and Cemetery South sites are discussed below.

4.3.3.1. Pan Am South

The Pan Am South layover facility site is located to the east side of the Pan Am (now CSX) main line rail track largely on land formerly used as the primary rail freight yard in Manchester. On the south it is adjacent to the Elliot at Rivers Edge outpatient hospital parking garage. On the east the site is adjacent to vacant lots and a mix of industrial and commercial uses, including the Manchester Transit Authority maintenance and storage facility and the Liberty Energy complex. On the west the site is bordered by the railroad main line and existing active freight rail storage tracks, and to the west of those tracks are existing condominiums and apartments along the Riverway (see Figure 12). The layover facility at this site would have an approximate footprint of 4.5 acres. The Pan Am South layover facility site is closest to the proposed Manchester Station, requiring minimal deadhead train moves.

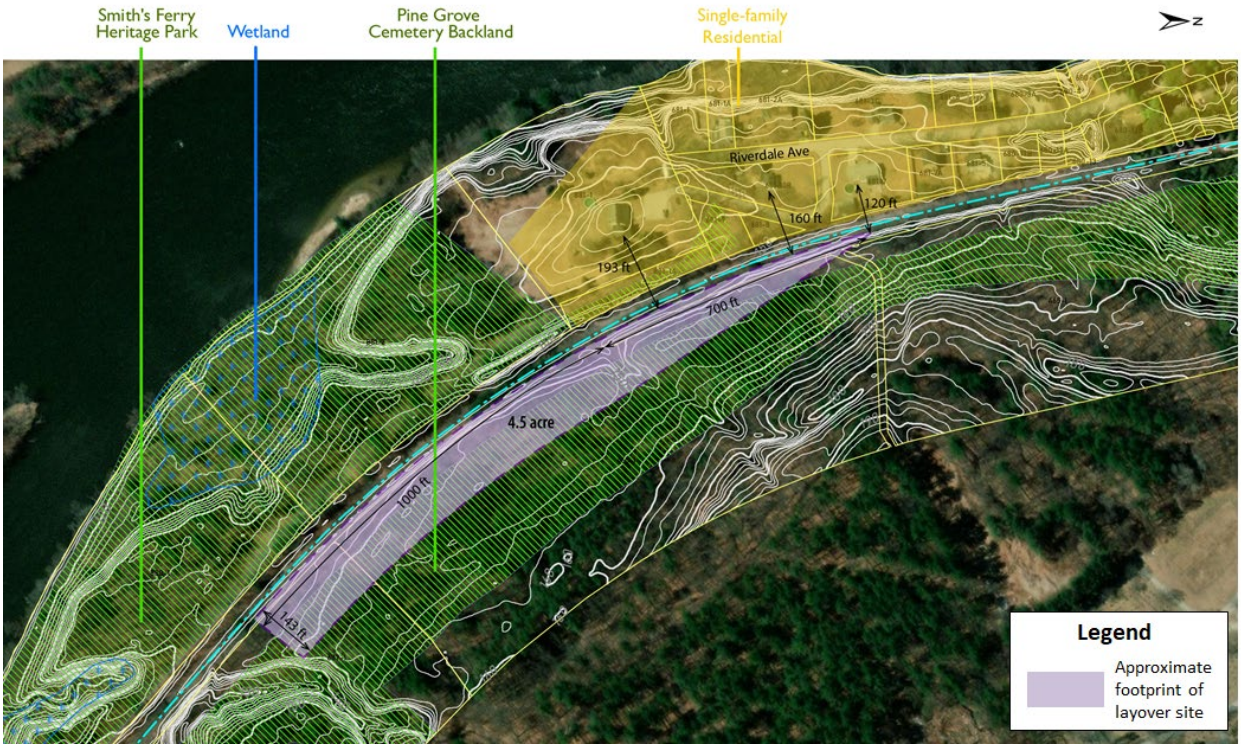
Figure 12: Pan Am South Layover Facility



4.3.3.2. Cemetery South

The Cemetery South layover facility site is located to the east side of the rail track within the City of Manchester's Pine Grove Cemetery backland property (see Figure 13). The layover facility at this site would have an approximate footprint of 4.5 acres. The land uses surrounding the proposed layover facility site include Smith's Ferry Heritage Park, wetland areas, Pine Grove Cemetery backland and single-family residential areas. The Cemetery South layover facility site is farther from the proposed Manchester Station compared to the Pan Am South site, requiring somewhat longer deadhead train movements. Both sites would support future electrification of the layover yard and mainline.

Figure 13: Cemetery South Layover Facility



Screening Process and Selection of Preferred Layover Facility Alternative

The layover facility screening showed that the Pan Am South location best meets the selection criteria compared to the Cemetery South location. The Pam Am South location would require less land acquisition, has existing access to public roads, and has existing utilities nearby to serve the facility. The location is most proximal to the proposed Manchester Station, therefore requiring minimum deadheading distance between layover facility and the potential Manchester Station. The Cemetery South layover facility is more than a mile away from Manchester Station. The Pan Am South location would not require clearing of wooded land, would not require passing through any grade crossings during deadhead moves, and would have no impacts to wetland resources, historic resources, or listed species, rare plants, and/or natural communities of concern. The Pan Am South location would have fewer impacts to conservation parcels and Environmental Justice communities compared to the Cemetery South location.

4.3.4 Operating Plans

The Project Team reviewed the 2014 operating plans considering the updated Purpose and Need and Goals and Objectives, as well as review of the MBTA's existing operating plan on the Lowell Line to develop and analyze a wide range of potential new operating plans consistent with the MBTA's latest regional commuter rail scheduling.

Table 1 summarizes the service plan for the Build Alternative. The proposed service plan includes extension of MBTA Lowell Commuter Rail service into southern New Hampshire with 32 weekday trains (16 round trips) serving the four proposed stations, plus weekend and holiday service.

Table 1. Build Alternative Service Plan

MONDAY THROUGH FRIDAY																								
		A	B	C	D	E	B	A	D	A	E	A	D	A	E		A	D	B	D	A	D	B
TURN		MAN	MAN	MAN	MAN	0:45	0:10	0:18	0:10	0:20	0:10	0:50	0:10	0:50	MAN	0:20	0:17	0:17	0:18	0:10	0:49	0:10	0:50
SOUTHBOUND	**MP**	**300**	**302**	**304**	**306**	**308**	**310**	**312**	**314**	**316**	**318**	**320**	**322**	**324**	**326**	**328**	**330**	**332**	**334**	**336**	**338**	**340**	**342**
Manchester NH	*55.5*	**4:52**	**5:52**	**6:22**	**6:52**	**7:22**		**8:25**		**10:25**		**12:25**		**14:25**	**15:25**	**15:55**	**16:55**	**17:55**	**18:25**		**20:55**		**22:55**
MHT Bedford	*50.4*	5:00	6:00	6:30	7:00	7:30		8:33		10:33		12:33		14:33	15:33	16:03	17:03	18:03	18:33		21:03		23:03
Nashua Crown St	*38.6*	**5:11**	**6:11**	**6:41**	**7:11**	**7:41**		**8:44**		**10:44**		**12:44**		**14:44**	**15:44**	**16:14**	**17:14**	**18:14**	**18:44**		**21:14**		**23:14**
South Nashua	*35.5*	5:18	6:18	6:48	7:18	7:48		8:50		10:50		12:50		14:50	15:50	16:20	17:20	18:20	18:50		21:20		23:20
Lowell	*25.4*	**5:35**	**6:35**	**7:05**	**7:35**	**8:05**	**8:35**	**9:05**	**10:05**	**11:05**	**12:05**	**13:05**	**14:05**	**15:05**	**16:05**	**16:35**	**17:35**	**18:35**	**19:05**	**20:35**	**21:35**	**22:35**	**23:35**
North Billerica	*21.8*	5:43	6:43	7:13	7:43	8:13	8:43	9:13	10:13	11:13	12:13	13:13	14:13	15:13	16:13	16:43	17:43	18:43	19:13	20:43	21:43	22:43	23:43
Wilmington	*15.2*	5:50	6:50	7:20	7:50	8:20	8:50	9:20	10:20	11:20	12:20	13:20	14:20	15:20	16:20	16:50	17:50	18:50	19:20	20:50	21:50	22:50	23:50
Anderson/Woburn	*12.6*	5:57	6:57	7:27	7:57	8:27	8:57	9:26	10:26	11:26	12:26	13:26	14:26	15:26	16:26	16:56	17:56	18:56	19:26	20:56	21:56	22:56	23:56
Winchester	*7.8*	6:04	7:04	7:34	8:04	8:34	9:04	9:33	10:33	11:33	12:33	13:33	14:33	15:33	16:33	17:03	18:03	19:03	19:33	21:03	22:03	23:03	0:03
Wedgemere	*7.3*	6:07	7:07	7:37	8:07	8:37	9:07	*9:35*	*10:35*	*11:35*	*12:35*	*13:35*	*14:35*	*15:35*	*16:35*	*17:05*	*18:05*	*19:05*	*19:35*	*21:05*	*22:05*	*23:05*	*0:05*
West Medford	*5.5*	6:11	7:11	7:41	8:11	8:41	9:11	*9:39*	*10:39*	*11:39*	*12:39*	*13:39*	*14:39*	*15:39*	*16:39*	*17:09*	*18:09*	*19:09*	*19:39*	*21:09*	*22:09*	*23:09*	*0:09*
North Station	*0.0*	**6:24**	**7:24**	**7:54**	**8:24**	**8:54**	**9:24**	**9:52**	**10:52**	**11:52**	**12:52**	**13:52**	**14:52**	**15:52**	**16:52**	**17:22**	**18:22**	**19:22**	**19:52**	**21:22**	**22:22**	**23:22**	**0:22**
TURN		BET	0:14	0:14	0:14	0:14	0:14	0:16	0:16	0:16	0:16	0:16	0:16	0:14	HH	0:14	0:14	0:14	0:16	0:46	0:16	0:16	0:16
		E	A	B	C	D	E	A	D	A	E	A	D	A	B	E		A	D	B	D	A	D
NORTHBOUND	**MP**	**301**	**303**	**305**	**307**	**309**	**311**	**313**	**315**	**317**	**319**	**321**	**323**	**325**	**327**	**329**	**331**	**333**	**335**	**337**	**339**	**341**	**343**
North Station	*0.0*	**5:09**	**6:38**	**7:38**	**8:08**	**8:38**	**9:08**	**10:08**	**11:08**	**12:08**	**13:08**	**14:08**	**15:08**	**16:06**	**16:36**	**17:06**	**17:36**	**18:36**	**19:38**	**20:38**	**21:38**	**22:38**	**23:38**
West Medford	*5.5*	*5:22*	*6:51*	*7:51*	*8:21*	*8:51*	*9:21*	*10:21*	*11:21*	*12:21*	*13:21*	*14:21*	*15:21*	16:19	16:49	17:19	17:49	18:49	*19:51*	*20:51*	*21:51*	*22:51*	*23:51*
Wedgemere	*7.3*	*5:25*	*6:54*	*7:54*	*8:24*	*8:54*	*9:24*	*10:24*	*11:24*	*12:24*	*13:24*	*14:24*	*15:24*	16:22	16:52	17:22	17:52	18:52	*19:54*	*20:54*	*21:54*	*22:54*	*23:54*
Winchester	*7.8*	5:27	6:56	7:56	8:26	8:56	9:26	10:26	11:26	12:26	13:26	14:26	15:26	16:25	16:55	17:25	17:55	18:55	19:56	20:56	21:56	22:56	23:56
Anderson/Woburn	*12.6*	5:34	7:03	8:03	8:33	9:03	9:33	10:33	11:33	12:33	13:33	14:33	15:33	16:32	17:02	17:32	18:02	19:02	20:03	21:03	22:03	23:03	0:03
Wilmington	*15.2*	5:39	7:08	8:08	8:38	9:08	9:38	10:38	11:38	12:38	13:38	14:38	15:38	16:38	17:08	17:38	18:08	19:08	20:08	21:08	22:08	23:08	0:08
North Billerica	*21.8*	5:47	7:16	8:16	8:46	9:16	9:46	10:46	11:46	12:46	13:46	14:46	15:46	16:46	17:16	17:46	18:16	19:16	20:16	21:16	22:16	23:16	0:16
Lowell	*25.5*	**5:56**	**7:25**	**8:25**	**8:55**	**9:25**	**9:55**	**10:55**	**11:55**	**12:55**	**13:55**	**14:55**	**15:55**	**16:55**	**17:25**	**17:55**	**18:25**	**19:25**	**20:25**	**21:25**	**22:25**	**23:25**	**0:25**
South Nashua	*35.5*	6:08	7:37		9:06	9:36		11:06		13:06		15:06	16:06	17:08	17:38	18:08	18:38	19:37		21:36		23:36	0:36
Nashua Crown St	*38.6*	**6:14**	**7:44**		**9:12**	**9:42**		**11:12**		**13:12**		**15:12**	**16:15**	**17:15**	**17:44**	**18:15**	**18:45**	**19:43**		**21:42**		**23:42**	**0:42**
MHT Bedford	*50.4*	6:27	7:57		9:25	9:55		11:25		13:25		15:25	16:28	17:28	17:57	18:28	18:58	19:56		21:55		23:55	0:55
Manchester NH	*55.5*	**6:37**	**8:07**		**9:35**	**10:05**		**11:35**		**13:35**		**15:35**	**16:38**	**17:38**	**18:07**	**18:38**	**19:08**	**20:06**		**22:05**		**0:05**	**1:05**
TURN		0:45	0:18	0:10	MAN	0:20	0:10	0:50	0:10	0:50	15:25	0:10	1:17	0:17	0:18	MAN	MAN	0:49	0:10	0:50	0:10	MAN	MAN

4.3.5 Service and Ridership Projections

Ridership forecasts were based on the proposed operating plan and regional population and employment forecasts. The 2018 and 2040 No-Build and Build forecasts are unconstrained by potential long-term changes in travel behavior post-COVID. The overall forecasted MBTA systemwide commuter rail ridership growth from 2018 to 2040 No Build is approximately 18,000 weekday boardings, representing an increase of 14.1%. The Lowell line has approximately 11,000 average weekday riders in the No Build (without the extension to Manchester), which increases to almost 15,000 weekday riders in both Build cases. The proposed service extension adds about 4,000 weekday boardings to the system total, which is an approximately 3% increase.

Table 2 compares the 2018 observed ridership on the MBTA Lowell Line with the 2040 forecasts with and without the proposed New Hampshire service extension. Without a New Hampshire extension the MBTA Lowell Line weekday boardings are forecast to increase by 24% compared with 2018 observations. The New Hampshire stations are expected to add 2,866 new weekday boardings to the network. The 2040 Build forecast adds 43% to the No Build forecast, including a 3% increase in Massachusetts boardings.

Table 2. Lowell Line 2040 Commuter Rail Route-level Average Weekday Boardings

	MBTA Observed (2018)	No Build Forecast (2040)	Build Forecast (2040)	No Build Growth (2018 v 2040)	Build Growth (2018 v 2040)	Build v No Build (2040)
Massachusetts Inner Stations*	2,722	3,308	3,401	22%	25%	3%
Massachusetts Outer Stations	3,028	3,823	3,959	26%	31%	4%
Massachusetts Total	**5,750**	**7,131**	**7,360**	**24%**	**28%**	**3%**
South Nashua			934			
Nashua Crown Street			705			
NHT Bedford			764			
Downtown Manchester			464			
New Hampshire Total			**2,866**			
Lowell Line Total (excluding North Station)	**5,750**	**7,131**	**10,226**	**24%**	**78%**	**43%**

*Excludes boardings at North Station

The total reduction in VMT can be found in Table 3, with the majority of the VMT reduction coming from trips traveling between states. It should be noted that the values are for weekday service only: weekend and holiday service will result in additional reductions in VMT.

Table 3. Average Weekday Reduction in VMT

Scenario	Within NH	Within MA	Between NH and MA	Total
Pheasant Lane Mall South Nashua Station	(7,194)	(1,098)	(46,581)	(58,935)

Three post-COVID scenarios were identified (Low, Medium, and High Impact) with associated ridership. Table 4 shows a closer look at the station-level impacts, rounded to the nearest hundred. As the percentage reductions are equal across the stations, the weekday boarding distributions remain the same but do show the range of impacts at each station.

Table 4. 2040 Station COVID Impacts on Ridership

Station Name	Base Forecast	Low Impact	Medium Impact	High Impact
Inner Massachusetts Stations	3,400	2,900	2,700	2,100
Outer Massachusetts Stations	4,000	3,400	3,100	2,500
South Nashua	900	800	700	600
Nashua Crown Street	700	600	500	400
MHT Bedford	800	700	600	500
Manchester NH	500	400	400	300
Total	**10,300**	**8,800**	**8,000**	**6,400**

4.3.6 Major Infrastructure Components

Major infrastructure components including recommended upgrades to track, bridges, crossings, and signals are summarized below.

Historically, the New Hampshire Main Line (NHML) was a double-track corridor along the entire length between Boston and Manchester and points north in NH. Currently, aside from sidings, the rail line is single-track north of Chelmsford, MA. The Build Alternative would require infrastructure upgrades at some locations along the Corridor to provide additional capacity and support maximum allowable speeds. Track upgrades would include major renewal of existing track and providing a second track in certain locations to accommodate the proposed commuter rail operating plan and freight services on the same line. Installing the second track would only be necessary in key segments of the corridor. Other infrastructure upgrades include a new signal system with Positive Train Control (PTC), bridge rehabilitation, and reconstruction of existing at-grade crossings.

No improvements south of MBTA's Lowell Gallagher Terminal would be required as part of this project. North of Lowell the railroad would be upgraded to permit safe, reliable operation of 32 weekday daily passenger trains at speeds of up to 79 mph. Recommended upgrades to track, bridges, crossings, and signals are summarized below.

Track

Track upgrades would include major renewal of existing track and the addition of a second track in certain locations to increase maximum allowable speeds and support commuter rail and freight service. All the existing 70-plus-year-old 112-pound main line rail between Lowell and Manchester would be upgraded with new continuous welded rail (CWR) of a similar weight. Along segments where the rail is renewed with CWR, approximately one-third of the existing ties would be replaced. No double-track would be required between North Chelmsford (MP 28.5) and the southern end of the Tyngsborough Curve (MP 32). Industrial sidings would be created at three key areas of freight activity in Nashua and Merrimack to eliminate conflicts between local freight deliveries and through passenger trains. At these locations the existing main line track would be retained as an industrial siding with an entirely new parallel main line track constructed in the same alignment for use by through trains. Adding a second track would be facilitated by the railway having once been entirely double-tracked with the original track bed still largely intact. Approximately 7 miles of second track would be installed in the NH portion of

the Corridor and 8 miles in the MA portion of the Corridor. All track work would take place within the existing railroad right-of-way (ROW).

Bridges

The Project Team inspected 15 bridge crossings along the Corridor to identify where repairs are needed. Inspection results indicated that the Project would not require any new bridges and all the existing bridges can be used for the new service with certain repairs. The service expansion would use existing bridges over watercourses or roadways. Most of the bridges are rated as having sufficient strength to accommodate the proposed additional traffic. The Lock Street undergrade bridge in Nashua has an existing deficient concrete deck, which is proposed to be replaced. There is also the Merrimack Parkway undergrade bridge access road (16” wide) which is also getting replacement of its concrete deck. These are deck only replacements with no feasible alternative. The large steel (circa 1930) structure spanning the Merrimack River between Manchester and Bedford is proposed to have its deck replaced. The other bridges should receive a renewal of worn and weakened components when the rails crossing them are replaced.

Grade Crossings

With double-tracking and increased frequency of faster trains, most of the 21 roadway grade crossings between Manchester and downtown Lowell would need upgrades in their automatic highway warning devices (AHWD) and the crossing surfaces.

Signals

The Build Alternative would include a new train control and signal system, including PTC, as well as some new switches and reconfigurations of track.

4.3.7 Capital and Operating and Maintenance (O&M) Costs

This section summarizes the capital and operating and maintenance (O&M) cost estimates for the Baseline, future No-Build Alternatives, and LPA (Table 5). Capital cost includes costs for the construction of stations and layover facility and upgrade of tracks, and O&M costs include the annual cost for operating the rail service and maintaining the rail infrastructure and rolling stock in a state of good repair.

Table 5. Capital and O&M Costs

Alternative	Capital Cost	Annual O&M Costs
Manchester Regional Commuter Rail (October 2022 dollars)	$597M	$17.3M

5. Affected Environment and Environmental Consequences

This chapter provides a summary of the relevant regulatory requirements, methodology, affected environment for each environmental resource, and the environmental consequences associated with the No-Build and the reasonable and feasible Build Alternative, as well as potential mitigation measures for those resources. Resource-specific technical reports or memoranda containing further information on the applicable regulatory requirements, methodologies, affected environment and consequences are provided in the Appendices to this document.

Table 6. Summary of Potential Environmental Consequences and Mitigation Measures

		Potential Impacts and Mitigation Measures	
Environmental Resources		**Potential Impacts (Build Alternative)**	**Proposed Mitigation Measures**
4.1	Wetlands and Stream Crossings	Approximately 0.33 acres of direct, permanent impact to wetland resources (mostly associated with the construction of the Bedford-MHT Station) and 0.83 acres of secondary impact to wetland resources from vegetation clearing. Temporary impacts to Deep Brook in Chelmsford would occur from dewatering during construction for proposed bridge work. Impact to two low-quality wetlands due to the layover facility in Manchester. Approximately 5 miles of the existing rail line in MA would cross through the 100-foot buffer zone. Impacts to wetlands due to vegetation clearing and minor permanent impacts to bank due to proposed grading along the rail bed and culvert repair/maintenance. No direct impacts to vernal pool.	Permanent wetland impacts would need to be mitigated through permittee-responsible mitigation or payment of an in-lieu fee. Total estimated amount of mitigation required: BVW/Wetland = 26,414 sq. ft. (restoration) or 50,297 sq. ft. (creation), and Streambed/Bank = 1,525 sq. ft. / 292 linear feet. Temporary impacts would be restored after construction is complete.
4.2	Water quality	Potential temporary water quality impacts during construction and operation. Post-construction, the addition of impervious surface at the station and layover sites has the potential to adversely affect water quality. Fueling operations at the layover facility would have the potential to cause groundwater contamination without adequate control measures. No substantial amount of new impervious surface is proposed along the rail corridor. Operation of rail line would have potential for impacts from accidents/spills.	During construction, erosion and sedimentation controls and other Best Management Practices (BMPs) would be implemented to minimize temporary impacts to water quality. Stormwater treatment BMPs would be constructed at the South Nashua Station, Bedford-MHT Station, the Manchester Station, and the Manchester Layover to meet MS4 and NHDES Alteration of Terrain requirements. No stormwater treatment would be required along the rail line. A spill response plan for accidents would be developed for the operation of the rail line.

		Potential Impacts and Mitigation Measures	
Environmental Resources		**Potential Impacts (Build Alternative)**	**Proposed Mitigation Measures**
4.3	Endangered Species/ Wildlife/ Fisheries	Potential adverse impacts to the federally listed northern long-eared bat, bald eagles, Riverine clubtail dragonfly from vegetation clearing. Potential impacts to NH state-listed turtle and reptile species during construction. Potential impacts to sea lamprey and Eastern brook trout in Sebbins Brook from stormwater discharge and vegetation clearing associated with Bedford-MHT Station. No impacts to Essential Fish Habitat (EFH).	Acoustic surveys for northern long-eared bat presence/absence would be completed during final design if required. Seasonal clearing restrictions for bat species would be implemented as necessary. Tree clearing would be conducted between July and December to avoid impacts to bald eagles. A “wildlife friendly” option for erosion control matting would be used during construction. Vegetation clearing would be minimized where possible, particularly near rivers and streams.
4.4	Invasive species	Potential for spread of invasive species during construction, from both ground disturbing activities and vegetation clearing.	An invasive species management plan would be incorporated into the construction phase of the project. Long-term vegetation management of the rail corridor would also include planning for invasive species control.
4.5	Floodplain and Shoreland Resources	Floodplains: At the Bedford-MHT Station, portions of the parking lot/access drive and stormwater BMP are located within areas mapped as Zone AE floodplain and/or regulatory floodway. Addition of ballast and minor grading along rail line would result in approximately 4 acre-feet of fill within 100-year floodplain. No encroachments to regulatory floodways would be anticipated. Shoreland: The rail line crosses through approximately 4.5 miles of previously developed Riverfront Area in MA. Impacts would occur from vegetation clearing and addition of a second track. The rail line crosses through approximately 10 miles of Protected Shoreland in NH. Impacts would occur from vegetation clearing, addition of a second track, and station construction.	Floodplains/Floodway: Compensatory flood storage areas would be created within rail ROW to offset impacts along rail line. Detailed floodplain/floodway analysis would be required near the Bedford-MHT Station to identify the extent of the Zone AE floodplain and regulatory floodway and confirm there would be no impacts. Shoreline Resources: Restoration of degraded Riverfront Area would occur if mitigation is determined to be necessary during permitting phase. In NH Protected Shoreland, stormwater runoff from the stations would be managed and treated in accordance with MS4 and NHDES AoT requirements.
4.6	Hazardous waste	Soil and groundwater impacts due to manufactured gas plant related wastes in the vicinity of Crown Street, Bedford/Manchester, and Hybrid Stations and layover facility.	Surficial soil in the vicinity of the right-of-way can be managed as LRS. Soil generated below approximately six feet is impacted above SRS and may result in being stockpiled and transported off-site for disposal. Groundwater impacts may require additional testing, containment, and/or permitting.

Potential Impacts and Mitigation Measures			
Environmental Resources		**Potential Impacts (Build Alternative)**	**Proposed Mitigation Measures**
4.7	Noise and vibration	Noise impacts due to the warning horns from the additional number of trains. Noise impacts from wheel/rail noise at residences near the Crown Street Station. Noise impacts residential buildings west of layover facility due to the idling trains between 4 am to 7 am. Operation vibration impacts a total of 3.6 miles of the proposed alignment. Construction vibration impacts on Bedford-Manchester Station if pile driving is used. One potential daytime construction noise impact.	Wayside horns and window upgrades to mitigate noise impacts and ballast mats to mitigate operations vibration impacts. FTA construction noise limits will be incorporated. Upgraded exterior windows for houses within 143 feet of the layover facility tracks.
4.8	Cultural resources	The potential impacts associated with construction of new stations and layover facility, bridge renovations or upgrades will still require assessment. In consultation with the SHPOs and Indian Tribes, it will be determined if the Project will adversely affect any historic properties determined eligible for inclusion in the NRHP.	A Treatment Plan will be developed and implemented if it is determined that it is not possible to avoid or minimize disturbance.
4.9	Air quality	The change in emissions associated with the project will not impact the region's attainment status. The local air quality impact will not be significant due to Project operations. The Regional air quality analysis shows that the project is presumed to conform to the applicable state implementation plans (SIPs) and would not require a full conformity analysis and conformity determination. The estimated annual operational emissions of GHGs show an annual net increase in GHG emissions associated with the Project compared to the future No-Build.	Operational mitigation measures: Change the fuel to biodiesel fuel, shift rail operations along the entire line to electricity, use sustainable station design and construction. Construction mitigation measures: Use local, renewable, recycled materials; use biodiesel for construction engines, and replant trees.
4.10	Environmental justice and Title VI compliance/Equity Analysis	Impacts to residents due to noise and vibration during both the initial construction phases as well as ongoing operations.	Wayside horns, upgraded windows, and sound walls for noise mitigation, and ballast mats or resilient rail fasteners for vibration mitigation.
4.11	Transportation	Traffic impacts on intersections at Route 3 off-ramp and Middlesex Road in South Nashua; and Elm St and Valley St., Elm St. and Market Basket Dr., and Elm St. and Auburn St. in Manchester.	Revise signal timings and phasing to accommodate additional traffic at the intersections, provide additional left turn lane and revise approaches.
4.12	Socioeconomic	No adverse impacts anticipated.	None

Environmental Resources		Potential Impacts and Mitigation Measures Potential Impacts (Build Alternative)	Proposed Mitigation Measures
4.13	Energy resources	The project will consume energy resources as part of the construction of rail line, stations and layover facility. Increased emissions from vehicle congestion are not anticipated. The project will also consume fuel resources as part of the commuter rail construction and operations and maintenance.	Long-term mitigation of energy impacts will likely take the form of fleet upgrades (lower-emission engines, electrification), potential solar installations at station locations, and other energy technology improvements.
4.14	Visual and Aesthetics	No impacts anticipated other than the vegetation clearing along the rail right-of-way that may restore views of the rail line that have been obstructed by years of unattended vegetation growth. The only station with any tall feature is Manchester Station, where the Project includes a pedestrian/bicycle bridge overpass that connects the station plaza and platform with South Commercial Street. As Manchester Station is located behind the stadium, its scoreboard, high mast lights, and other tall buildings along South Commercial Street, visual impacts from the pedestrian/bicycle bridge are not anticipated.	Limited to proper lighting design that does not disperse light from the site onto adjacent parcels.
4.15	Land Use	No impacts anticipated.	None
4.16	Open space and recreation resources/ Section 4(f)	No impacts anticipated. There are a number of NRHP and NRHP-eligible resources within the corridor.	As the design progresses, mitigation for some NRHP and NRHP-eligible bridges may be required and will be identified as the design progresses.
4.17	Property acquisition	Require easements of some property owned by CSX for station platforms adjacent to the tracks. Acquisition or easement needed for access at the stations and for the proposed parking lot at Bedford/MHT. None of the proposed stations will displace any existing residences or businesses. The layover facility will need some partial easements or acquisitions of ROW of some existing private landowners in order to create access, including at the south end near Hancock Street and at the access driveway from Elm Street.	At South Nashua there is the opportunity to negotiate a shared parking arrangement with the adjacent mall property owner(s); at Nashua Crown Street the City of Nashua owns the existing P&R lot and is supportive of its use for station parking; at Bedford/MHT most of the land needed for access and parking is owned by NHDOT; and at Manchester the station and layover are primarily on inactive portions of CSX parcels. The extent of private parcels needed might be reduced as design progresses.

5.1 Environmental Resources of No Concern

The following environmental resources were considered but not found within the study area based on agency and stakeholder coordination, database searches and site visits; therefore, they are not included for further discussion in this document:

- Coastal Zone: The project is not located within the coastal zone: therefore, there will be no effects to coastal resources.
- Solid Waste Disposal: There are no solid waste disposal areas in the study area: therefore, there will be no effects to solid waste disposal areas.
- Farmland: The Project is not located near or within farmland: therefore, there will be no project-related impacts on farmland.

5.2 Wetlands and Stream Crossings

5.2.1 Regulatory Requirements

At the federal level, wetlands are protected under the Clean Water Act (CWA) and activities resulting in impacts to them require a permit from the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA. In addition, surface waters that are considered navigable require a permit under Section 10 of the Rivers and Harbors Act. In NH, wetland resources are protected at the state level under the Fill and Dredge in Wetlands Act (RSA 482-A) and the NH Department of Environmental Services (NHDES) Administrative Wetlands Rules (Env-Wt 100-900). In MA, wetlands are protected at the state level by the Wetlands Protection Act (WPA), which is administered by the municipal conservation commissions, with overview by the MA Department of Environmental Protection (MassDEP).

5.2.2 Affected Environment

Wetlands and surface waters within and adjacent to the project corridor were identified through a combination of site visits and desktop map review[2]. Within MA, the entire rail corridor was field delineated. Within NH, approximately 9 miles of the rail corridor and the proposed station and layover sites were field delineated. The field delineation efforts focused on areas of potential impact. Wetland resources along the remaining 12 miles of the NH corridor were identified using online maps.

The dominant surface water feature within the project corridor is the Merrimack River, which flows from north to south along the entire rail line. The rail line crosses the Merrimack River once, at the Manchester-Bedford municipal boundary. The wetland resources within the project corridor include palustrine and riverine systems that feed into the Merrimack River. Since the proposed rail corridor follows an existing railroad embankment, wetland and stream crossings are currently bridged or culverted.

[2] Additional information on the wetland delineation for the project is provided in the Wetland Delineation Report prepared by GM2 Associates, Inc. in August 2021, and the Wetland Delineation Report Addendum, dated January 2022 and revised in April 2022.

The only prime wetlands within the project corridor are located within Nashua. These include the Merrimack River (within the City of Nashua), Salmon Brook, the Nashua River, and Pennichuck Brook (in Nashua). None of the prime wetlands within the project corridor have a 100-foot buffer zone. One vernal pool was identified adjacent to the rail line in Merrimack. No other vernal pools were observed near the project corridor during field reviews conducted in 2021: however, it is possible that additional vernal pools could be present in segments of the project that were not field reviewed.

5.2.3 Environmental Consequences

This section summarizes the impacts of No-Build Alternative and Build alternative on the wetland and stream crossing resources. This includes permanent, temporary (usually construction-related), direct and indirect impacts.

5.2.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no temporary construction-related impacts as well as permanent impacts to the wetland resources within the study area due to the Project. Under the No-Build condition, the owners of the railroad (MBTA in MA and CSX in NH) could be expected to perform ongoing maintenance and repair of the rail line to support current freight-only operations, which would likely include some vegetation clearing around existing tracks and sidings.

5.2.3.2. Manchester Commuter Rail Alternative Consequences

The Build Alternative would result in approximately 0.33 acres of direct, permanent impact to wetland resources, as well as approximately 0.83 acres of secondary impact to wetland resources from vegetation clearing (Table 7). Most of the proposed permanent wetland impact is associated with the construction of the Bedford-MHT Station (approximately 10,700 square feet, which includes approximately 6,450 square feet of permanent impact to Priority Resource Areas). The other stations would not result in any permanent wetland impacts. The proposed layover facility in Manchester would result in approximately 1,500 square feet of impact to two low-quality wetlands.

Along the rail line, most of the wetland impacts are associated with vegetation clearing within the rail ROW. Many of these areas were previously cleared. There are also minor permanent wetland and bank impacts associated with proposed grading along the rail bed and culvert repair/maintenance. The project involves the replacement of one culvert in Bedford (MP 50.45). This culvert carries an intermittent stream under the rail line. No direct impacts to navigable waters are proposed under the Build Alternative.

In MA, over 5 miles of the existing rail line crosses through 100-foot buffer zone. Proposed impacts within the buffer zone include vegetation clearing, addition of a second track, signal system upgrades, and reconstruction of at-grade crossings.

In Merrimack, a small amount of grading and vegetation clearing would occur within the 100-foot buffer (vernal pool envelope) and the 750-foot critical terrestrial habitat buffer of vernal pool ME16. No direct impacts to the vernal pool would occur. The rail line currently crosses through the vernal pool envelope and critical terrestrial habitat so the impacts would occur within a previously disturbed area. Post-construction, approximately 75% of the vernal pool envelope would remain forested and approximately 95% of the critical terrestrial habitat would remain forested.

Temporary wetland impacts would be further identified and quantified during the final design and permitting phase. One location with anticipated temporary impacts includes the Deep Brook crossing in Chelmsford, where proposed bridge work would include the repair of scour holes in the abutments. This would require temporary dewatering during construction.

Table 7. Wetland Impact Summary

		BVW / Wetland (sq. ft.)	Bank (sq. ft.)	LUWW / Stream (sq. ft.)	Stream Bank / Channel (linear ft.)
Subtotal (MA)	Permanent Impact	338	80	0	76
	Conversion Impact (vegetation clearing)	745	21,500	0	4,205
Subtotal (NH)	Permanent Impact	12,368	994	451	216
	Conversion Impact (vegetation clearing)	2,750	11,090	0	1,642
Total (Entire Project)	Permanent Impact	12,706 (0.29 acres)	1,074 (0.02 acres)	451 (0.01 acres)	292
	Conversion Impact (vegetation clearing)	3,495 (0.08 acres)	32,590 (0.75 acres)	0 (0 acres)	5,847

BVW = Bordering Vegetated Wetland
LUWW = Land Under Water Bodies and Waterways

5.2.4 Potential Mitigation Measures

Permanent wetland impacts from the Build Alternative would need to be mitigated through permittee-responsible mitigation (such as wetland creation, restoration, or upland preservation) or payment of an in-lieu fee. The required mitigation would be finalized during permitting once the design and impacts are further defined. Based on the preliminary estimate, the project would require restoration of a total of 26,414 square feet or creation of 50,297 square feet of Bordering Vegetated Wetland (BVW) and mitigation of 1,525 square feet/292 linear feet of streambed and/or bank throughout the study corridor or payment of in-lieu fee. Detailed information about the preliminary wetland mitigation is provided in Appendix A.

Preliminary mitigation amounts were identified based on the requirements outlined in the USACE's *New England District Compensatory Mitigation Standard Operating Procedures* (2020), the NHDES Wetlands Rules (Env-Wt 800), and the MA Wetlands Protection Act Regulations (310 CMR 10.00). It is anticipated that mitigation would not be required for temporary impacts since these would be restored once construction was complete. Mitigation amounts for secondary impacts from clearing were calculated using Table C2a in the USACE's Mitigation SOP. This recommends that permanent conversion of forested wetland to emergent wetland be mitigated at 30% of the standard amount and permanent conversion of scrub-shrub wetland to emergent wetland be mitigated at 15% of the standard amount. Stream mitigation amounts were calculated using a 1:1 ratio as specified in the NHDES Wetlands Rules (Env-Wt 803.08(b)). Final mitigation requirements would be coordinated with the regulatory agencies during final design and permitting.

The in-lieu fee payments were calculated using the USACE's Fact Sheet on MA In-Lieu Program Fees and the NHDES Aquatic Resource Mitigation (ARM) Fund calculator. In-lieu fee

payments could be used in place of permittee-responsible mitigation (dollar amounts are in place of permittee-responsible mitigation, not in addition to).

Proposed vegetation clearing would be within previously cleared areas in the rail ROW along the upper edge of the bank. Mitigation requirements would be confirmed with the Conservation Commissions during final design.

The Conservation Commissions in Nashua, Merrimack, Bedford, and Manchester were contacted to identify any potential local mitigation opportunities. The Bedford Conservation Commission responded that the stream and wetland system located north of the proposed Bedford-MHT Station (Wetlands BE5 and BE7 and the stream crossing at MP 50.45) would benefit from channel reconstruction, improved hydrologic connectivity, riparian enhancement, and invasive species control.

5.3 Water Quality

5.3.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to surface water quality:

Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES), which regulates the discharge of pollutants from point sources (pipes, ditches, or other conveyances) into waters of the US (streams, regulated wetlands, and other waterbodies). The NPDES program also includes Municipal Separate Storm Sewer Systems (MS4). In addition, under Section 401 of the Clean Water Act, projects that require federal permits or licenses require a Water Quality Certification by the state.

In NH, surface water quality is regulated at the state level by RSA 485-A, Water Pollution and Waste Disposal, and by the NHDES Surface Water Quality Standards Administrative Rules (Env-Wq 1700). Surface water quality in NH is also regulated under the NHDES Alteration of Terrain Administrative Rules (Env-Wq 1500).

Surface water quality in MA is regulated at the state level by MGL Chapter 21, Sections 26 through 53 and the Surface Water Quality Standards (314 CMR 4.00). Stormwater treatment for development projects in MA is reviewed by the Conservation Commission as part of a Notice of Intent application for a Wetland Permit.

Groundwater resources are protected at the federal level by the Safe Drinking Water Act (42 U.S.C. Section 300f). In NH, groundwater resources are protected under the Groundwater Protection Act (RSA 485-C) as well as other state and local regulations. In MA, groundwater resources are protected under MGL Chapter 21, Sections 26 to 53 and 314 CMR 5.00 (Groundwater Discharge Permit Program). These regulations protect the potential use of groundwater as a drinking water source, as well as surface waters under the MA Surface Water Quality Standards (314 CMR 4.00).

5.3.2 Affected Environment

Surface Water

The main surface water feature along the project corridor is the Merrimack River, which parallels the rail line from Lowell to Manchester and is crossed once by the project at the Bedford-

Manchester line. The rail line also crosses various tributaries to the Merrimack River, as shown in Table 2.2 of the Natural Resources Technical Report (Appendix A).

All surface waters within and adjacent to the project corridor are designated as Class B. There are no Class A waters or Outstanding Resource Waters within one mile of the project. The entire project corridor is located within MS4-regulated communities.

Groundwater

The rail corridor from the Merrimack Wastewater Treatment Plant to the northern terminus at Granite Street is located within a Source Water Protection Area associated with Pennichuck Water Works. The rail corridor also crosses through a water supply intake protection area near the Merrimack Wastewater Treatment Plant and a wellhead protection area near Reeds Ferry in Merrimack.

There are no mapped source water protection areas or wellhead protection areas within or adjacent to the rail line in MA.

Water supply wells are located within 1,000 feet of the Crown Street Nashua, Bedford-MHT, and Manchester Station sites, as well as the Manchester Layover Facility site. No wellhead protection areas are located within 1,000 feet of the station/layover sites.

5.3.3 Environmental Consequences

5.3.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no temporary construction-related impacts as well as permanent impacts to water quality within the study area due to the Project.

5.3.3.2. Manchester Commuter Rail Alternative Consequences

The Build Alternative has the potential to result in water quality impacts during construction and operation. Construction impacts would be temporary and could result from ground-disturbing activities that may release sediment into nearby surface waters. Due to known contamination in portions of the project corridor, dewatering and soil excavation during construction could also impact water resources if contaminated water and soil are not handled appropriately.

Post-construction, the addition of impervious surface at the station and layover sites has the potential to adversely affect water quality. The following table shows the approximate amount of new impervious surface proposed at each station/layover site. There would be no substantial amount of new impervious surface along the rail corridor since the improvements would occur within the existing rail embankment/ballast.

Table 8. Proposed New Impervious Surface at Stations and Layover Facility

Station / Layover Site	Proposed New Impervious (square feet)
Pheasant Lane Mall – South Nashua	52,382
Crown Street – Nashua	40,663
Bedford-MHT	172,445
Manchester Station	13,049
Manchester Layover	49,845

Although the study area consists of a currently operating freight rail line, the addition of commuter trains would increase rail traffic and the risk of spills associated with derailments or other accidents. This would be of particular concern near the water supply intake protection area near the Merrimack Wastewater Treatment Plant as well as the wellhead protection area near Reeds Ferry in Merrimack. In addition, fueling operations at the layover facility would have the potential to cause groundwater contamination without adequate spill cleanup and control measures.

5.3.4 Potential Mitigation Measures

During construction, erosion and sedimentation controls and other Best Management Practices (BMPs) would be implemented to minimize temporary impacts to water quality. The Build Alternative would require preparation of a Stormwater Pollution Prevention Plan (SWPPP) and coverage under the NPDES Construction General Permit. A NPDES Remediation General Permit would be necessary for construction if dewatering is required in contaminated areas.

Stormwater BMPs would be constructed at the South Nashua Station, Bedford-MHT Station, Manchester Station, and the Manchester Layover to treat runoff from the additional impervious surfaces. The Build Alternative would need to meet the NHDES Alteration of Terrain rules, as well as MS4 requirements. It is anticipated that no stormwater treatment would be required along the rail line.

NHDES Alteration of Terrain Rules regarding setbacks for stormwater discharges from water supply wells would be adhered to during final design. The operator of the rail line would develop a spill response plan for accidents and incorporate measures to protect against and contain spills during locomotive refueling at the layover facility in Manchester. An oil/water separator would be installed at the layover facility for treatment of the locomotive drip pans. The upgraded track infrastructure associated with the Build alternative would likely reduce the chances of a derailment compared to the track conditions under the No-Build alternative.

5.4 Endangered Species/Wildlife/Fisheries

5.4.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to endangered species, wildlife, and fisheries resources:

Endangered Species/Wildlife

Threatened and endangered species are protected at the federal level under the Endangered Species Act of 1973 (16 USC 1531-1544). The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668 et seq.) prohibits the “take” of bald eagles and golden eagles. In addition, the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712) prohibits the take of protected migratory bird species without prior authorization by the US Fish and Wildlife Service.

In NH, rare plant species are protected under the Native Plant Protection Act of 1987 (RSA 217-A) and listed animal species are protected under the NH Endangered Species Conservation Act of 1979 (RSA 212-A). Consultation with the NH Fish and Game Department (NHF&G) in accordance with NHF&G Rule *Fis 1004* is required for projects that could have an adverse effect on listed wildlife species. In addition, in NH, RSA 228:46-c (“Wildlife Corridors and Habitat Strongholds”) requires NHDOT to consider wildlife corridors and habitat strongholds, including

the improvement of stream crossings and minimizing impacts to wildlife connectivity where feasible.

In MA, both rare plant and animal species are protected under the MA Endangered Species Act of 1990 (MESA) (MGL c.131A). The MA Natural Heritage and Endangered Species Program (NHESP) designates areas of Priority Habitats and Estimated Habitats based on the known locations of listed species. In addition, the MA NHESP produces maps showing the locations of Certified Vernal Pools and Potential Vernal Pools.

Fisheries

At the federal level, the Magnuson-Stevens Act regulates marine fisheries resources and protects “Essential Fish Habitat” (EFH) for federally managed fish species. In NH, the Fish and Game Department Fisheries Division monitors and manages inland and marine fisheries. In MA, the Division of Fisheries and Wildlife (MassWildlife) is responsible for the management of marine and freshwater fisheries throughout the state.

5.4.2 Affected Environment

Endangered Species/Wildlife

Various state and federally listed rare, threatened, and endangered species were identified within the vicinity of the project corridor. These include the federally-listed northern long-eared bat (*Myotis septentrionalis*) and Monarch butterfly (*Danaus plexippus*), which is a candidate species for federal listing. Two MA state-listed species were identified by NHESP: bald eagle (Haliaeetus leucocephalus) and riverine clubtail dragonfly (*Stylurus amnicola*). In NH, various state-listed species were identified by NHB. Some of these species included brook floater mussel (*Alasmidonta varicosa*), bald eagle, Blanding’s turtle (*Emydoidea blandingii*), Eastern hognose snake (*Heterodon platirhinos*), wood turtle (*Glyptemys insculpta*), Northern black racer (Coluber constrictor), and grasshopper sparrow (*Ammodramus savannarum*), as well as several rare plant species and one exemplary natural community. A summary of field surveys conducted in 2021 and agency coordination is provided in the Natural Resources Technical Report (Appendix A).

Fisheries

The Merrimack River, Stony Brook, the Nashua River, Pennichuck Brook, Horseshoe Pond, and the Souhegan River are designated as EFH for Atlantic salmon (*Salmo salar*). Most of the streams and rivers crossed by the project are classified as warmwater fisheries. Sebbins Brook, located south of the proposed Bedford-MHT Station is considered a coldwater fishery and is known to contain sea lamprey (*Petromyzon marinus*) and Eastern brook trout (*Salvelinus fontinalis*). Deep Brook, which is crossed by the rail line in Chelmsford, is designated as a Coldwater Fish Resource but, according to information received from MassWildlife, the lower reach of the stream that is crossed by the project doesn’t provide habitat and water temperatures suitable for coldwater fish.

5.4.3 Environmental Consequences

5.4.3.1. No-Build Alternative Consequences

Under the No-Build Alternative, there would be no temporary construction-related impacts as well as no permanent impacts to endangered species, wildlife, and fisheries within the study area.

5.4.3.2. Manchester Commuter Rail Alternative Consequences

Endangered Species/Wildlife

Since the Build Alternative would involve tree clearing along sections of the rail ROW, there is potential for adverse impacts to the federally listed northern long-eared bat. Approximately 40 acres of vegetation clearing would occur although much of this would involve shrubs and trees less than 3 inches in diameter.

Based on field surveys conducted in 2021, no rare plant species or exemplary natural communities were identified within the rail ROW or at the proposed station and layover facility sites, so no impacts would occur from the Build Alternative.

Bald eagles (Special Concern in NH and MA) occur throughout the project corridor. Clearing large trees along the Merrimack River and other large waterbodies could adversely affect this species, particularly near known nesting sites.

Riverine clubtail dragonfly (Endangered in MA) occurs in Chelmsford and Tyngsborough. Vegetation clearing along rivers and streams has the potential to result in adverse impacts to this species.

Potential impacts to several NH state-listed turtle and reptile species could occur during construction of the Build Alternative, particularly within the segments of the rail line in Merrimack and Bedford.

Eastern meadowlark and grasshopper sparrow have been recorded in the fields [redacted] in Merrimack. Since the Build Alternative does not involve any permanent or temporary impacts to this field habitat, no adverse effects to grassland bird species would be anticipated.

Brook floater is known to occur in sections of the Merrimack River in NH. Since the Build Alternative would not involve permanent or temporary impacts to the Merrimack River channel, no impacts to brook floater mussels are anticipated.

Fisheries

The Build Alternative would not impact Essential Fish Habitat (EFH). In-water work would occur at the Deep Brook bridge in Chelmsford; however, Deep Brook is not mapped as EFH. Based on correspondence with the National Marine Fisheries Service (NMFS), the Build Alternative would not require EFH consultation since no other in-water work is proposed.

Sea lamprey and Eastern brook trout are known to occur in Sebbins Brook. Although the Build Alternative would not result in direct impacts to Sebbins Brook, indirect impacts may occur from vegetation clearing and stormwater discharges. Increases in water temperature from these indirect impacts could have adverse effects on these species.

5.4.4 Potential Mitigation Measures

Endangered Species/Wildlife

The following avoidance, minimization, and mitigation measures were incorporated into the preliminary design, or would be implemented during final design and construction:

- Semi-rich oak-sugar maple forest, an exemplary natural community, was identified adjacent to the Pine Grove Cemetery Layover Site in Manchester. This layover site

option was not selected due to concerns with natural resource impacts as well as other constraints.

- The Build Alternative would not involve impacts to the Merrimack River. If this changes during final design, an additional survey for Wright's spike sedge (rare plant) would be conducted. In addition, coordination with NHF&G would occur to determine if a mussel survey is required.
- Proposed vegetation clearing would be minimized where possible, especially near rivers and streams.
- The use of welded plastic or biodegradable plastic netting or thread in erosion control matting would be avoided during construction since these types of materials can be harmful to snakes and other reptile species. A "wildlife friendly" option, such as jute matting, will be used instead.
- Construction personnel would receive training in the identification of rare, threatened, and endangered species that may occur within the project area and be aware of their protected status. NHF&G turtle and snake flyers would be distributed to all contractors. Photographs of the species listed in the NHB report would be included on the construction plans.
- Tree clearing activities along the Merrimack River will be conducted between July and December to avoid impacts to bald eagles.
- Impacts to the fields near Anheuser-Busch in Merrimack are not proposed under the Build Alternative since they are located beyond the rail ROW. If any impacts to these fields are identified during final design, coordination with NHF&G and NH Audubon would occur to determine the need for grassland bird surveys.
- Bat acoustic surveys would likely be required during final design to document the presence or probable absence of northern long-eared bat (NLEB) within the project area. In addition, surveys of bridges or other applicable structures that may be impacted during construction would be completed during final design to determine if they provide bat roosting habitat.
- General avoidance and minimization measures, such as seasonal restrictions for tree clearing, would be implemented as necessary to reduce impacts to NLEB.
- Wildlife and aquatic organism passage would be considered during final design, particularly at proposed bridge and culvert replacements or rehabilitations.

Continued coordination with USFWS, NHF&G, NHNHB, and MassWildlife NHESP would be required during final design to confirm impacts and identify any additional mitigation measures. Consultation with NHF&G as outlined in NHF&G Rules *Fis 1004* would need to occur as part of the permitting process. The project will also require review under the MA Endangered Species Act (MESA).

Fisheries

The Build Alternative would not involve impacts to EFH, so no mitigation measures are proposed. If impacts change during final design, work within and adjacent to diadromous fish resources should be reviewed to determine if EFH consultation is necessary. Potential indirect impacts to Sebbins Brook from vegetation clearing and stormwater management would be considered during the final design of the Bedford-MHT station.

5.5 Invasive Species

5.5.1 Regulatory Requirements

Invasive plants include non-native species that are able to rapidly colonize an area and can out-compete native species. Executive Order 13112 was enacted in 1999 to prevent the introduction of invasive species and minimize the economic, ecological, and human health impacts that they can cause. In NH, aquatic invasive plant species are regulated by NHDES, and terrestrial species are regulated by the NH Department of Agriculture. Invasive plants are regulated in MA by the Department of Agricultural Resources.

5.5.2 Affected Environment

Invasive plants are present throughout most of the project corridor. Some of the species that were observed during field visits include Asian bittersweet (*Celastrus orbiculatus*), glossy buckthorn (*Frangula alnus*), Japanese knotweed (*Reynoutria japonica*), purple loosestrife (*Lythrum salicaria*), and Tatarian honeysuckle (*Lonicera tatarica*).

5.5.3 Environmental Consequences

5.5.3.1. No-Build Alternative Consequences

The No-Build Alternative would have no temporary construction-related impacts as well as no permanent impacts to invasive plant species within the study area.

5.5.3.2. Manchester Commuter Rail Alternative Consequences

Since invasive plant species are present throughout the project corridor, the Build Alternative would potentially result in the spread of these species during construction, from both ground disturbing activities and vegetation clearing.

5.5.4 Potential Mitigation Measures

An invasive species management plan, with control measures, would be incorporated into the construction phase of the project. Long-term vegetation management of the rail corridor would also include planning for invasive species control.

5.6 Floodplain and Shoreland Resources

5.6.1 Regulatory Requirements

Floodplains and Floodways

Executive Order 11988, Floodplain Management, directs federal agencies to evaluate potential floodplain impacts, avoid impacts where practicable, and mitigate flood storage loss where impacts are unavoidable. In NH, Executive Order 96-4 requires all state agencies to comply with floodplain management requirements for communities that participate in the National Flood Insurance Program (NFIP). In MA, Executive Order No. 149 requires all state agencies to avoid construction, provision of loans or grants, conveying, or permitting projects in floodplains to the extent possible.

Shoreland Resources

In NH, areas within 250 feet of large streams and ponds, rivers, and lakes are protected under the Shoreland Water Quality Protection Act (SWQPA). In MA, The Rivers Protection Act of 1996 provides protection to rivers by establishing a Riverfront Area (RFA) that is regulated under the Wetlands Protection Act. In most municipalities, the RFA is 200 feet wide, however in larger cities and densely developed areas, the RFA is 25 feet wide.

5.6.2 Affected Environment

Floodplains and Floodways

Since the rail corridor is located along the Merrimack River, large portions of the rail line are located adjacent to areas that are mapped as 100-year floodplains and sections of the rail line cross 100-year floodplains. Mapped floodplains and regulatory floodways are located within or adjacent to the Pheasant Lane Mall-South Nashua and Bedford-MHT Stations.

Shoreland Resources

In NH, over 10 miles of the existing rail line is located within Protected Shoreland. Most of this area is associated with the Merrimack River although the rail line also crosses through the Protected Shoreland zone of the following waterbodies: Salmon Brook, Nashua River, Pennichuck Brook, Horseshoe Pond, and Souhegan River.

In MA, the rail line crosses through RFAs associated with the Merrimack River, Black Brook, Stony Brook, Deep Brook, Bridge Meadow Brook, and Mill Brook. The RFA is 200 feet wide in Tyngsborough and Chelmsford and 25 feet wide in Lowell. Within Lowell, the tracks do not cross through RFA, but portions of the rail ROW extend into RFA. In Tyngsborough, the rail line crosses through approximately 3.2 miles of RFA while in Chelmsford it crosses through approximately 1.3 miles of RFA.

5.6.3 Environmental Consequences

5.6.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no temporary construction-related impacts as well as permanent impacts to floodplain or shoreland resources within the study area due to the Project.

5.6.3.2. Manchester Commuter Rail Alternative Consequences

Floodplains and Floodways

Although most of the rail line is elevated above the 100-year floodplain, portions of it cross through areas mapped as either Zone A or AE (100-year) floodplain. The addition of ballast and minor grading along the rail line would result in approximately 4 acre-feet of fill within 100-year floodplains. This includes approximately 2.7 acre-feet in Chelmsford, 0.8 acre-feet in Tyngsborough, and 0.5 acre-feet in Manchester. No substantial fill within floodplains would be anticipated along the rail corridor in Lowell, Nashua, Merrimack, and Bedford. The Build Alternative would not encroach on regulatory floodways along the rail line.

The proposed station and layover facility sites were designed to be located outside of regulatory floodways and 100-year floodplains. At the Bedford-MHT Station, portions of the parking

lot/access drive and stormwater BMP are located within areas mapped as Zone AE floodplain and/or regulatory floodway. A review of the Base Flood Elevation (BFE) and the LiDAR contours for this area show a discrepancy between the mapped floodplain/floodway and the existing site conditions. Based on this information, it appears that the Zone AE floodplain and regulatory floodway do not extend into the proposed station limits and there would be no loss of flood storage. This would need to be confirmed during the final design/permitting phase of the project through a more detailed floodplain/floodway analysis.

Shoreland Resources

Within MA, the Build Alternative would involve disturbance within Riverfront Area (RFA) from vegetation clearing and the addition of a second track. The southern end of the Pheasant Lane Mall Station is also located within RFA. The proposed work within RFA would be located within previously developed areas and would be subject to the requirements outlined in 310 CMR 10.58(5) (*Redevelopment within Previously Developed Riverfront Areas; Restoration and Mitigation*).

Within NH, large sections of the rail corridor are located within Protected Shoreland. Proposed impacts would be associated with vegetation clearing, addition of second track, and station construction. Since the rail corridor was historically double-tracked, the second track will be added within the existing rail embankment and new impacts along the rail corridor are limited. The South Nashua and Bedford-MHT Stations would involve new impervious surface within the Protected Shoreland of the Merrimack River.

5.6.4 Potential Mitigation Measures

Floodplains and Floodways

The minor loss in flood storage that would occur along the rail corridor in Chelmsford, Tyngsborough, and Manchester would be mitigated by providing compensatory flood storage within the rail ROW. Further evaluation of floodplain impacts would occur during final design to determine the required amount and locations of compensatory storage.

Shoreland Resources

Although the proposed work within RFA would be located within previously developed areas, restoration or mitigation may be required, particularly if any impacts extend beyond previously developed areas. Mitigation could include restoration of degraded RFA. Proposed impacts within RFA would be finalized during the permitting phase and coordination with the local Conservation Commissions would occur to determine a restoration strategy, if required.

Similar to MA, work within NH Protected Shoreland Areas would generally be limited to previously developed areas. Vegetation clearing would occur adjacent to the rail line, within the rail ROW. Stormwater would be managed and treated in accordance with MS4 and NHDES AoT requirements.

5.7 Hazardous Waste

5.7.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to hazardous waste sites:

Federal

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980
- Resource Conservation and Recovery Act (RCRA) of 1976
- Executive Order (EO) 12088, Federal Compliance with Pollution Control Standards

NH

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

MA

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

5.7.2 Affected Environment

The affected environment section provides a concise description of Limited Reuse Soils (LRS), hazardous waste sites, and Per and Polyfluoroalkyl Substance (PFAS) in the vicinity of the project limits and their effect on the No-Build and Build Alternatives.

Limited Reuse Soils (LRS)

Soil along railroad rights-of-way generally have the potential of being impacted with petroleum hydrocarbons/polycyclic aromatic hydrocarbons (PAHs) associated with fluids and combustion of fuel, wood treating chemicals associated with railroad ties, metals, herbicides associated with maintenance of vegetation along tracks, asbestos, polychlorinated biphenyls (PCBs) associated with transformer fluids and potentially lead-based paint in areas where overpasses were painted prior to 1970. Despite any known releases, these surficial soils would likely be considered LRS and reused within the railroad right-of-way.

The quantity of LRS anticipated to be generated during site work is outlined below:

- Trackwork, Culverts, Bridges and Signals @ 1.5' depth — 330 yd^3
- Stations and Layover Estimate
  - i. Proposed South Nashua Station @ 1.5' depth — 2,800 yd^3
  - ii. Proposed Nashua Crown Street Station @ 1.5' depth — 3,500 yd^3
  - iii. Proposed Bedford/MHT Station @ 1.5' depth — 22,000 yd^3
  - iv. Proposed Manchester Station @ 1.5' — 6,500 yd^3
  - v. Proposed Manchester Layover Facility — 37,222 yd^3
  - ***Total estimate of LRS based on above*** — ***72,352 yd^3***

Hazardous Waste Sites/Contamination Inventory

A total of 62 sites were listed on contaminant-related databases within 1,000 feet of the project limits, along with 11 landfills located within 4,000 feet of the project limits, and three PFAS sites within 1,000 feet of the project limits. Of the 62 sites, 46 have achieved regulatory closure and/or are adequately regulated. Based on review of the database listings, six sites were identified that are considered potential environmental concerns for the proposed stations/layover facility and are described below. Further detail is provided in the technical report titled *Nashua-Manchester 40818, Capital Corridor Hazardous Waste Sites/Contamination Inventory and PFAS* Evaluation included in Appendix B.

Proposed South Nashua Station: Based on historical maps reviewed, the project limits have been occupied by railroad tracks since at least the late 1800s. The shared parking area with the adjacent mall was occupied by grassy and wooded land with a stream from at least the late 1930s until the construction of the Pheasant Lane Mall in 1986.

The project limits were not identified on any contaminant-related database. Three off-site properties within 1,000 feet were identified on contaminant-related databases and one landfill was identified within 4,000 feet. Based on regulatory status, distance and/or topography, none of these listings are considered an environmental concern for this proposed station.

Proposed Nashua Crown Street Station: The proposed Nashua Crown Street Station has been occupied by railroad tracks since at least the early 1900s. The parking lot portion, currently occupied by a Park and Ride facility, was historically occupied by a portion of the Gregg & Son manufacturing operation lumber sheds from the late 1800s through the mid-1950s. Between 2017 and 2018 the site was redeveloped as the current Park and Ride.

The Park and Ride portion of the project limits is a portion of a state hazardous waste site (SHWS)/Leaking Underground Storage Tank (LUST)/Brownfield site identified as New Hampshire Department of Environmental Services (NHDES) #199402011 (Triangle Pacific Corporation, 25 Crown Street). The LUST listing is closed. Groundwater was impacted by chlorinated volatile organic compounds (CVOCs). Based on regulatory status (active), proximity and CVOC impacts to groundwater, this SHWS is considered a potential concern for the proposed Crown Street Station.

Concentrations of several PAHs were detected in the test pit samples above the NHDES Soil Remediation Standards (RSRs). The PAHs detected are commonly attributable to the fill material in urban areas.

Six properties were identified within a 1,000-foot radius listed on a contaminant-related database and six landfills were identified within a 4,000-foot radius of the proposed station. Based on the project team's review and analysis of the database listings and landfill listings, none of the surrounding sites/landfills are expected to present an environmental concern to the proposed station based on their distance, regulatory status (i.e., regulatory closure, no violations found), media impacted (soil only), and/or topographical position relative to the proposed station (i.e., down-gradient or cross-gradient) outside of the Park and Ride listing.

Proposed Bedford/MHT Station: Historical research indicates that the railroad tracks have been present since at least the early 1900s. The proposed station area was occupied by grassy and wooded areas from at least the mid-1940s. By the mid-1980s, a commercial style structure was constructed in the location of the proposed overflow parking area. According to the Bedford Assessors' information this building appeared to be used as a church (Faith Christian Center). Between 2006 and 2009, construction of Raymond Wieczorek Drive occurred. The church was demolished by 2012 and Raymond Wieczorek Drive opened to the public in 2015.

The proposed station was not listed on any contaminant-related database; however, the proposed station is located within the Pre-Groundwater Management Zone (Pre-GMZ) of the St. Gobain Performance Plastics (SGPP) Consent Decree Area (March 2018). In July 2021, SGPP completed the installation and operation of a thermal oxidizer for control of PFAS emissions. The preliminary results show the outlet concentrations of perfluorooctanic acid (PFOA) and perfluorooctyl sulfonate (PFOS) below the emissions limits. Based on aerial distribution from the SGPP, and the proposed station being located within the Pre-GMZ, there is a potential concern for the presence of PFAS-impacted soil and groundwater at the proposed station.

Proposed Manchester Station: Historical research indicates that the proposed Manchester Station has been occupied by railroad tracks since at least the late 1800s. The parking area in the northern portion of the proposed Manchester Station (Granite Street portion) at the southwest corner of Canal Street and Granite Street was occupied by a filling station between 1971 and 1975. By the mid-1980s, this lot is depicted as grassy and appears to be paved by the late 1980s. No additional information pertaining to the former filling station was obtained during this assessment.

The proposed station was not identified on any contaminant-related database. Thirty sites on contaminant-related databases were identified within 1,000 feet, three of which are considered potential off-site concerns. Four landfills were identified within 4,000-feet, none of which were considered potential environmental concerns for the proposed station. The three potential off-site properties are summarized below:

- B&M/John Danais Company site abuts the proposed station to the west and downgradient. Impacts to soil and groundwater appear to be associated with a former 8,000-gallon tetrachlorethylene (PCE) aboveground storage tank (AST) that was located approximately 25 feet west of the existing railroad tracks. Based on proximity, there is a potential for residual PCE-impacted soil and/or groundwater to be present within the project limits.

- Hermsdorf Fixtures, 108 Franklin Street, located approximately 250 feet east and upgradient of the proposed station and is listed on the UST, ALLSITES (NHDES # 199407080), Resource Conservation and Recovery Act Non-Generator/No Longer Regulated (RCRA NonGen/NLR), and Aerometric Information Retrieval System (AIRS) databases. Based on proximity, topographic position (upgradient) and regulatory status (active), this site is considered a potential environmental concern to groundwater beneath the proposed station.

- Energy North (#200000301), at 130 Elm Street, located approximately 500 feet south and cross-gradient, was a former manufactured gas plant (MGP) (Manchester Gas Works) with documented soil and groundwater impacts of MGP-related wastes.

Based on the 2020 Annual Report[3], concentrations of PCE, trichloroethylene (TCE), benzene, toluene, ethylbenzene, 1,2,4-trimethylbenzene, naphthalene, and styrene are present in groundwater above ambient groundwater quality standards (AGQS). A portion of the proposed station as well as the planned access road from Valley Street are located within the Groundwater Management Zone (GMZ) of this site. There is a potential for impacted soil and groundwater associated with this site to be located within the southern portion of the project limits and is therefore considered an environmental concern.

Several remedial investigations have occurred: based on proximity and regulatory status, this site is considered a potential environmental concern for the proposed Manchester Station.

Proposed Manchester Layover Facility: Historical research indicates that the railroad tracks have been present since at least the early 1900s.

The proposed layover facility is not identified on any contaminant-related database; however, the facility is located within the GMZ of the former Energy North site (#200000301) discussed above. During investigations conducted at the former Energy North site, impacted soil and groundwater had been identified both upgradient and downgradient of the railroad right-of-way

[3] Annual Summary Report, 2019/2020 Monitoring Year, Former Manufactured Gas Plant, 130 Elm Street, Manchester, New Hampshire, NHDES Site #20003011. Prepared by GZA GeoEnvironmental, Inc., dated October 20, 2020.

as well as impacted sediment along the banks of the Merrimack River to the west of the proposed layover facility.

During the advancement of geotechnical borings as part of the EA, impacted soils were encountered approximately six to eight feet below grade. These soils were gray in color with a strong petroleum-like odor. A composite soil sample was submitted for laboratory analysis. Concentrations of VOCs (benzene, naphthalene, toluene, 2-methylnaphthalene) and PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, fluorene, indeno(1,2,3-cd) pyrene, and naphthalene) were detected above the NHDES Soil Remediation Standards (SRS).

Based on review, 20 properties were identified within a 1,000-foot radius of the project limits listed on a contaminant-related database of which two were identified as potential environmental concerns for the project limits.

- Energy North/Liberty Utilities, 130 Elm Street, located approximately 130 feet east and upgradient and is listed on the SHWS and AIRS databases. MGP impacts were identified extending as far west and into the Merrimack River. Additionally, PCE and TCE detected in groundwater at the MGP site were not considered compounds of concerns at the MGP and likely attributable to an off-site source.
- Manchester Transit Authority, 110 Elm Street, located abutting the project limits to the east and upgradient, is listed on the Brownfields, SHWS, LUST, ALLSITES, Spills, and PFAS databases. The LUST listing was closed in 2005.

Based on files reviewed, additional subsurface investigations in 2020 identified TPH in once soil sample above the SRS. No PAHs or TPH were detected above AGQS in groundwater samples. CVOCs were detected in groundwater above AGQS. Initial PFAS sampling was completed in 2020, and PFOA was detected above the AGQS, with the highest concentrations in the upgradient well. A review of NHDES files was conducted in order to further evaluate the potential source of CVOCs in groundwater. Based on data reviewed, the extent of CVOCs in groundwater at the off-site upgradient former Electropac site was not well defined and could represent a regional groundwater quality issue. An additional SSI was proposed for 2021.

5.7.3 Environmental Consequences

5.7.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no temporary construction-related impacts as well as permanent impacts to the identified hazardous waste sites/PFAS sites within the study area due to the Project.

5.7.3.2. Manchester Commuter Rail Alternative Consequences

The Nashua-Manchester Commuter Rail project may encounter short-term delays due to the movement of contaminated soils along the railroad right-of-way; specifically, soils from a depth greater than five feet below existing grade in the vicinity of the proposed layover facility where subsurface materials are impacted by MGP wastes above standards, soils up to five feet in the vicinity of the eastern side of the parking lot at the proposed Nashua Crown Street station where PAHs impacts were detected above standards, and soils in the vicinity of the proposed Bedford/MHT Station which may be impacted by PFAS.

A portion of the proposed Hybrid Station and the Layover Facility are located within the GMZ of the Energy North site and the proposed Bedford/MHT station is located within the Pre-GMZ of the (SGPP) site. A GMZ identifies the area where groundwater contamination is contained. The area of the SGPP Pre-GMZ has impacts of PFAS in groundwater and the area of the Energy North GMZ has VOCs and petroleum-related constituents in groundwater. Additionally, based on documents reviewed, it appears that there is a regional CVOC plume in the vicinity of both the proposed Manchester Station and Layover facility. If dewatering is required as part of construction activities, additional containment, sampling or permits may be required to manage potentially impacted groundwater.

5.7.4 Potential Mitigation Measures

Surficial soil in the vicinity of the right-of-way can be managed as LRS and is categorized as no impact. Surficial soil (0-5') in the vicinity of the eastern side of the proposed Nashua Crown Station parking lot are impacted with PAHs which are typically associated with fill material. This soil may be categorized as negligible and will likely be able to remain in place. Any soil generated as part of the proposed Manchester Station or Layover Facility below approximately six feet is impacted above SRS and may result in being stockpiled and transported off-site for disposal and is categorized as moderate. Groundwater impacts associated with the Pre-GMZ for SGPP site at the proposed Bedford/MHT Station, potential regional CVOC plume and/or impacts associated with the former MGP site may require additional testing, containment, and/or permitting due to impacts and is categorized as moderate.

5.8 Noise and Vibration

This section summarizes the affected environment for noise and vibration within the study area corridor. The analysis of noise and vibration impacts used design information for the proposed alignment of the Build Project Alternative. The FTA Transit Noise and Vibration Impact Assessment Manual provides guidelines for establishing the extent of the study area to be used for the noise and vibration impact analyses. It also provides guidance for identifying noise-sensitive locations where increased annoyance can occur from train pass-bys. Further information on regulatory requirements and the affected environment is provided in the Noise and Vibration Technical Report included as Appendix C.

5.8.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to noise and vibration:

Federal

- FTA. Transit Noise and Vibration Impact Assessment Manual. FTA Report Number 0123, September 2018 (noise and vibration guidelines)

NH & MA

- No applicable state laws and regulations

5.8.2 Affected Environment

The affected environment follows the Manchester Commuter Rail Alternative from Lowell, MA to Manchester, NH within the existing freight rail corridor, as well as the proposed stations in South Nashua, Nashua Crown Street, Bedford/MHT, and Manchester, and the layover facility in Manchester. This region includes areas and communities within Middlesex County in Massachusetts and Hillsborough and Merrimack Counties in New Hampshire. These areas are mixed in terms of rural, residential, commercial, and industrial land use with isolated residential clusters considered to be suburban in nature, except for the downtown urban areas of Lowell, Nashua, and Manchester. Each proposed station location falls within the urban areas of the cities of Nashua and Manchester.

5.8.2.1. Existing Noise Levels

In general, freight trains would generate 67 dBA L_{dn} at 50 feet from the rail tracks without horns. The noise level would drop off at a rate of 4.5 dBA per doubling of distance, per the FTA Guidance Manual. The warning horn noise level would be 74 dBA L_{dn} at 50 feet from the rail centerline within ¼-mile of each grade-crossing. Warning horns would be the dominant noise sources when receptors are near grade-crossings. When receptors are not near grade-crossings, the dominant noise sources would be passing freight trains, passenger trains, or vehicular traffic.

5.8.2.2. Existing Vibration Levels

Unlike the FTA noise impact assessment method, train-related vibration impact thresholds are not dependent upon existing ground-borne vibration levels, so the documentation of existing ground-borne vibration levels is not an issue as it is for noise levels. As a reference, the existing freight trains generate 82 VdB at 50 feet when they operate at their maximum speed of 40 mph. The existing maximum speed for freight trains is 40 mph for a short section only between Lowell and North Chelmsford. North of Lowell, freight trains operate at a maximum speed of 25 mph along the entire existing line.

5.8.3 Environmental Consequences

5.8.3.1. No-Build Alternative Consequences

No noise impacts would result from the No-Build Alternative in that this scenario maintains freight operations within the corridor with no projected and planned annual growth.

5.8.3.2. Manchester Commuter Rail Alternative Consequences

Noise and vibration impacts under the Build Alternative are summarized below.

Operations Noise Impacts: Most of the predicted unmitigated noise impacts under the Build Alternative are due to the warning horns from the additional number of trains operating in the corridor when they approach the at-grade roadway crossings. There are also severe noise impacts predicted from wheel/rail noise at residences close to the tracks.

Operations Vibration Impacts: Vibration impacts are predicted for a total of 3.6 miles of the proposed alignment. Approximately 1.1 miles of that total would be associated with new track in areas where the former second track is being reinstalled and 2.5 miles would be associated with renewal of the existing single track.

Station Noise Impacts: The dominant noise source near each station will be the warning horn. The Build Alternative would only be expected to result in noise impacts at residences near the platform of the Nashua Crown Street Station. There are 13 single-family residential properties and 5 multifamily residential properties within 350 feet of the Nashua Crown Street station that are under the severe impact category.

Layover Facility Noise Impacts: Up to two locomotives may be idling simultaneously between roughly 4:00 and 7:00 am at the layover facility in Manchester. Depending on which track the idling trains will be using, the associated noise levels could exceed the impact threshold at the closest residential townhouse buildings along Riverwalk Way to the west of the layover tracks. The severe impact threshold distance is 143 feet, which is situated near the central tracks of the proposed layover facility.

Traffic Noise Impacts: Because the proposed Build Alternative is located in busy developed areas of Nashua, Bedford (near the MHT airport), and Manchester, the existing traffic volumes around the station sites are already high. No traffic noise impacts are expected to be caused by traffic increases around the proposed stations.

Construction Noise Impacts: Noise-sensitive receptors within 45 feet of construction activities would be potentially impacted during daytime hours and those within 145 feet would be potentially impacted during nighttime hours. Since construction activities are planned to occur only during daytime hours, nighttime impacts are not being considered. No noise impacts will result from the implementation of the Build Alternative. Only 1 potential daytime impact has been identified as a result of the analysis conducted pursuant to the FTA guidelines.

Construction Vibration Impacts: During construction, some equipment may cause perceptible ground-borne vibrations, most notably pile driving equipment. If pile driving is used for the Build Alternative, it would only be for certain elements of the Bedford/MHT Station construction or a small number of culvert replacements.

5.8.4 Potential Mitigation Measures

Potential mitigation measures for the noise and vibration impacts under the Build Alternative are summarized below:

Operations Noise Mitigation Measures: A planned combination of wayside horns and window upgrades would eliminate these impacts at most locations, with the few remaining impacts eliminated with sound walls.

Operations Vibration Mitigation Measures: Ballast mats installed with new track sections and resilient ties added to existing track sections would eliminate these impacts.

Station Noise Impacts: These impacts would be eliminated by providing upgraded windows to those buildings.

Layover Facility Noise Mitigation Measures: Severe noise impacts would be eliminated by providing upgraded exterior windows for houses within 143 feet of the layover facility tracks.

Traffic Noise Mitigation Measures: Based on the analysis completed for the Build Alternative, no traffic noise impacts are expected to be caused by traffic increases around the proposed stations.

Construction Noise Mitigation Measures: Construction noise will be monitored to verify compliance with the relevant noise limits and appropriate noise restrictions will be incorporated

into the plans and specifications of the construction bid documents for the Project to meet the FTA construction noise limits in the most efficient and cost-effective manner.

Construction Vibration Mitigation Measures: Construction of the Build Alternative is not expected to result in impacts exceeding FTA limits for residential buildings in the study area or for institutional buildings in the Project Area. Therefore, there are no significant vibration impacts expected from construction of the Build Alternative.

5.9 Cultural Resources

This section summarizes the affected environment for cultural resources within the study area corridor. Further information on regulatory requirements and the affected environment is provided in the Cultural Resources Technical Report included as Appendix D.

5.9.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to cultural resources:

Federal

- Section 106 of the National Historic Preservation Act (NHPA) of 1966: A description of the technical analysis, research and field investigation supporting the Section 106 process will be provided. Coordination and review with the SHPO have already been initiated. The Area of Potential Effect (APE) for the potential station and layover facility locations has been identified and may be further refined as designs are finalized. A preliminary APE has been recommended for the track upgrades and double-tracking but may be expanded as design of the repairs to bridges and stream crossings are finalized. Temporary construction access locations, temporary staging areas and limits of work (including clearing) will be identified to the maximum extent feasible based on the anticipated level of design.
- Advisory Council on Historic Preservation (ACHP), "Protection of Historic Properties" (36 CFR Part 800)
- Section 4(f) requirements (49 U.S.C. 303): The EA and supporting documents will identify 4(f) properties within or adjacent to the rail line, station and layover facility locations. It is expected that the use and impacts to 4(f) properties will be avoided: alternatives analysis will document the design process associated with 4(f) considerations.

NH

- New Hampshire Statutes Title 19 Chapter 227-C: Historic Preservation

MA

- M.G.L. Title 2 Chapter 9, Sections 26 to 27C

5.9.2 Affected Environment

The first step in assessing potential cultural resources impacts was to define an Area of Potential Effects (APE), as defined in regulations implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800 – Protection of Historic Properties, which requires federal agencies to consider the effects of their undertakings on historic properties. This process involves efforts to identify historic properties potentially affected by the undertaking, assess its effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

The railroad bed of the current project was originally designed to accommodate a set of two or more parallel tracks. Following the discontinuance of passenger rail service, much of this second track was removed, and thus the current rail line contains only a single track along much of its length. The corridor right-of-way remains at its initial width and therefore the existing rail bed can accommodate the reintroduction of sections of double track needed to reestablish commuter rail services without needing to establish additional railbed or expand the existing railroad right-of-way (ROW) into adjacent properties. While new rails are needed for the re-establishment of the double track sections, and renewal of the existing single track is part of the project, all planned track work will occur within the confines of the existing railroad bed of the ROW. As a result, most of the existing line outside of stations and bridges is being excluded from further cultural resources consideration unless plans change.

The APE boundary has been defined to assess potential direct impacts on cultural properties and also assess indirect visual/atmospheric/audible impacts to above-ground properties. The assessment of archaeological sensitivity and potential within that APE focuses on the direct impacts or Limit of Disturbance (LOD) of planned construction where ground disturbance may occur outside the ROW or within undisturbed portions of the ROW. To that end, the current APE focuses on the four planned station locations, the layover facility, and the locations of possible bridge work and culvert repair. The APE has been initially defined as a 250-foot zone around the planned LOD for those locations, which should encompass possible staging and access activity, or modifications in plans. As project plans move forward, the APE will be adjusted to either remove areas from further consideration or to encompass any new areas outside the ROW, such as access roads or areas of deep excavation that go underneath the existing rail bed, which will then be subjected to additional cultural resources evaluation.

Additional details can be found in Appendix D. The Project Team coordinated with the State Historic Preservation Offices (SHPOs) of Massachusetts and New Hampshire, as well as local consulting parties for the Section 106 compliance process.

Historic Architecture

In New Hampshire, the project APE intersects with four historic properties that have already been determined to be eligible for the National Register of Historic Places (NRHP). The north end of the APE briefly intersects the southeastern edge of the Amoskeag Millyard Historic District, and the southern portion of the overall corridor (from E. Hollis Street in Nashua southward) is coterminous with the alignment of the Nashua and Lowell Railroad historic district. In Merrimack, the APE associated with a project bridge location intersects the Merrimack Wastewater Treatment Facility (Mast Road), and another bridge APE location intersects the Nashua Gas Light property.

Background research and a field reconnaissance also found that there are 23 additional resources over 50 years of age within the APE that have not been previously surveyed or formally evaluated, including 14 buildings in the vicinity of the rail line and nine bridges that carry the rail line over the Merrimack River and its tributaries. Additional assessment will occur during final design and permitting after the EA.

In Massachusetts, background research gathered from Massachusetts Cultural Resource Information System (MACRIS), a Massachusetts Historical Commission (MHC) visit, and other online sources determined that there are three (NRHP)-listed resources that intersect the APE, including the Lowell Locks and Canals Historic District, the Lowell National Historic Park, and Middlesex Canal Historic and Archaeological District.

In addition, background research and the field visit determined that there are six bridges and a culvert along the line that are included in the Massachusetts state inventory and are likely associated with the Nashua and Lowell Railroad. The project APE also intersects the eastern edge of the Tyngsborough Center Historic District, which is included in the MHC inventory but not formally evaluated for NRHP status. These resources will require additional assessment during final design and permitting.

Archaeology

In general, the overall corridor has a high sensitivity for containing archaeological sites due to the proximity to the Merrimack River, which has been used as a major transportation and settlement corridor for thousands of years.

In New Hampshire, state records document the presence of five previously recorded archaeological sites within the APE (three precontact and two post-contact), all within the general area of the proposed MHT-Bedford/MHT Station on the west side of the river. Current data from previous surveys suggests that all of these sites will require additional investigation to determine if they are NRHP-eligible. In addition, the rail corridor in NH crosses over the general location of two additional previously recorded precontact archaeological sites. There is currently no APE designated for these locations because all work is currently proposed to be limited to the existing rail ROW and track bed fill. If future plans required excavation deeper than the existing track bed, archaeological investigations would be required in those areas to determine if these sites still survive underneath. Archaeological survey may also be required in the APE associated with the nine bridges along the corridor in New Hampshire, depending on whether construction plans will include ground disturbing activities outside of the existing ROW.

In Massachusetts, there are no previously identified archaeological sites within the APE as currently defined. There is one recorded site that is crossed by a portion of the rail corridor that is not within the APE, and as with similar sites in NH, if future plans required excavation deeper than the existing track bed, archaeological investigations would be required in this area to determine if this site still survives underneath. Archaeological survey may also be required in the APE associated with the six bridges along the corridor in Massachusetts, depending on whether construction plans will include ground disturbing activities outside of the existing ROW.

5.9.3 Environmental Consequences

5.9.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no additional direct or indirect impacts to the Section 4(f) and Section 106 properties as well as archaeological sites along the existing corridor due to the Project.

5.9.3.2. Manchester Commuter Rail Alternative

Additional historic property identification and evaluation efforts will be completed as outlined below and documentation of the identification efforts will be prepared and submitted to the

SHPO and Consulting Parties for a 30-day review period. Prior to finalizing any documentation, the comments that are received through this consultation process will be considered.

Before advancing any type of Project construction in the APE or selecting sites for ancillary activities associated with the Project, the identification and evaluation of above-ground historic resources for inclusion in the NRHP will be completed in accordance with applicable Federal and state standards and guidelines.

The identification efforts will include a review of the current status of the previously recorded resources along with a comprehensive architectural history survey of the previously unrecorded resources that were identified during the preliminary assessment conducted during preparation of the EA.

Before advancing any type of Project construction in the APE or selecting sites for ancillary activities associated with the Project, the identification and evaluation of archeological resources will be completed for inclusion in the NRHP in accordance with applicable Federal and state standards and guidelines.

All locations where ground-disturbing activities are proposed or where they may occur within temporary easements and permanent right of way will be examined. These locations may include, but are not limited to, cuts and fills deeper than or outside of the existing rail bed, bridge foundations, drainage excavations, waste areas, borrow sites, construction staging areas, and storage areas.

A plan for the identification and evaluation of archeological resources will be developed in consultation with the SHPOs and Tribal Preservation Officers. Preparation of the plan for identification and evaluation will be guided by each state's standards for conducting fieldwork and reporting and the archeological component of each state's Historic Preservation Plan.

The studies completed will demonstrate a level of effort consistent with 36 CFR § 800.4(b)(1) and provide the information to determine which historic and archaeological resources are eligible for inclusion in the NRHP in accordance with 36 CFR § 800.4(c).

In consultation with the SHPOs and Indian Tribes it will be determined if the Project will adversely affect any historic properties determined eligible for inclusion in the NRHP pursuant to 36 CFR § 800.5. If it is determined that the Project may adversely affect eligible resources, reasonable efforts will be made to avoid or minimize the adverse effect.

5.9.4 Potential Mitigation Measures

If it is determined that it is not possible to avoid or minimize disturbance, a Treatment Plan will be developed and implemented as part of the above consultation to mitigate the adverse effects. The implementation of the Treatment Plan will be completed for each property prior to the initiation of any Project construction activities that could affect that property.

5.10 Air Quality

This section summarizes the affected environment for air quality within the study area corridor. Further information on regulatory requirements and the affected environment is provided in the Air Quality Technical Report included as Appendix E.

5.10.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to air quality:

Federal

- 1970 Federal Clean Air Act (FCAA)
- 1990 Clean Air Act Amendments (CAAA)
- U.S. EPA regulations at 40 Code of Federal Regulations (CFR) 93 Subpart A
- U.S. EPA regulations at 40 Code of Federal Regulations (CFR) 93 Subpart B
- Council on Environmental Quality (CEQ), 2016 Final guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas (GHG) Emissions and the Effects of Climate Change
- Executive Order 13990, “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis”
- FTA Transit Greenhouse Gas Emissions Estimator v2.0

NH

- 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)

MA

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

5.10.2 Affected Environment

Ambient air quality standards have been set by both the federal government, MassDEP, and NHDES to protect public health and welfare with an adequate margin of safety. However, according to the MassDEP, the state does not designate areas as attainment or nonattainment with these standards. Pollutants for which National Ambient Air Quality Standards (NAAQS) have been established are often referred to as “criteria” air pollutants. This term is derived from the comprehensive health and damage effects review that culminates in pollutant-specific air quality criteria documents, which preceded the establishment of NAAQS. These standards are reviewed on a legally prescribed frequency and revised as warranted by new health and welfare effects data. Each NAAQS is based on a specific averaging time over which the concentration is measured. Different averaging times are based upon protection against short-term, high-dosage effects or longer-term, low-dosage effects. Most NAAQS may be exceeded no more than once per year.

The ambient air quality in the project area is monitored at a number of permanent air quality monitoring stations operated by USEPA, MassDEP, and NHDES. The monitoring stations within Massachusetts that are closest to the Project area are in Chelmsford (Manning Road and Technology Drive), Haverhill, and Boston (Kenmore Square and Roxbury). In New Hampshire the monitoring stations nearest to the Project area are in Nashua (Gilson Road), Concord (Pleasant Street), Peterborough (Miller State Park), and Londonderry (Moosehill School). For each pollutant, the maximum concentration from these stations was selected as a conservative

background concentration level. Background concentration data is presented in Tables 4 through 9 in the Appendix E Air Quality Technical Report.

These tables show that within the 3-year monitoring periods air quality concentrations have remained relatively steady. Given the conservative nature of these monitored concentrations and the fact there are no NAAQS exceedances, it can be concluded that air quality data within the project area shows compliance with the NAAQS as well. The change in emissions associated with the project will not impact the region's attainment status.

5.10.3 Environmental Consequences

5.10.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no additional direct or indirect impacts to the air quality along the existing corridor due to the Project.

5.10.3.2. Manchester Commuter Rail Alternative

Local Analysis Results

The results of the micro-scale analysis are presented in Table 9**.** The results represent the Project emissions increases as a result of the additional locomotive emissions along the track and at stations for the Manchester Regional Commuter Rail. These emission increases do not account for any potential future line electrification and therefore are likely conservative estimates. In addition, all locomotive emissions are based on a similar engine from EPA's "Annual Certification Data for Vehicles, Engines, and Equipment"[4], which meet or are more stringent than EPA's Tier 4 standards. The specific model is based on a Locomotive MP54AC with Cummins QK60 twin engine as referenced in the 2020 MBTA Rail Vision analysis report[5].

Table 9. Local Air Quality Impacts from Locomotives

Annual Emissions (tons/year)	CO	NOX	PM10	PM2.5	SO2	VOC
MA Total	0.66	5.28	0.07	0.06	0.03	0.18
NH Total	1.42	11.39	0.14	0.06	0.06	0.39
Idling emissions	0.04	4.87	0.00	0.00	0.00	0.01
Total Emissions	**2.12**	**21.54**	**0.21**	**0.21**	**0.09**	**0.58**
Applicable General Conformity Emission *de minimus* level (to each nonattainment or maintenance area)	**NA**	**100**	**NA**	**NA**	**100**	**100**
Exceed *de minimus* level?	**NA**	**No**	**NA**	**NA**	**No**	**No**

Notes:
NA = Not applicable, NAA = Nonattainment area, NH = New Hampshire, MA = Massachusetts

Since mobile source dispersion modeling and hotspot analyses are not required for this analysis, the results of the micro-scale emissions presented in Table 9 show that project emissions are below the federal general conformity de minimis levels for all applicable criteria

[4] https://www.epa.gov/system/files/documents/2023-01/locomotive-2007-present.xlsx
[5] https://cdn.mbta.com/sites/default/files/2021-07/2020-02-rail-vision-appendix-f.pdf

pollutants in each nonattainment or maintenance area in New Hampshire and Massachusetts. Therefore, the local air quality impact will not be significant due to Project operations.

Regional Analysis Results

The total net change in criteria pollutant emissions in the Project's affected region from the Manchester Regional Commuter Rail Alternative are presented in Table 10. Table 10 shows the net change in emissions associated with the Project that accounts for the emission increases from locomotives and emission decreases associated with reduction in on-road emissions associated with traffic reductions. There will be very little change in emissions for all criteria pollutants except for NOX with all net emissions changes below the federal general conformity de minimis levels. Therefore, the project is presumed to conform to the applicable state implementation plans (SIPs) and would not require a full conformity analysis and conformity determination.

Table 10. Regional Air Quality Impact – Criteria

Emissions Increase (tons/year)	CO	NOX	PM10	PM2.5	SO2	VOC
Personal Vehicles – MA	-15.55	-0.38	-0.15	-0.03	-0.02	-1.29
Personal Vehicles – NH	-8.58	-0.21	-0.07	-0.02	-0.01	-0.70
Personal Vehicles – Total	**-24.13**	**-0.58**	**-0.22**	**-0.05**	**-0.03**	**-1.99**
Boston Express Buses – MA	-1.45	-0.50	-0.01	-0.00	-0.00	-0.04
Boston Express Buses – NH	-0.73	-0.21	-0.00	-0.00	-0.00	-0.02
Boston Express Buses – Total	**-2.18**	**-0.72**	**-0.02**	**-0.00**	**-0.00**	**-0.06**
Locomotive – MA	0.66	5.28	0.07	0.06	0.03	0.18
Locomotive – NH	1.46	16.26	0.15	0.14	0.07	0.40
Locomotive – Total	**2.12**	**21.54**	**0.21**	**0.21**	**0.09**	**0.58**
Net Emissions Change – MA	-16.34	4.40	-0.09	0.03	0.01	-1.15
Net Emissions Change – NH	-7.85	15.84	0.07	0.12	0.05	-0.31
Net Emissions Change – Total	**-24.19**	**20.24**	**-0.02**	**0.15**	**0.06**	**-1.46**
Applicable General Conformity Emission de minimus level (to each nonattainment or maintenance area)	**NA**	**100**	**NA**	**NA**	**100**	**100**
Exceed *de minimus* level?	NA	No	NA	NA	No	No

Notes:
NA = Not applicable

USEPA regulations for on-road vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades in three ways: (1) by lowering the benzene content in gasoline; (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures; and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers. Federal regulations are also severely reducing the diesel emissions from both on-road and non-road vehicles, and diesel PM is therefore also expected to diminish over time. In general, the impacts are expected to be much lower than those presented in Table 10.

The estimated annual operational emissions of GHGs associated with the Manchester Regional Commuter Rail are presented in Table 11, which shows an annual net change in GHG emissions associated with the Project compared to the future No-Build.

As previously stated, FTA has developed a spreadsheet tool to estimate emissions from transit projects. The Transit Greenhouse Gas Emissions Estimator v3.0 was released in April 2022. This tool estimates upstream and downstream GHG emissions from project construction and operations. Upstream emissions are those associated with the extraction, transport, and production of the materials used in construction and vehicle fuel. Downstream emissions are those associated with tailpipe emissions from construction equipment and transit vehicles. Operations include maintenance and use of vehicles. The tool provides GHG emissions as metric tons of carbon dioxide equivalent (MT CO2e), which accounts for all individual species of the relevant GHG combined into a single number. Inputs to the tool include miles of track, number of stations, parking spots, number of trees removed, size of building constructed, and miles based on mode of transportation both for the project and displaced. Displaced miles are when automobile and bus users switch to using the new rail service, thereby reducing auto and bus vehicle miles. Some limitations of the FTA tool are the lack of specific station types to commuter rail and restricting commuter rail to only new track construction rather than converted/upgraded track. This leads to a very conservative (high) estimate of construction GHG. The user's guide to the FTA tool comments that the only factors available are based on heavy rail stations with no data specific to commuter rail and does not provide a specific choice of full station versus platform. Table 11 presents a high-level summary of the results of the tool and Table 12 presents the results for each state.

Table 11. Greenhouse Gases Upstream and Downstream

Net Emissions	Upstream	Downstream	Total
Construction (MT CO2e/Project)	**514,734**	**16,193**	**530,927**
Transit Maintenance (MT CO2e/yr)	0	133	133
Facility Operation (MT CO2e/yr)	0	10	10
Vehicle Operations (MT CO2e/yr)	0	6,982	6,982
Vehicle Maintenance (MT CO2e/yr)	0	243	243
Displaced Emissions (MT CO2e/yr)	-1,277	-5,454	-6,731
Annual Net Emissions Change – Non-Construction Total (MT CO2e/yr)	**-1,277**	**1,914**	**636**

Table 12. Upstream and Downstream GHG by State

Net Emissions	MA Upstream	MA Downstream	NH Upstream	NH Downstream
Construction (MT CO2e/Project)	7,648	4,370	507,086	11,823
Transit Maintenance (MT CO2e/yr)	0	42	0	91
Facility Operation (MT CO2e/yr)	0	0	0	10
Vehicle Operations (MT CO2e/yr)	0	2,215	0	4,767
Vehicle Maintenance (MT CO2e/yr)	0	77	0	166
Displaced Emissions (MT CO2e/yr)	-829	-3,539	-449	-1,915

Annual Net Emissions Change – Non-Construction Total (MT CO2e/yr)	**-829**	-1,204	-449	3,118

The results shown in Tables 11 and 12 assume only a small reduction in the number of express buses in the corridor under the Build compared to the No-Build. The spreadsheet tool was also used to test a scenario where the number of express buses in the Build alternative would be reduced by half of what they are in the No-Build, which is still a conservative assumption relative to levels of express bus service in peer corridors with commuter rail service, such as Worcester-Boston and Providence-Boston. Under this scenario there would be an annual total net reduction in non-construction GHG emissions.

5.10.4 Potential Mitigation Measures

Since this is a project-level impact analysis, the details of design, construction, and operation are not yet fully available. Therefore, this section identifies potential measures for inclusion, which would reduce the program's energy and GHG footprint if implemented. These measures will be further investigated, and if found to be practicable, incorporated in the program's design and operation.

Operational

Change the Fuel to Biodiesel Fuel: Options to use biodiesel for the locomotives will be investigated, including blends of B20 and B100 (20 percent biodiesel with 80 percent standard diesel, or pure biodiesel). B20 can be used with current technology while B100 may require some adjustments or new engines. The use of B20 would reduce GHG emissions by 10 percent, and B100 would reduce GHG emissions by 70 percent.

Electrification: The benefits of shifting rail operations along the entire line to electricity have not been quantified at this time. Benefits would increase over the years as the New Hampshire grid shifts to increasingly higher fractions of renewable power sources (the New Hampshire grid currently includes relatively large fractions of nuclear and hydro power, which result in very little GHG emissions). The layover station will allow the trains to plug into the grid for operating HVAC operations and shut down the engines overnight.

Sustainable Station Design and Construction: Although station energy use was not included in this analysis, new stations would be designed in accordance with the new requirements from the State.

Construction

Use of Local, Renewable, Recycled Materials: Most construction emissions are estimated to come from the extraction, production, transport, and disposal of construction materials. Although precise details are not known at this time, the reduction in these emissions can be substantial if local, renewable, and recycled materials are used. The largest contributors are cement and steel. If emissions associated with material can be cut in half (existing strategies demonstrate that this is possible), the emissions payback period could be reduced by nearly 40 percent.

Biodiesel for Construction Engines: Biodiesel blends would be used in construction engines to the extent practicable.

Replanting Trees: Trees that need to be removed for construction would be replaced with a larger number of trees, replacing the trees in kind or greater.

5.11 Environmental Justice & Title VI Compliance / Equity Analysis

This section summarizes the affected environment for environmental justice communities within the study area corridor. Environmental Justice is the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” In the context of the proposed Nashua-Manchester rail corridor this means understanding where vulnerable populations within the corridor may reside and understanding the benefits/impacts they may experience with the development of the rail corridor.

5.11.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to environmental justice communities:

Federal

- Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Executive Order (EO) 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
- Executive Order (EO) 14008, Tackling the Climate Crisis at Home and Abroad
- Title VI of the Civil Rights Act of 1964
- FTA Circular 4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients, August 15, 2012
- U.S. DOT Order 5610.2(a), Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 77 FR 27534
- Federal Transit Laws, Title 49, U.S.C. Chapter 53

NH

- Use federal standards

MA

- Environmental Justice Policy of the EEA

5.11.2 Affected Environment

The presence of potential EJ populations in the Nashua-Manchester rail corridor was determined by analyzing minority population (by city/town) and low-income populations (as measure of federal poverty line and 150% of the federal poverty line) from the 2015-2019 American Community Survey 5-Year Survey, and the EPA EJSCREEN Tool which uses a demographic index to assess relative vulnerability of populations within the study corridor.

Minority populations include Black or African American, American Indian/Alaskan, Asian, Native Hawaiian/Pacific Islander, Other Race, Two or more races and Hispanic/Latino races). Based on the ACS survey data, minority population is concentrated in Lowell (53%), Nashua (26%), and Manchester (24%).

Moving Ahead for Progress in the 21st Century (MAP-21) defines a "Low-Income Individual" as an individual whose family income is at or below 150 percent of the poverty line published by

the US Department of Health and Human Services (DHHS). The DHHS 2020 poverty guideline is $26,200 for a family of four making $39,300 or below 150% of the poverty line for a family of four. The US Census Bureau, which defines "poverty thresholds" for statistical purposes, set the 2020 poverty threshold used in their tabulations at $26,496 for a family of four.

The EPA EJSCREEN Tool mapping shows vulnerable populations concentrated in the communities of Lowell, Nashua, and Manchester. For Nashua-Manchester station areas, Manchester and Nashua Crown Street have increased concentrations of EJ populations compared to the other station areas.

Detailed information on where minority and low-income populations reside within corridor communities and the EPA EJSSCREEN mapping is provided in Appendix F.

5.11.3 Environmental Consequences

5.11.3.1. No-Build Alternative Consequences

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, environmental justice communities with the study area would continue to have limited travel options and access to employment, goods and services, particularly those populations who live in zero-vehicle households and are transit-dependent.

5.11.3.2. Manchester Commuter Rail Alternative

According to the EJ Population Analysis prepared by NHDOT for the Nashua-Manchester project, communities in the study corridor meet EJ thresholds for minority population (37.4%), elderly populations (10.46%) and low income (27.74%). Each of these populations are meaningfully greater within a 1-mile radius of the corridor than the surrounding areas.

Low-income populations (both below the poverty line and below 150% of the poverty line) are concentrated in Lowell (17.3% & 26.2%), Nashua (8.2% & 14.1%), and Manchester (13.1% & 21.2%). Additionally, the EPA EJSCREEN Tool indicates the presence of EJ populations within proximity to each of the corridor stations as well as public and subsidized housing within proximity of all stations except the proposed Bedford/MHT station site. Overall, the corridor is majority white, the highest concentration of minority groups occur around station areas (within 1-mile) in Lowell (46%), Nashua (18%), and Manchester (21%) (EJSCREEN 2020).

5.11.4 Potential Mitigation Measures

EJ populations would not experience disproportionately high adverse effects as result of this project. Residents would generally experience significant benefits from the addition of new rail service with the possibility of minor but largely mitigable impacts. The principal impact experienced by corridor residents would be related to noise and vibration during both the initial construction phases as well as ongoing operations related impacts. The project proposes implementation of mitigation strategies which would fully or partially mitigate impacts from construction and operations phases. These strategies are described fully in the 5.8 Noise and Vibration Section and would include wayside horns for at-grade crossings, home soundproofing (upgraded windows) and sound walls for noise mitigation, and ballast mats or resilient rail fasteners for vibration mitigation.

5.12 Transportation

This section summarizes the affected environment for transportation network and facilities within the study area corridor.

5.12.1 Regulatory Requirements

There are no applicable federal and state laws, regulations, and executive orders pertaining to transportation networks and facilities. NHDOT's guidelines were followed in preparing the traffic impact analysis.

5.12.2 Affected Environment

The affected environment includes major intersections located near each proposed station location. These intersections were chosen based on existing traffic patterns, anticipated traffic demands, and anticipated future traffic circulation.

South Nashua

The proposed South Nashua commuter rail station is located behind the Pheasant Lane Mall. There were seven study intersections identified at this location. The study intersections are:

- Middlesex Rd at Smokey Bones/Mall Entrance
- Route 3 Ramps at Daniel Webster (DW) Highway/Middlesex Rd (State Line)
- Pheasant Lane at DW Highway
- Dan Chan St at DW Highway
- Danforth Rd at DW Highway
- Silver Dr at DW Highway
- Spit Brook Rd at DW Highway

Nashua

The proposed Nashua commuter rail station access point is on Crown Street. There were four study intersections identified at this location. The study intersections are:

- East Hollis Street at Chase Street
- East Hollis Street at Arlington Street
- Crown Street at Arlington Street
- Crown Street at Chase Street

Bedford

The proposed Bedford/MHT commuter rail station access point is along South River Road south of the Raymond Wieczorek Drive eastbound Entrance/Exit ramps. There were three study intersections identified at this location. The study intersections are:

- Raymond Wieczorek Drive EB Ramps at South River Road
- South River Road (Route 3 DW Highway) at Somerville Drive
- South River Road (Route 3 DW Highway) at East Point Drive

Manchester

The proposed Manchester commuter rail station is located west of Elm Street and South of Granite Street. There were five study intersections identified at this location. The study intersections are:

- Elm Street at Valley Street
- Elm Street at Market Basket Drive
- Elm Street at Auburn Street
- Elm Street at Granite Street/Lake Avenue
- Granite Street at Canal Street

Details for each location are provided in the Transportation Technical Report (Appendix G).

Intersection capacity analysis was conducted following methodologies described in the Highway Capacity Manual. The Synchro software program was used to calculate an expected Level of Service (LOS) for each intersection. The LOS of an intersection is designated on a scale of A to F, with A representing the best operating conditions and F the worst. The LOS is determined using the calculated delay of the intersection. Table 13 below shows the LOS according to the calculated delay ranges for a signalized and unsignalized intersection.

Table 13. LOS for Intersections

LOS	Signalized Intersection	Unsignalized Intersection
A	≤ 10 seconds	≤ 10 seconds
B	10 – 20 seconds	10 – 15 seconds
C	20 – 35 seconds	15 – 25 seconds
D	35 – 55 seconds	25 – 35 seconds
E	55 – 80 seconds	35 – 50 seconds
F	> 80 seconds	> 50 seconds

Source: Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis

Intersection capacity analyses were conducted using available peak hour traffic counts. Given the existing peaking characteristics of the study area intersections and the anticipated peaking characteristics of the proposed commuter rail project, some analyses were limited to the PM peak hour only. The results of existing conditions analysis are summarized below.

- South Nashua: All intersections exhibit acceptable operations;
- Nashua Crown Street: All intersections exhibit acceptable operations;
- Bedford / MHT: All intersections exhibit acceptable operations; and
- Manchester: All intersections exhibit acceptable overall operations (Elm/Valley and Elm/Granite have individual approaches that exceed capacity).

5.12.3 Environmental Consequences

5.12.3.1. No-Build Alternative Consequences

The year 2040 has been selected as the project design year. The year 2040 No-Build traffic volumes were developed by applying a compound growth rate of 0.5% per year from the base year 2022. This growth rate over an eighteen-year period is intended to include and account for planned project developments not associated with this proposed project. No geometric changes are made between the Existing Condition and No-Build Condition.

Background growth will cause overall conditions at the Elm/Valley Street intersection in Manchester to approach capacity, with many other intersections exhibiting lower LOS as well. Additional individual approaches at multiple intersections also exceed capacity under the No Build Alternative.

5.12.3.2. Manchester Commuter Rail Alternative Consequences

Ridership forecasts were developed using the latest version (v2.5) of the Federal Transit Administration's STOPS forecasting model. Daily ridership forecasts for each new station location were calculated for anticipated 2040 conditions. Average weekday daily boardings at each of the four new stations are shown below in Table 14:

Table 14. Average Weekday Boardings 2040

Station Location	Average Weekday Boardings
South Nashua	906
Nashua Crown Street	690
Bedford / MHT	769
Manchester	462
Total	**2,827**

It should be noted that these ridership forecasts and subsequent traffic analyses represent a scenario unconstrained by the impacts of COVID-19 on ridership levels and workplace attendance. Sensitivity analyses were conducted to provide guidance on potential changes to ridership demand associated with the pandemic. The following scenarios were analyzed:

- Baseline, 0% Decrease, Assumes pre-COVID level trip rates
- Low Impact, 15% Decrease, a "Quick Recovery" COVID scenario for 2025 that assumed 10% more telework and 0.5% fewer jobs compared to pre-COVID levels, leading to a reduction in overall trips of approximately 5%. The resulting impact was a 15% decrease in transit trips (which also includes shifts from existing transit trips to auto).
- Medium Impact, 22% Decrease, a "Second Wave" COVID scenario for 2025 that assumed 10% more telework and 6% fewer jobs compared to pre-COVID levels, leading to a reduction in overall trips of approximately 15%. The resulting impact was a 22% decrease in transit trips (which also includes shifts from existing transit trips to auto).
- High Impact, 44% Decrease, a "Cautious Recovery" COVID scenario for 2025 that assumed 15% more telework and 2% fewer jobs compared to pre-COVID levels, leading to an overall reduction in trips of approximately 10%. The resulting impact was a 44% decrease in transit trips (which also includes shifts from existing transit trips to auto).

In addition to the daily ridership forecasts, mode shares for each station were developed. These mode shares, shown below in Table 15, were used to calculate vehicle trips to and from each station location.

Table 15. Mode Share by Station

Station Location	Park & Ride	Kiss & Ride	Walk / Bike	Arrive by Transit Connection	Total
South Nashua	60%	20%	10%	10%	100%

Station Location	Park & Ride	Kiss & Ride	Walk / Bike	Arrive by Transit Connection	Total
Nashua Crown Street	18%	6%	66%	10%	100%
Bedford / MHT	81%	19%	0%	0%	100%
Manchester	36%	10%	50%	4%	100%

Interim steps were conducted to convert the ridership forecasts to peak hour trip generation.

Ridership forecasts were distributed over the local roadway networks serving each of the proposed stations. The results of intersection capacity analyses for the Build Alternative, compared to the No Build Alternative, are summarized below:

- South Nashua: All intersections exhibit acceptable operations. No change in LOS resulting from project-related trips;
- Nashua Crown Street: All intersections exhibit acceptable operations. Minor change in LOS at Arlington/E. Hollis resulting from project-related trips;
- Bedford / MHT: All intersections exhibit acceptable operations. Minor change in LOS at S. River/Wieczorek off-ramps resulting from project-related trips; and
- Downtown Manchester: Elm/Valley and Elm/Market Basket exhibit changes in LOS resulting from project-related trips.

5.12.4 Potential Mitigation Measures

Mitigation measures are proposed for movements where project-related trips have degraded the movement to LOS E or worse when compared to the No-Build Condition. Below in Table 16 are a summary of mitigation measures and corresponding results for each location.

Table 16. Summary of Mitigation Measures and Impacts

Intersection	Proposed Mitigation	Impact to Traffic
Route 3 Off-ramp and Middlesex Rd	Revise signal timings to accommodate additional traffic at the intersection.	The northbound left movement improves from LOS E in the Build Condition to LOS D in the Build Mitigated Condition.
Elm St and Valley St	Provide additional EB left turn lane and revise WB approach to a WB left | thru/right configuration. Revise signal timing and phasing.	Intersection movements that are LOS F in the Build Condition improve to LOS E or better after mitigations.
Elm St and Market Basket Dr	Revising signal timing for better coordination with Elm St at Valley St.	Overall intersection LOS improves from LOS E in the Build Condition to LOS C in the Build Mitigated Condition. Southbound approach improves from LOS F in the Build Condition to LOS C in the Build Mitigated Condition.

Intersection	Proposed Mitigation	Impact to Traffic
Elm St and Auburn St	Revise signal timings to accommodate additional traffic at the intersection.	Revising the traffic signal timing at this intersection improves the northbound left from LOS E in the Build Condition to LOS C in the Build Mitigated condition.

5.13 Socioeconomic

This section summarizes the affected environment for socioeconomic impacts within the study area corridor. The local-level analysis focused on property value changes and new development potential around station areas, while the regional analysis focuses on how the Project affects factors such as employment, employment earnings and tax revenue. Regional economic impacts were separately analyzed for New Hampshire and Massachusetts.

Please refer to Appendix H for more detailed descriptions on how the impacts were estimated.

5.13.1 Regulatory Requirements

There are no federal laws or regulations, guidance, and executive orders applicable to socioeconomic impacts.

5.13.2 Property Value Analysis

A common way to assess station area benefits is through observing the changes in property value, which captures the improved access to amenities that an enhanced urban transit network can bring. Impacts on the value of properties within 0.5-mile of each proposed station were estimated by applying percentage increases in property value due to the Project to the current value of the properties. Impacts on industrial and vacant land are not included in the property value analysis. Local real estate tax rates were also collected to estimate the annual increase in real estate tax revenue in the municipalities where the proposed stations are located. All impacts presented in this section should be interpreted as the impacts to be realized immediately after the Project completion.

As Table 17 shows, the total property value increase is estimated to be $563.5 million, generating approximately $11.2 million in real estate tax revenue.

Table 17. Impacts on Property Value (2022$)

Station	Property Value Increase	Real Estate Tax Rates	Estimated Real Estate Tax Revenue
Manchester	$339,000,000	1.8%	$6,102,000
Bedford/MHT	$3,700,000	1.7%	$62,900
Nashua Crown Street	$5,400,000	2.3%	$124,200
South Nashua	$215,400,000	2.3%	$4,954,200
Total Estimated Tax Revenue	**$563,500,000**		**$11,243,300**

Source: AECOM 2022; dollar values rounded to the nearest thousand

5.13.3 Land Use Analysis

An illustrative analysis was conducted to assess the development potential for areas adjacent to each of the proposed stations. This section presents estimates of station area development potential using demographic and ridership forecasts for the areas where the proposed stations are located. This analysis assumes that the development potential for each station area would be fully realized by 2040. The analysis does not include the redevelopment of existing uses not yet identified in plans or proposals in the subject communities.

Table 18. Impacts on Land Use by Station Area

Station	Commercial (sq ft)	Residential (units)
Manchester	884,000	910
Bedford/MHT	4,000	20
Nashua Crown Street	14,000	20
South Nashua	354,000	1,010
Total	**1,256,000**	**1,960**

Source: AECOM 2022; all values rounded to the nearest 10

5.13.4 Regional Economic Analysis

5.13.4.1. Employment and Labor Income Impacts

Construction of the Project would support the local economy through the hiring of construction personnel, renting or purchasing construction equipment, and procurement of construction materials for the duration of the construction period, affecting the local labor and manufacturing markets. Expenditures associated with infrastructure renewal would generate similar effects as construction activities during years when such expenditures are incurred. In addition, implementing the commuter rail service would support jobs and labor income because of ongoing operations and maintenance (O&M) expenditures to run the service, which are recurring annual impacts that would continue through the life of the service.

For this analysis, IMPLAN was used to estimate the regional economic benefits generated by the Project. Employment effects are expressed in job-years (hereafter “jobs”), which are defined as one job per person per year.

Annual total (direct, indirect, and induced) Employment and Labor Income effects associated with construction, infrastructure renewal, and O&M activities are presented in Table 19. Over the construction period, costs associated with construction would support approximately 1,270 and 340 jobs, as well as $110.6 million and $30.5 million in labor income per year in New Hampshire and Massachusetts, respectively. Expenditures on infrastructure renewal would support 30 and 10 jobs, as well as $3.0 million and $0.6 million in labor income per year in New Hampshire and Massachusetts, respectively. O&M expenditures would support 240 and 140 jobs, as well as $8.3 million and $5.2 million in labor income per year in New Hampshire and Massachusetts, respectively.

Table 19. Annual Employment and Labor Income Impacts by State and Type of Industry

	New Hampshire		Massachusetts	
Industry	Employment	Labor Income (2022$)	Employment	Labor Income (2022$)

Construction	1270	$110,621,000	340	$30,495,000
Infrastructure Renewal	30	$2,971,000	10	$550,000
O&M	240	$8,322,000	140	$5,192,000

Source: IMPLAN; AECOM 2022; labor income values rounded to the nearest thousand; employment values rounded to the nearest 10

5.13.4.2. Office and Retail Impacts

The increase in commercial activities (office and retail) would also contribute to the economy of New Hampshire and Massachusetts by creating new employment opportunities and employment earnings. Approximately $464 million and $493 million in total annualized economic output would be generated due to the increase in office and retail operational activities, respectively, within 0.5-mile radius of the proposed stations in 2040. As shown in Table 20, by 2040 the annual jobs created, and labor income generated associated with the increase in commercial activities (office and retail) due to the Project are estimated to be 10,080 and $578.1 million.

Table 20. Annual Employment and Labor Income Impacts Due to Office and Retail Activities

Industry	Employment	Labor Income (2022$)
Office	3,840	$292,569,000
Retail	6,240	$285,483,000
Total	**10,080**	**$578,052,000**

Source: IMPLAN; AECOM 2022; labor income values rounded to the nearest thousand; employment values rounded to the nearest 10

5.13.4.3. Tax Impacts

The tax impacts examined in this analysis include effects generated from personal taxes, social insurance taxes, corporate profit taxes, as well as taxes on production and imports.

Table 21 presents O&M tax impacts of the Project (excluding tax impacts from Insurance, Casualty and Liability). O&M expenditures would generate approximately $257,000 and $288,000 for New Hampshire and Massachusetts, respectively.

Table 21. Annual Tax Impacts Due to O&M (2022$)

Type of Impact	New Hampshire			Massachusetts		
	County	State	Federal	County	State	Federal
O&M	$28,000	$257,000	$1,636,000	$440	$288,000	$1,055,000

Source: IMPLAN; all values rounded to the nearest thousand except county impacts for Massachusetts

Tax Impacts from Office and Retail Activities

As shown in Table 22, office and retail development around the station areas would generate $3.0 million and $5.6 million in state tax revenue, respectively, in 2040. All tax revenue would be realized in New Hampshire, where the proposed stations will be located.

Table 22. Annual Tax Impacts Due to Office and Retail Operational Activities (2022$)

Industry	County	State	Federal
Total Effect - Office	$591,000	$3,000,000	$59,930,000
Total Effect - Retail	$653,000	$5,648,000	$35,960,000

Source: IMPLAN; all values rounded to the nearest thousand

5.14 Energy

This section summarizes the affected environment for energy resources within the study area corridor.

5.14.1 Regulatory Requirements

The following federal and state laws, regulations, guidance, and executive orders are applicable to energy resources:

Federal

- NEPA 42 U.S.C. Part 4332

NH

- 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

MA

- 310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation

5.14.2 Affected Environment

Transportation-related energy use within the study area includes fuel use by passenger vehicles and intercity buses, as well as fuel use by the limited number of freight deliveries using the existing rail line. Energy use by vehicles outside of the immediate study area with origins and destinations that will be served by the proposed project are also part of the affected environment.

5.14.3 Environmental Consequences

5.14.3.1. No-Build Alternative

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no additional direct or indirect impacts to energy use along the existing corridor due to the Project.

5.14.3.2. Manchester Commuter Rail Alternative

The project would expend energy resources as part of the construction of rail line improvements (including those associated with manufacturing construction materials) and the station and layover facilities development. Fuel resources will also be consumed as part of the commuter rail operations and maintenance.

Provision of commuter rail service will divert riders from passenger vehicles using the existing roadway network to rail service, which is expected to result in a net reduction in fuel use as a result of reduced VMT and VHT (more details provided in the air quality section). Increased emissions from vehicle congestion associated with vehicle trips to and from the station locations are not anticipated based on the results of traffic analysis as noted in the Transportation section.

5.14.4 Mitigation

Long-term mitigation of energy impacts will likely take the form of fleet upgrades (lower-emission engines, electrification), potential solar installations at station locations, and other energy technology improvements.

5.15 Visual and Aesthetics

Visual resources in the corridor were analyzed as part of the historic architecture analysis conducted for cultural resources. Parks, open space and natural resources are also considered within the context of visual and aesthetic impacts.

5.15.1 Affected Environment

The Merrimack River runs adjacent to the rail right-of-way for the length of the project area. In addition, there are natural systems, open space and recreational areas that abut the rail corridor. Proposed station areas and the layover facility are located in more developed urban areas where properties adjacent to the rail corridor have been previously disturbed.

As documented in Section 5.9, there are historic properties and districts along the entire length of the rail corridor.

5.15.2 Environmental Consequences

5.15.2.1. No-Build Alternative

Under the No-Build Alternative, the use of the rail for limited freight deliveries will continue without the need to construct new stations or layover facilities. Therefore, there would be no additional direct or indirect impacts to the visual resources along the existing corridor due to the Project

5.15.2.2. Manchester Commuter Rail Alternative

For work associated with the rail line, no impacts are anticipated as the rail right-of-way historically accommodated double tracking throughout the length of the corridor. Vegetation clearing along the rail right-of-way will occur as part of deferred maintenance and may restore views of the rail line that have been obstructed by years of unattended vegetation growth.

Station construction will occur at lower elevations / profiles than surrounding commercial uses or highway infrastructure, and the proposed layover facility will be located in the inactive portion of the existing CSX rail yard in Manchester. The only station with any tall feature is Manchester Station where the Project includes a pedestrian/bicycle bridge overpass that connects the station plaza and platform with South Commercial Street. The height of the pedestrian/bicycle bridge is 23 feet from the top of rail to the bottom of the bridge structure, and an additional 12-15 feet from the bottom of the bridge structure to the top of the roof structure. Because Manchester Station is located behind the stadium, its scoreboard, high mast lights, and other tall buildings along South Commercial Street, visual impacts from the station pedestrian/bicycle bridge are not anticipated. Please refer to the station renderings provided in Section 4.3.

No visual impacts are anticipated to the adjacent historic properties. In consultation with the SHPOs and Indian Tribes it will be determined if the Project will adversely affect any historic properties determined eligible for inclusion in the NRHP pursuant to 36 CFR § 800.5. If it is determined that the Project may adversely affect eligible historic resources; any potential visual impacts to adjacent historic properties will also be identified and reasonable efforts will be made to avoid or minimize the adverse effect.

5.15.3 Potential Mitigation Measures

Mitigation for visual impacts at the station locations and layover facility will primarily be limited to proper lighting design that does not disperse light from the site onto adjacent parcels, planting vegetation as needed where vegetation was trimmed or cleared, and using materials that blend in with the surrounding landscape. If it is determined that the Project may adversely affect historic eligible resources, reasonable efforts will be made to avoid or minimize any potential adverse visual impacts.

5.16 Land Use

This section summarizes the affected environment for land use resources within the study area corridor.

5.16.1 Regulatory Requirements

The following state laws, regulations and guidance are applicable to land use resources:

NH

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

MA

- 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 in August 2010.
- The Executive Office of Energy and Environmental Affairs (EEA) Smart Growth & Smart Energy policy

5.16.2 Affected Environment

Existing land use characteristics and zoning regulations in the vicinity of the four proposed station locations, as well as the proposed layover facility, are summarized below.

South Nashua Station

Land uses in the vicinity of the South Nashua Station are primarily retail and commercial, with some multifamily residential developments within a one-mile radius of the proposed station location. Zoning is identified as Highway Business, General Business and Urban Residence, with a Transit-Oriented Development (TOD) overlay district also in place.

Nashua Crown Street Station

Land uses in the vicinity of the Crown Street Station are a mix of commercial, single-family and multifamily residential within a one-mile radius of the proposed station location. Zoning is Highway Business, General Business and Urban Residence, with a Transit-Oriented Development (TOD) overlay district also in place.

Bedford / MHT Station

Land uses in the vicinity of the Bedford/Manchester Airport Station are a mix of commercial, open space (wooded) areas and single-family residential. Zoning is identified as Performance Zone, which allows for multiple commercial and residential uses, and the Merrimack River Shoreland Protection Zone.

Manchester Station

Land uses in the vicinity of the Manchester Station are a mix of commercial, industrial, institutional, recreational and multifamily residential within a one-mile radius of the proposed station location. Zoning is Central Business District, Amoskeag Millyard Mixed Use District, Redevelopment District – Mixed Use and Arena Overlay District.

Manchester Layover Facility

Land uses in the vicinity of the proposed Layover Facility are a mix of commercial, industrial, institutional, recreational and multifamily residential within a one-mile radius of the proposed station location. Zoning is Central Business District, Amoskeag Millyard Mixed Use District, Redevelopment District – Mixed Use and Arena Overlay District.

5.16.3 Environmental Consequences

5.16.3.1. No-Build Alternative

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no additional changes to compatibility with land uses along the existing corridor due to the Project.

5.16.3.2. Manchester Commuter Rail Alternative

Environmental consequences associated with land use and zoning in the vicinity of the four proposed station locations, as well as the proposed layover facility, are summarized below.

South Nashua Station

The City of Nashua implemented the TOD overlay district to encourage mixed-use development in the vicinity of transit facilities / stations, and in anticipation of the extension of commuter rail service from Lowell. The potential Pheasant Lane Mall station is compatible with the future land use and zoning goals of the city. In addition, the station may serve as a catalyst for redevelopment at the Pheasant Lane Mall, which has experienced vacancies by retail anchor tenants in recent history. Re-use of these spaces and associated parking areas is more desirable than greenfield development. Any redevelopment projects will be required to work with the City's regulatory boards and address potential impacts associated with redevelopment.

Nashua Crown Street Station

Land uses in the vicinity of the Nashua Crown Street Station are a mix of commercial, single-family and multifamily residential within a one-mile radius of the proposed station location. Zoning is Highway Business, General Business and Urban Residence, with a Transit-Oriented Development (TOD) overlay district also in place.

Bedford / MHTStation

Land uses in the vicinity of the Bedford / Manchester Airport Station are a mix of commercial, open space (wooded) areas and single-family residential. Zoning is identified as Performance Zone, which allows for multiple commercial and residential uses, and the Merrimack River Shoreland Protection Zone.

Manchester Station

Land uses in the vicinity of the Manchester Station are a mix of commercial, industrial, institutional, recreational and multifamily residential within a one-mile radius of the proposed station location. Zoning is Central Business District, Amoskeag Millyard Mixed Use District, Redevelopment District – Mixed Use and Arena Overlay District.

Manchester Layover Facility

Land uses in the vicinity of the proposed Layover Facility are a mix of commercial, industrial, institutional, recreational and multifamily residential within a one-mile radius of the proposed station location. Zoning is Central Business District, Amoskeag Millyard Mixed Use District, Redevelopment District – Mixed Use and Arena Overlay District.

5.16.4 Potential Mitigation Measures

There is no mitigation proposed for land use impacts associated with the Manchester Commuter Rail Alternative. Activities associated with rail maintenance and restoration of the second track are historic uses within the rail right-of-way. Station locations occur in areas where the station use is allowed or encouraged under existing zoning, and the layover facility is in the existing railyard where rail uses have occurred since construction of the original rail line.

5.17 Open Space and Recreation Resources / Section 4(f)

This section summarizes the affected environment for open space and recreation resources, and for resources classified as 4(f) properties within the study area corridor.

5.17.1 Regulatory Requirements

The following state laws, regulations and guidance are applicable to open space and recreation resources and Section 4(f) properties:

Federal

- Land and Water Conservation Fund (LWCF) Act of 1965 (16 USC 460 1-4) Section 6(f)
- 49 U.S.C. §303
- 23 U.S.C. §138
- 23 CFR 774

MA

- Article 97: Constitution of the Commonwealth of Massachusetts. Article 97 ensures that lands acquired for conservation purposes are not converted to other inconsistent uses.

5.17.2 Affected Environment

There are numerous public and private open space, conservation and recreational areas along the length of the project study area. Since work on the rail line is expected to occur entirely within the rail right-of-way, and the station and layover sites will occur on properties that are not classified as conservation, parkland or recreational land, these areas would not qualify as section 4(f) properties. There are a number of NRHP and NRHP-eligible resources within the corridor. Again, since track work is expected to be limited to within the rail right-of-way, impacts are not anticipated.

5.17.3 Environmental Consequences

5.17.3.1. No-Build Alternative

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no additional direct or indirect impacts to the open space and recreational resources and Section 4(f) properties along the existing corridor due to the Project

5.17.3.2. Manchester Commuter Rail Alternative

There are a number of NRHP and NRHP-eligible resources within the corridor. Again, since track work is expected to be limited to within the rail right-of-way, impacts are not anticipated. Conditions will be assessed for their relevance to exemptions identified at 23 CFR 774.13 (a)(2) regarding the improvement of railroad or rail transit lines that are in use or were historically used for the transportation of goods or passengers. As the design progresses, rehabilitation of some NRHP and NRHP-eligible bridges may be required. Potential impacts to these, as well as temporary construction impacts, will be identified as the design progresses.

As part of the alternatives analysis, the Pine Grove Cemetery property was considered for the Layover Facility. This alternative had the greatest potential to impact open space and recreational properties: both the cemetery backland (which would be cleared) and the adjacent Smith's Ferry Heritage Park would be affected. As noted earlier, this alternative was dismissed from further consideration based upon these potential impacts.

The Bedford Heritage Trail is a walking trail that travels along the Merrimack River. The trail, part of the statewide Heritage Trail system, starts at the end of Moore's Crossing Road, located

approximately 1.5 miles north of Bedford / MHT Station and heads north along the river for one mile to the Bedford Pumping Station, just south of the Route 293 bridge. Heading north, the trail crosses a 12-foot bridge built by the Bedford Rotary Club. Following the trail on the right, there is a picnic area overlooking the river. After the picnic area, the trail crosses another foot bridge, and Eagle Park is on the left. This small, wooded area is a winter roosting area for American Bald Eagles. The trail continues along the river crossing several small brooks and ends at the Bedford Pumping Station. The trail is open for walking and mountain bikes only. The trail is closed from December 1st until April 1st due to winter nesting of the eagles. Public parking is available at the end of Moore's Crossing Rd. There is no anticipated project-related impact to the Bedford Heritage Trail.

South of the Bedford Heritage Trail is an unofficial trail on various State of New Hampshire and private properties running north-south underneath utility easements and adjacent to the railroad right-of-way and Merrimack River. These properties are not designated as open space or conservation parcels.

5.17.4 Potential Mitigation Measures

As noted above, there are a number of NRHP and NRHP-eligible resources within the corridor. As the design progresses, mitigation for some NRHP and NRHP-eligible bridges may be required and will be identified as the design progresses.

5.18 Property Acquisition

This section summarizes the affected environment and potential impacts related to property acquisition within the study area corridor.

5.18.1 Regulatory Requirements

The following state laws, regulations and guidance are applicable to property acquisition:

Federal

- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), and amended (42 U.S.C. § 4601)
- 49 CFR Part 24

5.18.2 Affected Environment

Property acquisition requirements are based on the selection of the four station locations proposed in the study corridor as well the location and configuration of the proposed station parking, access roads, driveways, sidewalks, and pick-up/drop-off curbs and passenger areas and the layover facility. The existing rail right-of-way is of sufficient width to accommodate the proposed track work for the project. Station platforms are generally located within the existing railroad right-of-way owned by CSX with other station features located outside the rail right-of-way. South Nashua station is located at the southeast corner of the privately-owned Pheasant Lane Mall. Nashua station is located at Crown Street where the required land outside the rail right-of-way is owned by the City of Nashua. For Bedford/MHT station the land required for the station elements outside the rail right-of-way is largely within the footprint of a NHDOT owned highway interchange. For Manchester station most of the property required is within the rail right-of-way, which is the site of inactive yard tracks, with portions of some privately-owned

parcels needed for station access. As currently configured, none of the four proposed stations would displace existing residences or businesses.

For the layover facility the Pan Am South alternative is located primarily within the vacant inactive portion of the Manchester rail yard owned by CSX plus a small amount of privately held land at the northwest end of Hancock Street.

Municipal assessor databases were used to determine potential impacts by parcel within each city and town in the study corridor.

5.18.3 Environmental Consequences

5.18.3.1. No-Build Alternative

The Nashua-Manchester Regional Commuter Rail project would not be constructed or operated under the No-Build Alternative. Therefore, there would be no property acquisition along the existing corridor due to the Project.

5.18.3.2. Manchester Commuter Rail Alternative

The Manchester Commuter Rail Alternative would require easements of some property owned by CSX for station platforms adjacent to the tracks. Acquisition or easement will be needed for access at the stations and for the proposed parking lot at Bedford/MHT Station. None of the proposed stations will displace any existing residences and businesses. For the layover facility, the Pan Am South alternative is located primarily within the footprint of vacant inactive yard tracks owned by CSX, plus a small amount of privately held land at the northwest end of Hancock Street. The layover will need some partial takings of ROW from some existing private landowners in order to create access, including at the south end near Hancock Street and at the access driveway from Elm Street.

5.18.4 Potential Mitigation Measures

At South Nashua there is the opportunity to negotiate a shared parking arrangement with the adjacent mall property owner(s), which potentially reduces the need for acquisition of land for a new parking facility; at Nashua Crown Street the City of Nashua owns the existing P&R lot and is supportive of its use for station parking. It requires only minor modification at the southeast side to connect with the planned commuter rail platform; at Bedford/MHT the majority of the land needed for access and parking is owned by NHDOT. The private parcel impacted by the proposed bus loop on northwest side of the station minimizes impact to the existing business and retains its existing ingress/egress; and at Manchester the station and layover are primarily on inactive portions of CSX parcels, and access at the south and north ends of the station leverage existing roadways and driveways to minimize extent of land needed.

5.19 Indirect Effects and Cumulative Impacts

This section summarizes the indirect effects of the Manchester Regional Commuter Rail project as well as the Project's cumulative impacts when considered in combination with other projects and initiatives planned in the Project area within the same timeframe as the Build Alternative. This section also summarizes the methodology and the regulatory requirements used to analyze the indirect effects and cumulative impacts.

5.19.1 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:

“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.”

"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.

5.19.2 Indirect Effects

This section summarizes the potential indirect effects analysis of by taking into consideration how the proposed project, in combination with other planned and proposed developments within the overall study area, will be likely to affect development and existing residential, commercial, and institutional land uses. 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.

5.19.2.1. No-Build Alternative Consequences

The No-Build Alternative would result in a negative indirect impact. The lack of 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. The No-Build Alternative would not support potential land use changes designed to encourage transit-oriented development or, at a minimum, higher density/less sprawl development.

5.19.2.2. Manchester Regional Commuter Rail Alternative Consequences

The Manchester Commuter Rail Alternative would result in beneficial indirect impacts by creating opportunities for communities to implement healthy transportation options (walking, bicycling, and taking public transit). As a key component in future land use plans in both Nashua and Manchester, a shift from traditional development sprawl to transit-oriented development should reduce residential and commercial land consumption, infringement on natural resources and habitats, and energy savings associated with the reduced need for single-occupant vehicle travel (outside of the direct benefits noted earlier in regard to passenger forecasts and reduced VMT/VHT). As part of this project, the rail line will be upgraded from FRA Class 2 to FRA Class 4, which will shorten the time that takes for freight trains to service customers on the rail line. This, combined with new ownership of the rail line by CSX with its bigger rail network reach, could result in higher volumes of freight business on the rail line in the future, which could result

in additional air quality benefits as truck trips on the regional highway network are replaced by freight rail trips.

5.19.3 Cumulative Impacts of Manchester Regional Commuter Rail Alternative

Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. This section provides a summary of past, present, and reasonably foreseeable future projects (transportation and others) in the study area, the actual or potential direct environmental impacts of those projects, and how those impacts combined with potential direct impacts of Manchester Regional Commuter Rail may contribute to a cumulative effect on a particular resource or area of concern.

Cumulative impacts of the Build Alternative include benefits attributed to a further strengthened transportation network. Manchester Regional Commuter Rail implementation would build on a number of improvements that together extend mobility improvements and mode choice options through a large area of New Hampshire and Massachusetts. The increased opportunities for communities to encourage smart growth land use patterns and transit-oriented development 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.

Other cumulative benefits include reduced greenfield development as transit-oriented development encourages redevelopment near the station locations, and improved equity and access to jobs for zero-vehicle households living in proximity to station locations.

6. Comments and Coordination

This section summarizes the agency and stakeholder 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 EA. Public feedback/support and names of local, state and federal agencies and organizations that attended meetings or provided comments are included. Further information on public involvement is provided in the Public Involvement Plan and Materials Technical Report included as Appendix I.

6.1 Agency and Stakeholder Coordination

The Study team held virtual meetings with relevant agencies and stakeholders during preparation of the EA to share information on the definition and evaluation of the alternatives and to obtain input. At the federal level coordination was with FTA through its Region 1 office in Cambridge, MA. At the state level, meetings were held with a number of New Hampshire state agencies including Natural Resource Coordination meetings and Cultural Resource Agency meetings. Because project implementation and service would involve multiple states there were virtual coordination meetings with MassDOT/MBTA, particularly during development of the proposed operating plan and the definition of the four proposed stations and layover. Discussions were also held with Rhode Island DOT regarding the structure of their long-standing Pilgrim Partnership agreements under which MBTA currently provides commuter rail service to that state.

Additionally, coordination with the cities of Nashua and Manchester took place throughout the process of defining the service, station locations, and the layover. Information about the project was shared with relevant MPOs, transit authorities, Manchester-Boston Regional Airport (MHT) and others. Virtual meetings were held with Pan Am Railways and CSX to inform them of the project scope and the alternatives being evaluated. In June 2022 CSX closed on its acquisition of Pan Am Railways and further coordination with both CSX and the MBTA will be necessary as the project moves forward.

6.2 Public Involvement

The Project Team submitted its Public Outreach and Communications Plan (POCP) to FTA on March 18, 2021. The POCP describes how the Project Team will communicate with the public at various points of the project process via stakeholder meetings, newsletters, a general public meeting, e-bulletins, a project page on the NHDOT website, and other forms of outreach, as appropriate. The POCP also outlines how the Project Team will inform and seek input from the municipalities and stakeholders. The outreach program is built upon the framework developed during the 2014 project and the extensive input received at that time. Stakeholder opinions and comments will continue to be documented and reviewed throughout the project.

6.3 Public Comments

A project Fact Sheet was developed in summer of 2021, a general public meeting was held on November 17, 2021, in a hybrid in-person and Zoom format with over 100 attendees, and multiple meetings were held with the cities of Nashua and Manchester and with Manchester-Boston Regional Airport during the development and evaluation of the station and layover alternatives throughout 2021 and 2022. A second Fact Sheet was developed in winter 2023 summarizing the proposed project and its key features and benefits.

Copies of key presentations and meeting minutes, the Fact Sheets, and other project information is posted on the project website accessed https://www.nh.gov/dot/projects/nashuamanchester40818/index.htm

Further information on public comments is provided in the Public Involvement Plan and Materials Technical Report included as Appendix I.

7. List of Preparers

The Nashua-Manchester 40818 (Capitol Corridor) Manchester Regional Commuter Rail EA was prepared by FTA and NHDOT with support from AECOM, which is the lead consultant for the Project, and with assistance from a team of consulting engineers from Jacobs, WSP, NOBIS, Fitzgerald & Halliday, Inc. (FHI), and GM2. The following table identifies the agency personnel, consultant staff, and their study role.

Table 23. List of Preparers and Their Study Role

	Study Role	Team Members
AECOM Technical Services, Inc. 1155 Elm Street, Suite 401 Manchester, NH 03101	• Project Manager • Environmental Lead • Environmental • GIS/Land Use • Environmental Justice • Noise and Vibration • Station architecture lead • Station architecture • Station architecture • Civil Engineering Lead • Civil Engineering • Hazardous materials lead • Hazardous materials • Ridership lead • Ridership • Air quality lead • Air quality • Financial plan lead • Financial plan • Economic impact lead • Economic impact • Traffic engineering lead • Traffic engineering • Cultural resources lead • Archaeological resources • Architectural resources	• Jay Doyle, AICP • David Derrig, AICP • Kala Gurung, AICP • Mike Przybyla • Chris Nielsen • Jim Cowan, INCE Board Certified • George Katsoufis, AIA, ENV, LEED • Daniel Hogan • Andre Vasconcelos • Frank Astone, PE • Matthew Sanchez, PE, ENV SP • David Austin, PE, LSP • Cheryl Cormier, PG • Laura McWethy • Patrick Coleman, PE • Jeffrey Conners • Ian Miller • Robert Peskin, PhD, M.ASCE, MIAM • Ed Plasencia • Jason Weiss • Alice Chen • Arianna Seguin, PE • Isaac Almy, PE • Dan Cassedy, PhD, RPA • Joel Dworsky, RPA • Emily Everett, AICP
Jacobs Engineering Group Two Executive Park Drive Bedford, NH 03101	• Engineering lead • Rail operations lead • Signals • Track • Bridges • Value Engineering	• Jonathan Bruneau, PE • David Nelson • Dan Shay • Jeremy Bettencourt • John Wilson, PE • Randall Sprague, PE, PP, CVS
GM2 197 Loudon Road, Suite 310 Concord, New Hampshire 03301	• Natural resources • Engineering survey	• Jennifer Riordan, CWS, CPESC • Mitch Cummings, PLS
WSP USA 100 Summer Street Boston, MA 02110	• Layover facility lead • Layover facility	• Rachel Burckardt, PE • Sarah Bergman, EIT, LEED AP

	Study Role	Team Members
Fitzgerald & Halliday, Inc. 416 Asylum Street Hartford, CT 06103	• Public involvement • Public involvement	• Laura Parete • Marcy Miller
Nobis Group 585 Middlesex Street Lowell, MA 01851	• Geotechnical lead • Geotechnical	• Al Jones, PE • Patrick Clarke, PE
Richmond Hill Consulting, LLC PO Box 1001 Seymour, IN 47274	• Financial plan support	• Kenneth Kinney

8. Distribution List

The distribution list provided below is preliminary and will be finalized when the EA is finalized.

Table 24. Distribution List

U.S. Agencies/Official	• **Federal Railroad Administration (FRA)** • **Federal Transit Administration (FTA)** • **Federal Highway Administration – New Hampshire Division** • **United States Army Corps of Engineers New England District** • **United States Environmental Protection Agency, New England (USEPA)**

State Agencies/Officials	• **New Hampshire Department of Transportation (NHDOT)**
	  ○ Michelle Winters, Director of Aeronautics, Rail and Transit
	• **New Hampshire Department of Environmental Services (NHDES)**
	  ○ John J. Duclos, Administrator, Office of the Commissioner
	• **Massachusetts Executive Office of Energy and Environmental Affairs, MEPA Office**
	  ○ Tori Kim, Director
	• **Massachusetts Department of Environmental Protection (MassDEP)**
	• **Massachusetts Department of Transportation (MassDOT)**
	  ○ Meredith Slesinger - Rail & Transit Administrator
	• **Massachusetts Bay Transportation Authority (MBTA)**
	  ○ Jamey Tesler, Interim MassDOT Secretary and CEO
	  ○ Jeff Gonneville, MBTA Interim General Manager
	• **Massachusetts Historical Commission (MHC)**
	  ○ William Francis Galvin, Secretary of the Commonwealth; Chair, Massachusetts Historical Commission
	  ○ John Rosenberry, Designee

Elected Officials	• **New Hampshire**
	  ○ Governor Christopher Sununu
	  ○ Senator Jeanne Shaheen
	  ○ Senator Maggie Hassan
	  ○ Representative Chris Pappas, 1st Distrisct
	  ○ Representative Ann Kuster, 2nd District
	• **Massachusetts**
	  ○ Governor Maura Healey
	  ○ Lieutenant Governor-elect, Kim Driscoll
	  ○ Senator Elizabeth Warren
	  ○ Senator Edward Markey
	  ○ Representative Lori Trahan, 3rd District

Regional Planning Commissioners	• **Nashua Regional Planning Commission**
	  ○ Jay Minkarah, Executive Director
	• **Southern New Hampshire Planning Commission**
	  ○ Sylvia von Aulock, Executive Director
	• **Boston Regional Metropolitan Planning Organization**
	  ○ Tegin Teich, Executive Director
	• **Northern Middlesex Council of Governments**
	  ○ Jennifer Raitt, Executive Director

City and Town Officials	• **City of Manchester**
	  ○ Joyce Craig, Mayor
	  ○ Jodie Nazaka, Planning and Community Development Director
	• **City of Nashua**
	  ○ Jim Donchess, Mayor
	  ○ Sam Durfee, Planning Manager
	• **Town of Chelmsford**
	  ○ Paul Cohen, Town Manager
	• **City of Lowell**
	  ○ Sokhary Chau, Mayor

City Agencies	• **Greater Manchester Chamber of Commerce**
	  ○ April Difalco, President
	• **Greater Nashua Chamber of Commerce**
	  ○ Wendy Hunt, President & CEO
	• **Manchester-Boston Regional Airport**
	  ○ Theodore S. Kitchens, Airport Director

Interest Groups	•

9. References

References are provided in the individual technical reports contained in the appendices.

10. List of Appendices

Appendix A Natural Resources Technical Report

Appendix B Hazardous Materials Technical Report

Appendix C Noise and Vibration Technical Report

Appendix D Cultural Resources Technical Report

Appendix E Air Quality Technical Report

Appendix F Environmental Justice and Title VI Compliance/Equity Analysis Technical Report

Appendix G Transportation Technical Report

Appendix H Socioeconomic Technical Report

Appendix I Public Involvement Plan and Materials