Chapter 3 – Affected Environment and Environmental Consequences

3.1. Introduction

This chapter provides a brief overview of the regulatory context and methodology to assess effects on environmental resources; describes existing conditions in the Affected Environment; assesses the potential environmental impacts to the natural and social environment of the No Build and Build Alternatives defined in Chapter 2; and identifies mitigation measures where relevant. Consistent with FRA's *Procedures for Considering Environmental Impacts*,[1] evaluated resources include: air quality, water quality, noise and vibration, wetlands, floodplains, the coastal zone, energy, climate change, aesthetics and design quality, transportation, possible barriers to handicapped and elderly, land use and zoning, socioeconomic impacts, environmental justice (EJ), public health and safety, parks and recreational areas, cultural resources, construction period impacts, and indirect and cumulative impacts. Environmental resources not present within the study area (and, therefore, not evaluated in this document) include threatened and endangered species, use of natural resources (other than energy), and ecological systems. MassDOT evaluated these resources in DEIR Appendix 5, *Natural Resources Technical Report*.[2] As reported in this documentation, the Project Team consulted with the U.S. Fish and Wildlife Service and National Marine Fisheries Service in accordance with the U.S. Endangered Species Act (16 U.S.C. 1531-1543) and Section 7 requirements at 16 U.S.C. 1536.[3] Agency correspondence is provided in Appendix C of this EA.

A full environmental evaluation of these resources, conducted during the state review process, is detailed in documents on the SSX project website: https://www.massdot.state.ma.us/southstationexpansion.

3.2. Air Quality

The federal, state, and local regulations applicable to air quality at the project sites include the federal Clean Air Act, as amended (CAA and CAAA), and the established set of National Ambient Air Quality Standards (NAAQS) for various criteria pollutants; the Massachusetts Ambient Air Quality Standards (MAAQS), which are identical to the NAAQS; U.S. Environmental Protection Agency (EPA) General Conformity Rule (40 CFR 51 Subpart W); and U.S. EPA Determining Conformity Of Federal Actions To State Or Federal Implementation Plans (40 CFR 93).

Air quality assessments prepared for the SSX project included regional and local components, each with specific study areas. The local component assessment included a review of nearby traffic intersections that would be affected by motor vehicle traffic associated with the South Station site and the layover facility sites. Additionally, MassDOT conducted a regional analysis of SSX project-related direct and indirect emissions. An emission inventory is a listing, by source, of the amount of air pollutants discharged into the atmosphere for a given time period (typically one year). MassDOT and FRA (the Project Team) prepared project-related emissions inventories for the NEPA Air Quality analysis to estimate emissions of volatile organic compounds (VOCs, oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter up to 10

[1] Federal Railroad Administration. *Procedures for Considering Environmental Impacts, Federal Register 28545, Vol. 64, No. 101, Wednesday, May 26, 1999. https://www.fra.dot.gov/eLib/Details/L02710*

[2] Additional information is provided in Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report*, *Appendix 5, Natural Resources Technical Report*. October 2014. Available at: http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

[3] U.S. Endangered Species Act (16 U.S.C. 1531-1543), Section 7 requirements at 16 U.S.C. 1536, December 1973. Accessed October 2012. http://epw.senate.gov/esa73.pdf.

and 2.5 microns in diameter ($PM_{10}/PM_{2.5}$), and sulfur dioxide (SO_2). The full air quality evaluation is provided in the DEIR Appendix 10, *Air Quality Technical Report*.[4]

3.2.1. Existing Conditions

The Massachusetts Department of Environmental Protection (MassDEP) maintains a statewide network of monitoring stations that continuously measure pollutant concentrations in the ambient air. These stations provide data to assess compliance with the NAAQS and the MAAQS and to evaluate the effectiveness of pollution control strategies. For the most recently available full year of data (2012) at representative monitoring stations nearest to the SSX project, there were two exceedances of the 8-hour Ozone (O_3) standard and two exceedances of the annual Nitrogen Dioxide (NO_2) standard. There were no exceedances in the air quality study area of any other NAAQS or MAAQS in 2012.

U.S. EPA designates geographic regions in which measured ambient concentrations of air pollutants have exceeded the NAAQS as nonattainment areas. Areas of the country that have measured pollutant concentrations that are less than the NAAQS are designated attainment areas. Areas that have attained the standards after a period of nonattainment and that have plans in place to reduce emissions are classified as maintenance areas. The SSX project is located in Boston, Suffolk County, which is part of the Boston-Lawrence-Worcester Eastern Massachusetts Nonattainment area. The Commonwealth of Massachusetts was previously designated as a Serious Nonattainment Area with respect to the 1997 8-hour ozone standard of 0.08 parts per million (ppm). However, all air quality monitors now show that Massachusetts meets the 1997 ozone standard statewide. U.S. EPA updated the 8-hour ozone standard to 0.075 ppm in 2008, and designated Massachusetts as in attainment statewide except for Dukes County (Martha's Vineyard) in 2011.

On January 30, 1996, U.S. EPA published a direct final rule approving Massachusetts State Implementation Plan (SIP) revision request to redesignate the Boston metropolitan area Carbon Monoxide (CO) nonattainment area to attainment. This area includes the communities of Boston, Cambridge, Chelsea, Everett, Malden, Medford, Quincy, Revere, and Somerville. The direct final rule (61 Federal Register 2918) became effective April 1, 1996.

Massachusetts redesignation request, approved in the January 30, 1996 direct final rule, also included a maintenance demonstration and contingency plans, which outline Massachusetts control strategy for maintenance of the CO NAAQS. The maintenance plan provisions under Section 175A of the CAA require that maintenance of the relevant NAAQS be provided for at least 10 years after redesignation, followed by an additional 10-year maintenance period.

The 20-year maintenance period for the Boston metropolitan CO maintenance area expired on April 1, 2016. Therefore, the Boston metropolitan area is no longer required to demonstrate General Conformity for the Boston metropolitan CO maintenance area. However, the rest of the maintenance plan requirements continue to apply in accordance with the SIP.

[4] Additional information is provided in Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report*, *Appendix 10, Air Quality Technical Report*. October 2014. Available at: http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

3.2.2. Environmental Consequences

No Build Alternative

In the No Build Alternative, train, car, and bus volumes will increase over time. However, large decreases in pollutant emissions in the vicinity of South Station between 2012 and 2025 are anticipated due to significant reductions in U.S. EPA-mandated pollutant emission standards for locomotive and motor vehicle engines[5]. These significant reductions in emission factors would offset the growth of motor vehicle traffic and train volumes in the area around South Station. Small increases in pollutant emissions in the vicinity of South Station between 2025 and 2035 are anticipated, due to relatively small reductions in U.S. EPA pollutant emission standards for locomotive and vehicle engines and modest increases in motor vehicle volumes. These small reductions in emission standards would not completely offset the growth of traffic and train volumes in the area around South Station.

In the No Build Alternative, no MBTA trains would lay over at the Widett Circle site. Thus, pollutant emissions will not change at this site. There are 10 trains per day currently using the Readville – Yard 2 site for layover; these trains would continue to use Readville – Yard 2 in the No Build Alternative.

Build Alternative

Project-related impacts during routine operations would include emissions generated by locomotives entering and leaving the South Station Rail Terminal and by related layover facilities and vehicular traffic. Section 3.18 discusses MassDOT's approach to mitigate temporary construction-related air quality impacts. Table 3-1 presents the sum of total project-related criteria pollutant emissions at the South Station and layover sites.

Table 3-1 — Total Project-Related Criteria Pollutant Emissions at the South Station and Layover Sites

Project Alternative	VOCs (tpy)	NOx (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO (tpy)	SO_2 (tpy)
2012 Existing Conditions	7.36	27.74	1.90	1.21	84.61	0.49
2025 Conditions						
No Build Alternative	2.77	8.57	1.39	0.56	69.08	0.49
Build Alternative	2.85	8.98	1.43	0.57	70.40	0.56
2035 Conditions						
No Build Alternative	2.71	8.02	1.48	0.57	73.24	0.50
Build Alternative	2.79	8.49	1.51	0.60	74.97	0.57

tpy = tons per year

Based on the results of the emissions inventory analysis for the air quality study area, the Build Alternative would result in slightly higher emissions than the No Build Alternative and, with the exception of SO_2, total emissions in 2025 and 2035 are significantly lower than the 2012 baseline for all pollutants. The small increases in pollutant emissions in the vicinity of the South Station site or the layover facility sites due to the project would not lead to exceedances of the MAAQS and NAAQS and no adverse air quality impacts are expected to occur as a result of the project. As presented in DEIR Appendix 10, *Air Quality Technical Report,*[6] the result of other air quality-related emissions analyses includes:

[5] 40 CFR 88.104-94 = Clean-fuel vehicle tailpipe emission standards for light-duty vehicles and light-duty trucks and 40 CFR 88.311- 93 § 88.311- 98 = Emission standards for Inherently Low-Emission Vehicles.

[6] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report*, *Appendix 10, Air Quality Technical Report*. October 2014. Available at: http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

- **CO Status** – The CO modeling analysis included four selected traffic intersections at the South Station site (Atlantic Avenue at Seaport Boulevard, Atlantic Avenue at Summer Street, Surface Road at Kneeland Street, and Dorchester Avenue at West Broadway/Traveler Street), one at the Widett Circle site (Widett Circle at Widett Circle Access Road), and one at the Readville – Yard 2 site (Hyde Park Avenue/Neponset Valley Parkway/Wolcott Court/Wolcott Square.) The selected air quality study areas indicated that increases in project-related motor vehicle traffic volumes would not lead to exceedances of the NAAQS or MAAQS for CO, and no adverse air quality impacts are expected to occur as a result of the construction or implementation of the SSX project.

- **Mobile Source Air Toxics (MSATs) Status** – The MSAT analysis indicated there would be approximately a 2% increase in MSAT emissions due to the SSX project compared to MSAT emissions from the No Build Alternative. These small increases are unlikely to result in adverse health effects within the South Station study area. When compared to the MSAT emissions for the 2012 Existing Conditions, the MSAT emissions for the Build Alternative in 2025 and 2035 are lower by about 62% each.

- **Diesel Particulate Matter (DPM) Status** – A qualitative assessment of DPM emissions was performed for this project. DPM is part of a complex mixture that makes up diesel exhaust, which is emitted from a broad range of diesel engines including trucks, buses, and cars; and off road diesel engines that include railroad locomotives. For each year, the Build Alternative would produce more DPM emissions than the No Build Alternative. This is because all trains in the MBTA's fleet will either be "new" or "rebuilt" to meet the most stringent U.S. EPA Locomotive standards, which apply to all locomotives, which are built or rebuilt after 2015. By 2025 (the opening year of the proposed project), all locomotives must comply with these standards. Therefore, the only changes to emissions would be due to the increase in locomotive operations. The Build Alternative is expected to have a significant reduction of DPM compared to the 2012 baseline.

- **Ultrafine Particulates (UFPs) Status** – UFPs refer to particulate matter that is generally less than 100 nanometers in size. Compared with $PM_{2.5}$, the ultrafine particles would be 0.1 microns and smaller or roughly 25 times smaller than the regulated $PM_{2.5}$. The qualitative assessment of UFPs performed for this project showed that project-related UFP emissions are expected to increase over time. For each year, the Build Alternative would produce more UFPs than the No Build Alternative. The increase in all emissions is due to the increase in train volumes (operations). However, the Build Alternative is expected to have a significant reduction of DPM compared to the 2012 baseline.

3.2.3. Mitigation Measures

The air quality analyses demonstrate that emissions of criteria pollutants in the Build Alternative would be in conformance with NAAQS; would not increase in frequency or severity any existing violations; and would not create future violations. The slight increases in MSAT emissions associated with the Build Alternative would be unlikely to result in adverse health effects to the neighborhood areas adjacent to South Station. No significant impacts are anticipated. Therefore, no mitigation of project-related emissions would be required.

3.3. Noise and Vibration

Federal, state, and local regulations applicable to noise and vibration at the project sites include FTA's *Transit Noise and Vibration Impact Assessment* Guidance Manual;[7] FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment;*[8] and the City of Boston's Noise Ordinance.[9] In general, FRA adheres to the methodology described in the FTA guidance manual for assessing noise and vibration for FRA funded rail projects.

For the noise and vibration analysis, the Project Team:

- Identified applicable federal criteria and identified state and local noise and vibration criteria and ordinances;
- Compared noise levels under the future year 2035 Build Alternative with the FTA noise criteria for each identified noise-sensitive receptor location;
- Applied FTA criteria to assess annoyance due to vibration and ground-borne noise from transit operations;
- Evaluated the extent and severity of noise impacts from transit projects using the methods and procedures contained in the FTA *Transit Noise and Vibration Impact Assessment* guidance manual;
- Analyzed construction impacts potential for building damage; and
- Applied FTA criteria for extremely vibration sensitive equipment to sensitive land uses.

Additional information on this analysis can be found in DEIR Appendix 11, *Noise and Vibration Technical Report*.[10]

3.3.1. Existing Conditions

South Station

To establish the existing noise levels within the project area, the Project Team took noise measurements at eight locations within or adjacent to the South Station site, representing residential and non-residential sensitive noise receptors potentially affected by the project. The primary sources of noise in the area are the train operations at South Station, especially from the idling diesel locomotives, and local street traffic on Atlantic Avenue and Summer Street. Table 3-2 presents the existing noise measurements in and around the South Station site. Figure 3-1 shows some typical A-weighted sound levels for both transit and non-transit sources, measured in A-weighted Decibels (dBA).

[7] Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment.* (Report No. FTA-VA-90-1003-06). May 2006.

[8] Federal Railroad Administration. *High-Speed Ground Transportation Noise and Vibration Impact Assessment*. September 2012.

[9] City of Boston Municipal Code, Chapter 16, Section 26.

[10] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 11, Noise and Vibration Technical Report. October 2014. http://www.massdot.state.ma.us/Portals/25/docs/DEIR/appendix/11-Appendix11.pdf*

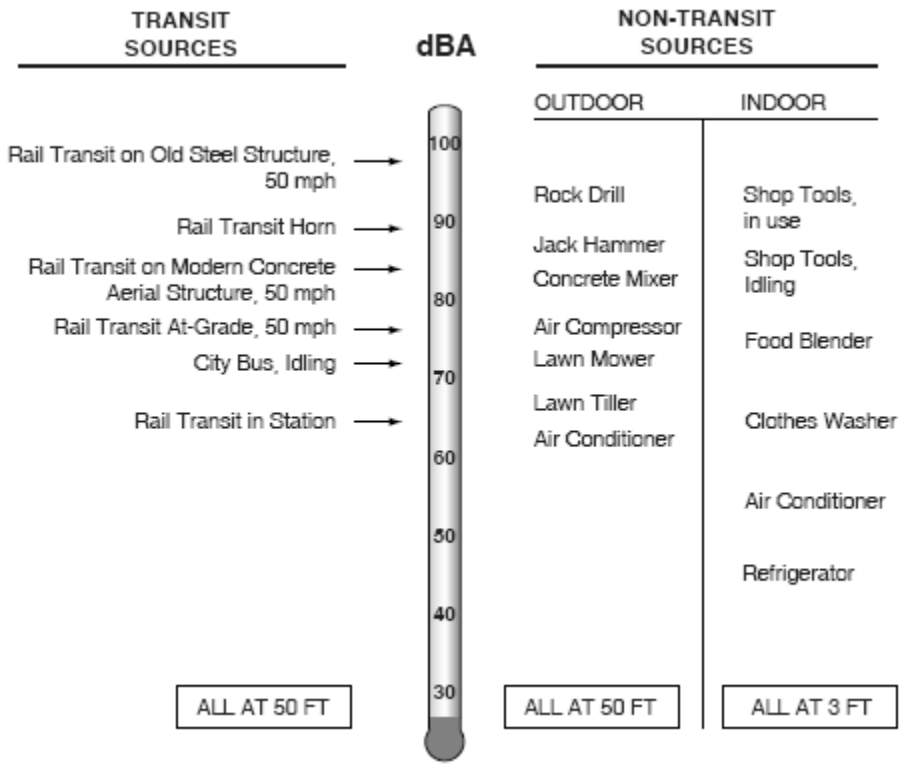

Figure 3-1 — Typical A-Weighted Sound Levels

In addition to the noise measurements, the Project Team took vibration measurements at four locations at the South Station site, including: the South Station headhouse; the east side of South Station near Track 13; the west side of South Station near Track 1; and a location immediately adjacent to the site, 245 Summer Street, which operates vibration-sensitive computer equipment in the basement of the building. Because of the slow speed of the trains entering and leaving South Station, typical vibration levels at the nearest residential receptors along Atlantic Avenue are below the FTA impact criterion of 72 vibration decibels (VdB) for human annoyance. Typical vibration levels at the nearest residential receptors along Atlantic Avenue are below 55 VdB from the slow-moving diesel locomotives on Track 1 (nearest to these receptors) at South Station.

A detailed indoor and outdoor vibration measurement program was conducted at 245 Summer Street, which operates vibration-sensitive computer equipment in the basement of the building, using more sensitive equipment to measure the indoor vibration levels. Vibration levels were below 60 VdB at a distance of 75 feet from the closest tracks. These levels are below the FTA outdoor criterion of 65 VdB for buildings with vibration-sensitive equipment. Vibration measurements obtained inside the basement at 245 Summer Street, adjacent to the vibration-sensitive computer equipment, indicated that vibration was not due to the trains, but rather due to the mechanical equipment located inside the basement.

Table 3-2 — Existing Measured Noise Levels at South Station Site and Vicinity

Description	Approximate Distance to Nearest Rail Line	Peak-Hour Leq[a]	Midday Leq	Nighttime Leq	Ldn Level[b]
South Station Headhouse	25 feet	72.3 dBA	---	---	---
245 Summer Street	50 feet	71.3 dBA	---	---	---
East Side of South Station – Track 13	15 feet	82.0 dBA	---	---	---
West Side of South Station – Track 1	15 feet	69.1 dBA	---	---	---
Atlantic Avenue at East Street	175 feet	67.8 dBA	67.0 dBA	64.4 dBA	69.3 dBA
Atlantic Avenue at Kneeland Street	175 feet	73.0 dBA	71.0 dBA	65.0 dBA	71.2 dBA
Federal Reserve Building	340 feet	64.6 dBA	---	---	---
Across Fort Point Channel at Necco Street	950 feet	56.4 dBA	57.9 dBA	54.0 dBA	59.2 dBA

a Leq is the A-weighted sound level, which averages the background sound levels with short-term transient sound levels and provides a uniform method for comparing sound levels that vary over time.
b The 24-hour Day-Night Average Sound Level (Ldn) is determined from the measured peak hour, midday, and nighttime hourly Leq noise levels. The Ldn noise level is only required for residential receptors or receptors where people normally sleep such as hospitals and hotels.
--- indicates that midday and nighttime hourly Leq noise measurements were not obtained because there were no residential receptors at this location.

Layover Facilities

At the Widett Circle site, the primary sources of noise are the trucks operating at the major warehouse facility, trains at the Southampton Rail Yard, and traffic noise from I-93. The nearest residential receptors are located along Albany Street south of the Widett Circle layover facility and across I-93. Noise levels at the noise measurement location on Albany Street are due to local street traffic on Albany Street and the traffic noise on I-93. The measured Ldn noise level at this location was 68.2 dBA. The Ldn (or day/night noise level) represents the average noise level over a 24-hour period with a 10-dBA penalty added to the nighttime hours (between 10 PM and 7 AM) to account for people's increased sensitivity to noise while trying to sleep. At the Readville – Yard 2 site, the primary noise source at the noise measurement location is the midday MBTA train operations at Readville – Yard 2. The measured Ldn noise level at the nearest residential receptor on Walcott Street was 57.9 dBA, with a peak-hour Leq level of 62.0 dBA during midday train layover operations. The Leq (or equivalent noise level) represents a level of constant noise that has the same acoustic energy as the fluctuating noise level over a given period of time such as an hour. Based on the measurement results at South Station, the Project Team did not take vibration measurements at these layover facility sites because it was assumed that, similar to the measurements at South Station, the slow speed of the trains traveling into and out of the sites would not result in significant vibration levels (above the FTA annoyance criterion of 72 VdB). The Project Team estimated the vibration levels at the nearest residential receptor on Walcott Street from the existing train operations at the Readville -Yard 2 layover facility to be 55 VdB.

3.3.2. Environmental Consequences

The FTA noise impact criteria are delineated into two categories: moderate impact and severe impact. The moderate noise impact threshold defines areas where the change in noise is noticeable, but may not be sufficient to cause a strong, adverse community reaction. The severe noise impact threshold defines the noise limits above which a significant percentage of the population would be highly annoyed by new noise. For each identified noise-sensitive receptor location at the SSX project sites, the Project Team compared noise levels in

the Build Alternative with the FTA noise criteria to determine potential impact.[11] Additional details on the impacts analysis can be found in DEIR Appendix 11, *Noise and Vibration Technical Report*.[12]

South Station

In the absence of mitigation, noise impacts from the Build Alternative would be expected to occur at noise sensitive receptor locations across Fort Point Channel due to the removal of the USPS facility along Dorchester Avenue, which currently acts as an effective noise barrier. With the removal of the USPS facility, there would be a direct sound propagation path to sensitive noise receptors across Fort Point Channel at Necco Street. As a result, the 24-hour Ldn (day-night average) noise level across Fort Point Channel would exceed the FTA moderate impact criteria. In addition, the peak-hour Leq (hourly equivalent) noise level at 245 Summer Street would also exceed the FTA moderate impact criteria. Tables 3-3 and 3-4 show the results of the noise modeling analysis and impact assessment for the peak-hour Leq noise level for non-residential receptors, and the 24-hour Ldn noise level for residential receptors.

Table 3-3 — Results of the Noise Modeling Analysis for the Peak-hour Leq Noise Level at Non-Residential Receptors

Description	2013 Calculated Peak-Hour Leq Level	2035 Calculated Peak-Hour Leq Level	Impact Assessment
245 Summer Street	69.4 dBA	71.1 dBA	Moderate Impact
Atlantic Avenue at East Street	63.6 dBA	64.4 dBA	No Impact
Atlantic Avenue at Kneeland Street	71.7 dBA	68.5 dBA	No Impact
Federal Reserve Building	59.2 dBA	61.9 dBA	No Impact
Across Fort Point Channel at Necco Street	57.3 dBA	59.8 dBA	No Impact

Table 3-4 — Results of the Noise Modeling Analysis for the 24-hour Ldn Noise Level at Residential Receptors

Description	2013 Calculated Ldn Level	2035 Calculated Ldn Level	Impact Assessment
Atlantic Avenue at East Street	64.5 dBA	64.0 dBA	No Impact
Atlantic Avenue at Kneeland Street	69.8 dBA	70.5 dBA	No Impact
Across Fort Point Channel at Necco Street	56.7 dBA	58.6 dBA	Moderate Impact

Because of the slow speed of the trains entering and leaving South Station, train vibration levels are not expected to exceed the FTA criterion of 72 VdB for human annoyance. The vibration levels would be perceptible along the platforms when standing next to the locomotives, however.

[11] Noise-sensitive receptors primarily include residences and buildings where people normally sleep, such as hospitals and hotels. Other noise-sensitive receptors include schools, libraries, and office buildings where quiet is essential for a productive work environment. Most other commercial, retail, and industrial land uses are not considered to be noise-sensitive. This would include the South Station headhouse.

[12] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 11, Noise and Vibration Technical Report. October 2014.* http://www.massdot.state.ma.us/Portals/25/docs/DEIR/appendix/11-Appendix11.pdf

Layover Facilities

There would be no noise impact from the train operations at the Widett Circle layover facility site; the nearest noise sensitive receptors located along Albany Street are approximately 1,300 feet from the acoustic center of the site. At the Readville – Yard 2 layover facility site, the midday peak activity hour Leq noise level of 65 dBA would exceed the FTA moderate impact criterion of 64 dBA at the nearby single-family residential receptors located along Wolcott Street and Wingate Road, and the apartment buildings along Riley Road and Sierra Road. Because of the slow speed of the trains entering and leaving the layover facilities, train vibration levels are not expected to exceed the FTA criterion of 72 VdB for human annoyance.

3.3.3. Mitigation Measures

South Station

The noise mitigation measures at South Station would consist of an 18-foot high, 1,450-foot long noise barrier that would reduce the noise levels from the train operations at South Station by 10-12 dBA in the Fort Point Historic District and along the Dorchester Avenue Harborwalk. Figure 3-2 shows the proposed location of the South Station noise barrier. The proposed headhouse between the new tracks and 245 Summer Street would provide a 10 dBA in noise reduction at this building.

Layover Facilities

There would be no noise impact from the train operations at the Widett Circle layover facility, and therefore no mitigation is required. At the Readville – Yard 2 layover facility, the existing berm/noise barrier would be extended to provide noise mitigation to the single-family homes along Wolcott Street and Wingate Road, and the apartment buildings on Riley Road and Sierra Road. This berm/noise barrier would be approximately 18 feet high and approximately 800 feet long. Figure 2-6 shows the proposed location of the extended berm/noise barrier. In addition, shore power would be supplied so that the locomotives can be plugged in to reduce the amount of engine idling time at the layover facility. Using electrical power at the layover facility rather than diesel-burning engines, greatly reduces air and noise pollution from trains. When trains use shore power, they tap layover facility electricity for their power needs at berth – lights, pumps, communications, refrigeration – instead of running diesel-fueled auxiliary on-board engines.

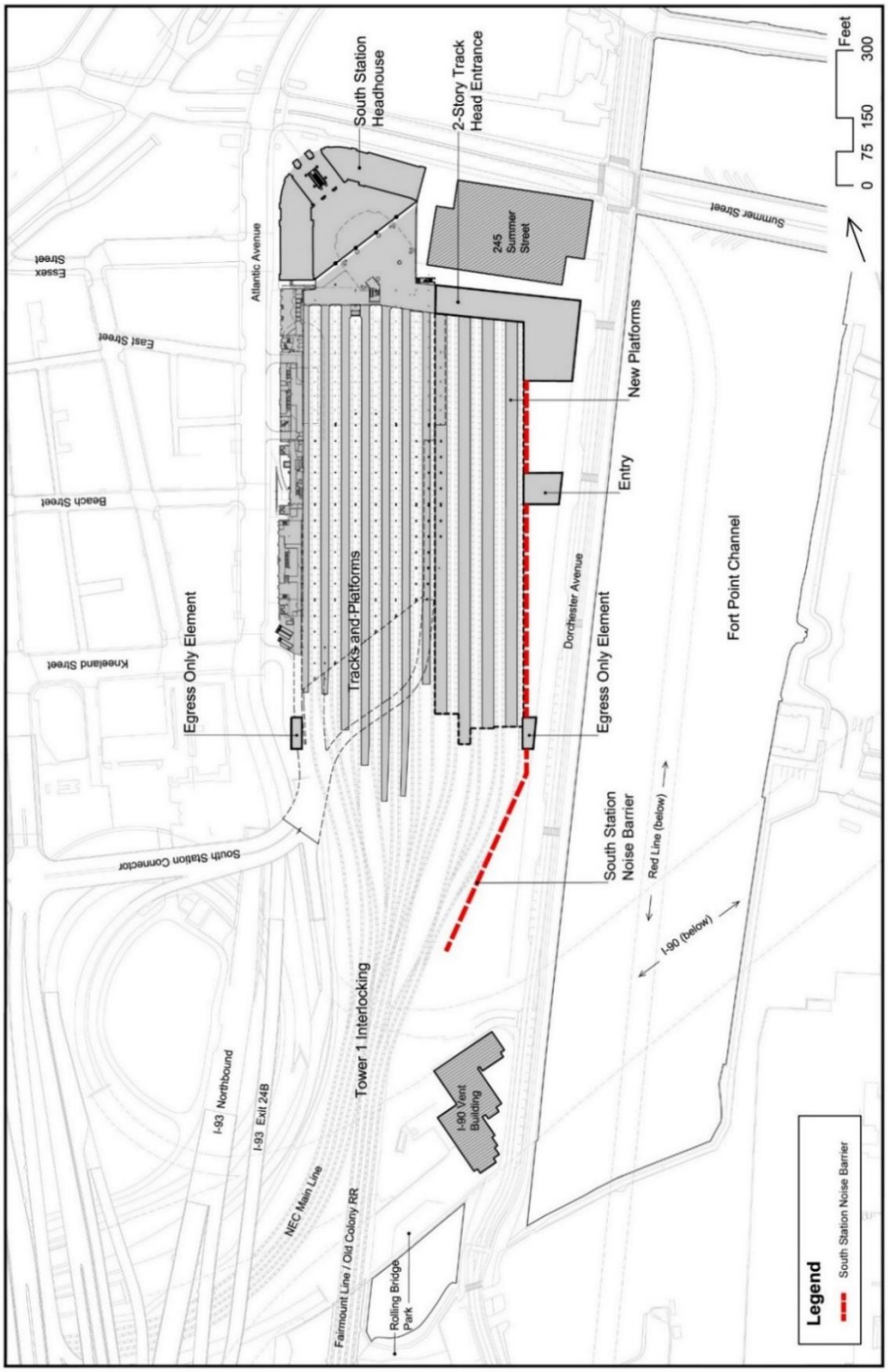

Figure 3-2 — South Station Proposed Noise Barrier

3.4. Water Resources and Water Quality

The Project Team evaluated water resources (including stormwater, potable water, and wastewater) and water quality in compliance with federal, state, and local regulations, such as the Massachusetts Stormwater Management Standards (310 Code of Massachusetts Regulations [CMR] 10.05), the Massachusetts Surface Water Quality Standards (314 CMR 4.00 et seq.), the Massachusetts Surface Water Quality Standards for Outstanding Resource Waters (ORWs) (314 CMR 4.04(3) and 314 CMR 4.05(3)), Areas of Critical Environmental Concern (ACECs) (301 CMR 12.00), and the National Wild and Scenic Rivers Act of 1968 (16 USC 1271 et seq.).

For the water resources and water quality analyses, the Project Team:

- Identified and characterized surface and groundwater resources in the vicinity of each project element with a discussion by location, watershed, and water quality;
- Identified stormwater and water quality-related permit requirements for construction of the Build Alternative;
- Described direct contributions to water resources and discussed any direct or indirect impacts to receiving waters for temporary (construction period) and proposed conditions;
- Identified mitigation strategies such as best management practices (BMPs) for short-term (construction) and long-term impacts;
- Provided a discussion of the project's compliance with regulations and regulatory performance standards for stormwater;
- Provided estimates of project-related water usage and wastewater generation, tabulated by use and project element;
- Confirmed availability of sufficient water supply for the project through consultations with BWSC;
- Identified the existing wastewater system to be used by the project elements, from the point of origin to the point of discharge;
- Reviewed federal, state, and local guidelines, permits, and directives regarding existing sanitary sewers, combined sewers, and Combined Sewer Overflows (CSOs) in the vicinity of the project elements;
- Coordinated with MWRA and BWSC regarding existing regulations and policies and project requirements;
- Identified water conservation measures to incorporate into the project elements; and
- Assessed the impacts of SSX project-related flows upon the existing BWSC wastewater system and identified mitigation measures.

3.4.1. Existing Conditions

South Station

The South Station study area is in the Boston Harbor watershed and contains one surface waterbody, Fort Point Channel, which is part of Boston Inner Harbor.

The Fort Point Channel drainage subbasin includes a large area of Boston. The subbasin consists of land uses that are largely residential with commercial and industrial land uses in the vicinity of the study area

and Fort Point Channel. This subbasin, according to BWSC, is a combined sewer and stormwater infrastructure drainage catchment area draining to Fort Point Channel and includes the entire area draining to Fort Point Channel. No other open water features exist within the subbasin and all stormwater is assumed to be conveyed in closed drainage systems.

Fort Point Channel is part of the Boston Inner Harbor waterbody (ID MA70-02). Boston Inner Harbor is included on the *Massachusetts Year 2014 Integrated List of Waters* as Category 5. Category 5 waters are defined as waters identified as impaired (i.e., not supporting one or more intended uses) where the impairment is related to the presence of one or more "pollutants," and the source of those pollutants is not considered to be natural and requiring one or more Total Maximum Daily Load (TMDL). The *Massachusetts Year 2014 Integrated List of Waters* lists Boston Inner Harbor as being impaired for polychlorinated biphenyls (PCBs) in fish tissue, fecal coliform, *Enterococcus*, dissolved oxygen, and other pollutants. A Draft Pathogen TMDL has been developed for Boston Harbor in its entirety, which includes Boston Inner Harbor.

The South Station site consists mostly of impervious surfaces (highly impenetrable by water) including roadways, sidewalks, and rooftops (including rooftop parking). At the train track area, although ballasted (a crushed stone trackbed), it is assumed to be impervious due to the underlying compact soils. There are only minor, incidental pervious areas (highly penetrable by water) that exist, except for Rolling Bridge Park. Stormwater from the study area is collected in closed drainage systems and either routed offsite to Atlantic Avenue or to outlets to Fort Point Channel. There is no evidence of stormwater detention, infiltration, or treatment measures in place at the site. Existing pollutants and pollutant sources to Fort Point Channel include cars, trucks, trains, aerial (atmospheric) deposition, hydrocarbons, metals, pathogens, total suspended solids (TSS), herbicides, trash, chloride, and nutrients. Ten stormwater outfalls from the South Station site discharge to the Fort Point Channel. Three active CSOs are also in the immediate vicinity of the South Station site. Soil borings show groundwater elevations varying in depth from 2.8 feet to 17 feet below the surface.

There is an extensive BWSC water distribution system along Atlantic Avenue, and to a lesser extent, along Dorchester Avenue at the South Station site. Wastewater collection at the South Station site is provided through a series of BWSC sanitary sewer mains, combined sewer mains, and CSOs. Table 3-5 summarizes existing wastewater generation and water usage volumes at the South Station site, which includes the South Station Rail Terminal, Bus Terminal, retail and office space, and the USPS facility.

Layover Facilities

The Widett Circle layover facility study area is located in the Boston Harbor watershed; however, there are no surface waters located in the Widett Circle site boundary. No stormwater detention, infiltration, or treatment measures are in place at Widett Circle. Stormwater from Widett Circle site is collected in a series of catch basins and overflows ultimately discharge from the combined sewer to Fort Point Channel. BWSC water mains, sewers, and combined sewers are located within the Widett Circle site.[13] The existing facilities on the site each have water services to serve their industrial and domestic uses. Table 3-5 provides existing wastewater generation and water usage at the proposed Widett Circle layover facility site.

Drainage from the Readville – Yard 2 site primarily discharges to the Neponset River (Waterbody ID 73-02), an impaired Category 5 waterbody, which runs south to north just east of the site. The *Massachusetts Year 2014 Integrated List of Waters* lists impairments for Segment 73-02 of debris/floatables/trash, Dichloro-diphenyl-trichloroethane (DDT), *Escherichia coli*, fecal coliform, foram/flocs/scum/oil slicks, other, oxygen-dissolved, PCB in fish tissues, and turbidity. A TMDL of

[13] BWSC utility mapping obtained from BWSC in April 2010.

bacteria for the Neponset River has been developed. Drip pans are positioned to collect any incidental drips from trains, which mix with stormwater and pass through oil/water separators before discharging to a sanitary sewer system. Besides the oil/water separators, no stormwater detention, infiltration, or treatment measures are in place at the Readville – Yard 2 site. Water service is provided to existing facilities via a BWSC water main.[14] BWSC separated sewers are located in the areas surrounding the site. Existing buildings on site discharge their wastewater to the BWSC system. Table 3-5 summarizes estimated wastewater generation and existing water usage rates at the Readville – Yard 2 layover facility site.

Table 3-5 — Estimated Existing and Proposed Water Usage and Wastewater Generation

Location	Existing Water Usage (gpd)	Proposed Water Usage (gpd)	Existing Wastewater Generation (gpd)	Proposed Wastewater Generation (gpd)	% Change
South Station	372,900	538,461	339,000	489,510	44%
Widett Circle	14,460	6,440	13,140	5,850	-55%
Readville – Yard 2	2,150	3,870	1,950	3,510	80%

gpd = gallons per day

3.4.2. Environmental Consequences

No Build Alternative

At South Station, the No Build Alternative would not result in any improvements to the stormwater collection system and would not reduce the overall amount of impervious area at the project site. Stormwater would continue to runoff into the Fort Point Channel. The closed drainage system would continue to contribute peak flow volumes to the CSOs and to the Boston Inner Harbor watershed. Pollutant and TSS loads to the watershed would not decrease. The No Build Alternative would not result in any improvements to peak flow rates, runoff volumes, or water quality at Widett Circle or Readville – Yard 2. Tables 3-6, 3-7, and 3-8 summarize the peak flow and volume calculations for the existing conditions and the No Build Alternative.

Build Alternative

As a result of the project, the South Station and Widett Circle sites would decrease in impervious coverage, while Readville – Yard 2 would increase in impervious coverage due to 2.0 acres of new pavement. Ballast cover would increase in all three locations.

South Station

At the South Station site, the Build Alternative would decrease the amount of impervious land cover at the site due to the removal of the existing USPS facility and its replacement with an expanded railroad yard, and the addition of landscaped areas on Dorchester Avenue. While both a railroad yard and buildings are considered to be impervious surfaces, railroad yards have some degree of permeability. It would increase the amount of water volume storage, thereby decreasing peak flow volumes to the closed drainage system and increasing the amount ground water recharge that took place. Recharge of stormwater would be provided through the installation of BMPs including a bioretention area in the vicinity of the station. These BMPs would provide approximately 80% Total Suspended Solids (TSS) removal from stormwater runoff from all impervious surfaces on the project site and also decrease TSS and pollutant loads being added to the Fort Point Channel. It would also decrease the overall amount flow added to the existing CSOs.

[14] BWSC utility mapping obtained from BWSC in April 2010.

Therefore, the peak flows and peak runoff volumes in the post-development condition would be less than the pre-development condition, resulting in an improvement to existing conditions and thereby complying with the MassDEP Stormwater Regulations, and Massachusetts Clean Waters Act. Table 3-6 summarizes the peak flow and volume calculations for the South Station project site.

Table 3-6 — South Station Peak Flow Rates and Runoff Volumes

Storm Event	24-Hour Rainfall Depth (in)	Existing & No Build Condition Peak Flow (ft^3/sec)	Existing Runoff Volume (ft^3)	Proposed Peak Flow (ft^3/sec)	Proposed Runoff Volume (ft^3)
2-yr	3.3	165	463,000	156	428,000
10-yr	4.9	233	749,000	227	710,000
50-yr	7.4	327	1,189,000	322	1,147,000
100-yr	8.8	377	1,444,000	373	1,401,000

As shown in Table 3-5, water usage at the South Station site would increase from existing conditions, and wastewater generation would increase from existing conditions. At South Station, this increase in generation would be due to the increase in commuters moving the station on a daily basis as well as the increased capacity in retail and station square footage. Since the wastewater discharge would exceed MassDEP's 15,000 gpd compliance threshold for the South Station project site, infiltration/inflow (I/I) offsets would be incorporated into the final design.

Layover Facilities

At the Widett Circle site, the project would result in a reduction in peak flow rates and runoff volume to less than existing conditions due to a 14.7-acre decrease in impervious surfaces (Table 3-7). In addition to the BMPs discussed below, the currently paved area will be replaced by ballast, which is a crushed stone trackbed with characteristics of both pervious and impervious surfaces. At the Readville – Yard 2 site, the project would result in an increase in the proposed peak flow and runoff volumes, prior to mitigation, due to the 2.0-acre increase in impervious cover. Table 3-8 summarizes the peak flow and volume calculations.

Table 3-7 — Widett Circle Peak Flow Rates and Runoff Volumes

Storm Event	24-Hour Rainfall Depth(in)	Existing & No Build Condition Peak Flow (ft^3/sec)	Existing Runoff Volume (ft^3)	Proposed Peak Flow (ft^3/sec)	Proposed Runoff Volume (ft^3)
2-yr	3.3	73.8	319,000	65.3	263,400
10-yr	4.9	104.5	497,500	97.9	436,700
50-yr	7.4	147.4	770,400	142.5	705,700
100-yr	8.8	171.4	927,700	167.2	861,700

Table 3-8 — Readville – Yard 2 Peak Flow Rates and Runoff Volumes

Storm Event	24-Hour Rainfall (in)	Existing & No Build Condition Peak Flow (ft^3)	Existing Runoff Volume (ft^3)	Proposed Peak Flow (ft^3/sec)	Proposed Runoff Volume (ft^3)
2-yr	3.3	35.5	141,100	36.7	146,800
10-yr	4.9	54.6	239,700	55.7	246,400
50-yr	7.4	81.0	394,200	81.8	401,600
100-yr	8.8	95.4	484,200	96.2	491,800

As shown in Table 3-5, water usage at the Readville – Yard 2 site would increase from existing conditions, and wastewater generation would increase from existing conditions. At Readville – Yard 2 water and wastewater increases are expected because of the increase in building area, and expected increase in occupants. Water usage at the Widett Circle layover facility would decrease from existing conditions; and wastewater generation would decrease from existing conditions. The water and wastewater reduction is expected at the Widett Circle layover facility because of the demolition of the existing buildings, change in use, and overall reduction in building area. The layover facility sites would require domestic sewer for the crew building and support shed proposed at each site.

Only light maintenance activities (e.g., cleaning the interior of coaches, minor running repairs) are proposed at the project sites, therefore no industrial wastewater would be generated that would require a U.S. EPA Industrial Permit. According to BWSC, its existing system has adequate capacity to handle the proposed water demand and wastewater discharge. Capacity would be further evaluated as project design advances.

3.4.3. Mitigation Measures

In order to minimize impacts, both structural and nonstructural stormwater BMPs would be installed, as necessary, to mitigate the changes in stormwater runoff volumes and peak rates, and to limit the impact from construction and operation on nearby waterbodies, including maintenance of the Total Maximum Daily Loads (TMDLs) of the Neponset River. They would be implemented in compliance with MassDOT and City of Boston Complete Streets guidelines and MassDEP stormwater management criteria and federal guidelines. Structural BMPs may include pervious pavers with underdrains for the sidewalks and the Harborwalk, vegetated open spaces, bioretention areas and/or tree box filters. Nonstructural BMPs at South Station would include reducing impervious ground cover, potentially disconnecting roof drains from the station to the closed drainage system, snow removal, and street sweeping along Dorchester Avenue.

MassDOT would incorporate water efficiency measures to minimize the use of water and wastewater generation. As project design advances, and in consultation with MassDEP and BWSC, MassDOT would develop an I/I Plan to mitigate for increased wastewater flows at the South Station site.[15, 16]

Depending upon the construction staging and location of service connections within the new buildings, replacing the existing sewer main could be required within Dorchester Avenue. MassDOT would develop Post Construction Stormwater Operation and Maintenance (O&M) Plans for South Station and the two layover sites during the final design. The City of Boston would develop the Post Construction Stormwater O&M Plan for Dorchester Avenue.

3.5. Wetlands

The federal, state, and local regulations applicable to wetlands at the project sites include: Sections 401 and 404 of the Clean Water Act (33 U.S.C. 1341 and 1344); Massachusetts Wetlands Protection Act, Massachusetts General Law [M.G.L.] c. 131, Section 40 and its implementing regulations; and Massachusetts Clean Water Act, [M.G.L.] c. 21, Sections 26-53.

[15] Massachusetts Department of Environmental Protection. *BRP 09-01: Policy on Managing Infiltration and Inflow in MWRA Community Sewer Systems*. September 24, 2010.

[16] Inflow is stormwater that enters the wastewater system through rain leaders, basement sump pumps, or foundation drains illegally connected directly to a sanitary sewer pipe, while infiltration is groundwater that seeps into sewer pipes through cracks, leaky pipe joints, and/or deteriorated manholes.

For the wetlands analysis, the Project Team:

- Determined federal jurisdictional areas in tidal/navigable waters;
- Identified and assessed wetlands located within approximately one half-mile of South Station and the layover facility sites, using existing Massachusetts Office of Geographic Information (MassGIS) data sets;
- Delineated and characterized SSX project area wetland resources, including wetland resource buffer zones, using combinations of data collection literature search and field delineation;
- Identified federal waterways and Massachusetts Wetlands Protection Act permitting requirements associated with the SSX project;
- Identified potential adverse impacts to the environment in the SSX project areas;
- Identified general mitigation strategies, such as avoidance and minimization; and
- Described the consistency of the SSX project design and construction with the performance standards established in the Massachusetts Wetlands Protection Act.

3.5.1. Existing Conditions

South Station

The South Station project footprint has limited vegetation and mainly impervious surfaces. Fort Point Channel, a navigable tidal water of the U.S., is identified as an Estuarine and Marine Deepwater Habitat according to the United States Fish and Wildlife Service (U.S. FWS) Wetlands and Deepwater Habitat Classification System.[17] The Fort Point Channel high tide line elevation, the limit of jurisdictional waters of the U.S., was determined to be 6.79 feet (North American Vertical Datum of 1988 or NAVD 88) [18] and is confined to the seawall along Dorchester Avenue.

There are no vegetated wetlands located in the study area or site boundary. The U.S. FWS National Wetland Inventory indicates that there is a small estuarine wetland at the southern end of Fort Point Channel, located approximately 250 feet west of the southern portion of the South Station site boundary. A site visit determined that an estuarine wetland does not exist at this location. Fort Point Channel, adjacent to the project site, is regulated as Land Under the Ocean under the Massachusetts Wetlands Protection Act (WPA). Massachusetts WPA jurisdictional resources within the South Station project footprint include coastal bank, 100-foot jurisdictional buffer to coastal bank, and land subject to coastal storm flowage (LSCSF), which is defined as the 100-year coastal floodplain (see Figure 3-3).

[17] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. "Classification of Wetlands and Deepwater Habitats of the United States." (FWS/OBS-79/31, 131 pp) December 1979. Accessed October 2012. http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf.

[18] National Oceanic and Atmospheric Administration, National Ocean Service, Elevations of Station Datum, Boston MA April 2003. Accessed January 2016. https://tidesandcurrents.noaa.gov/datums.html?id=8443970.

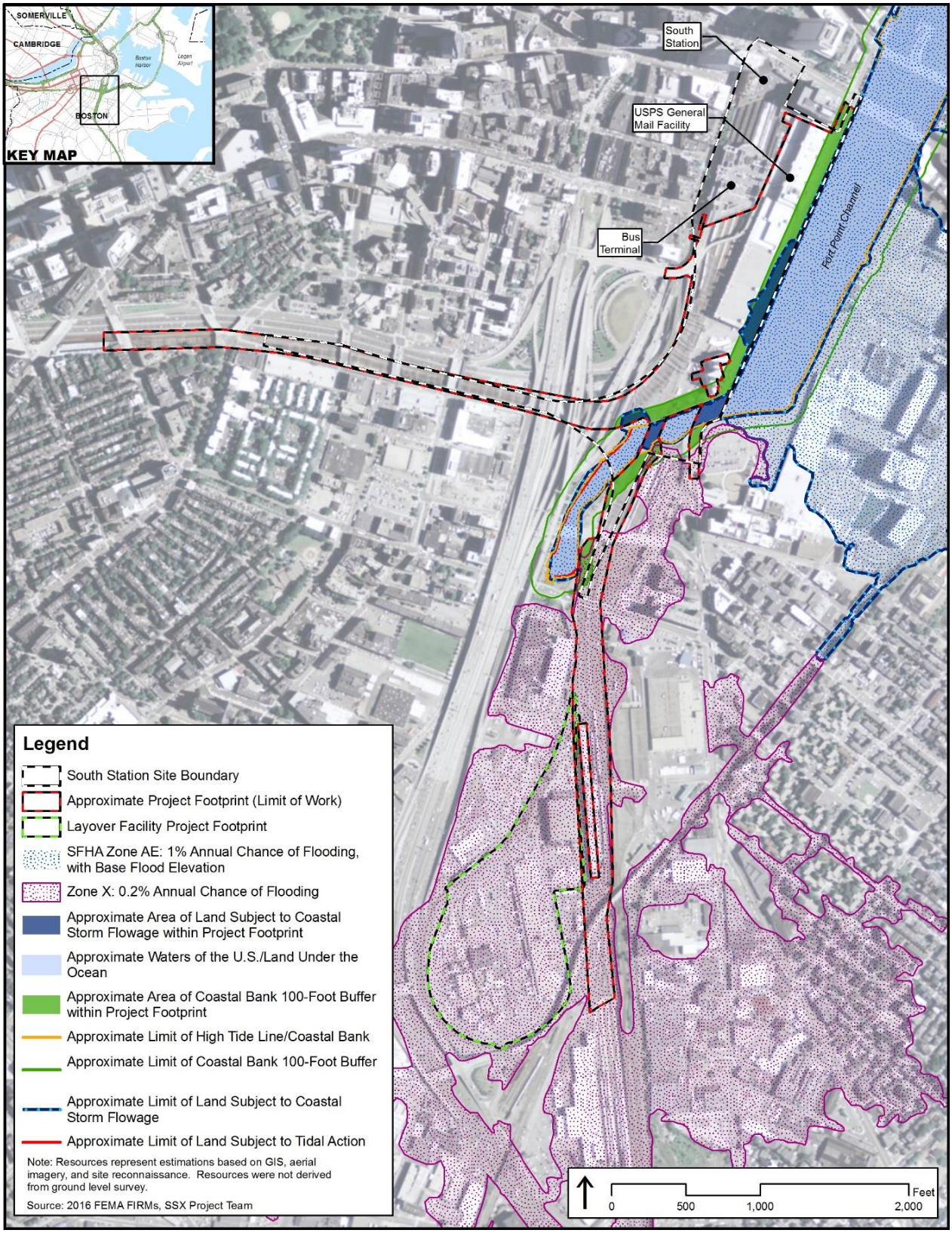

Figure 3-3 — Wetlands Resources – South Station and Widett Circle Layover Facility

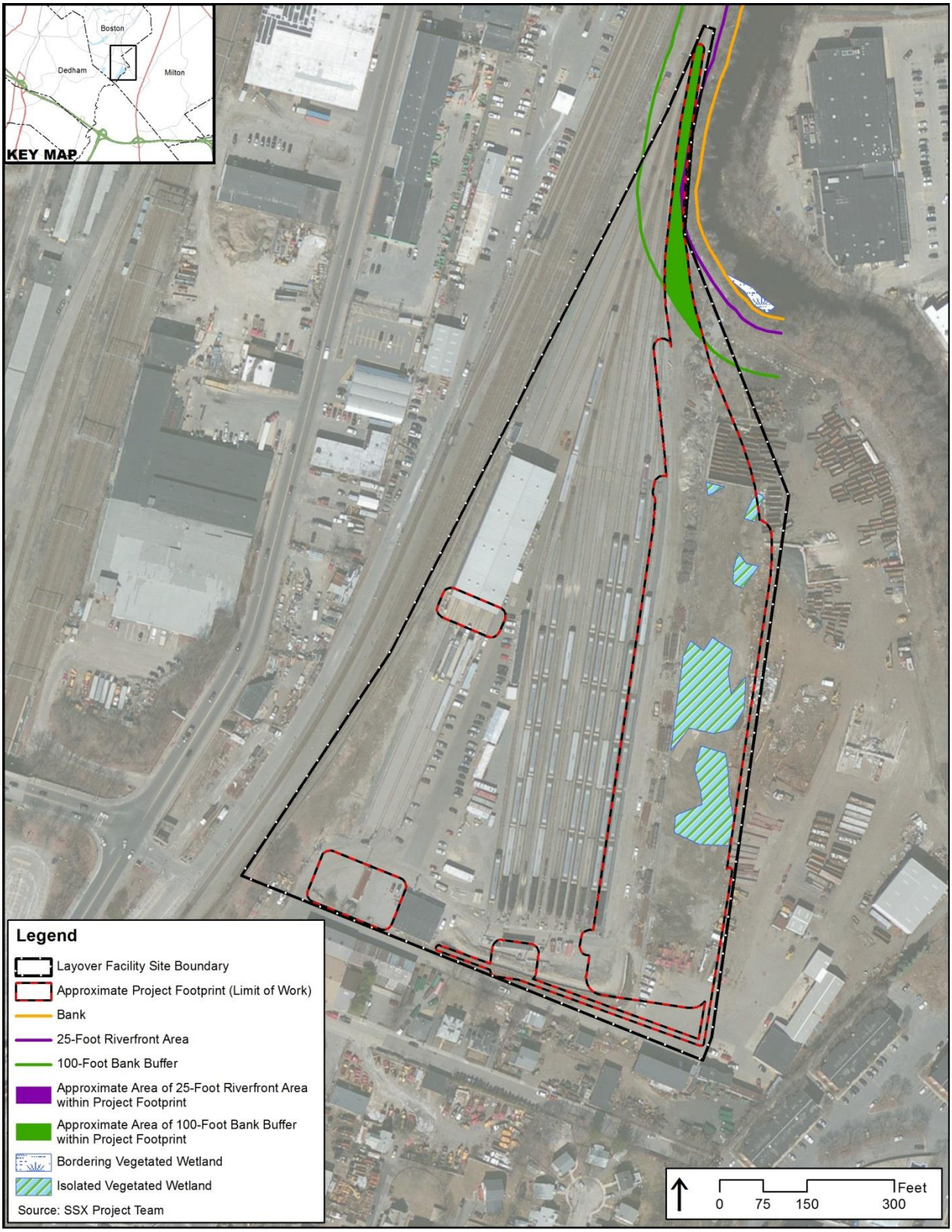

Figure 3-4 — Wetlands Resources – Readville – Yard 2 Layover Facility

Layover Facilities

The Widett Circle layover facility study area is located in the Boston Harbor watershed; however, there are no surface waters or natural wetlands located in the Widett Circle site boundary.

The Readville – Yard 2 site includes areas used as a rail yard by the MBTA, undeveloped property also owned by the MBTA, and an area used for metal recycling owned by an adjacent abutter. The project footprint consists of predominantly existing rail infrastructure, disturbed ground, sparsely vegetated grass, and shrub patches among actively used areas for materials storage and the disturbed edge of the wooded riparian buffer to the Neponset River. The northern portion of the site is within the 200-foot jurisdictional riverfront area to the Neponset River. This area is not floodplain, does not contain any extensive natural or vegetated areas, and partially occupies areas experiencing regular disturbance. As shown in Figure 3-4, the site contains five vegetated wetlands that are potentially federal jurisdictionally isolated, highly and regularly disturbed, include invasive species, are not indicative of natural wetlands, and are likely to have developed as a result of former and on-going land use operations. These wetlands do not appear to meet the U.S. ACE criteria of waters of the U.S.; however, they fall within 4,000 feet of the ordinary high water mark of the Neponset River, and could meet the criteria of needing a site specific evaluation of significant nexus on waters of the U.S. Both the onsite evaluation and digital hydrologic volume estimations of these five isolated vegetated wetland areas confirmed that they are not jurisdictional under the Massachusetts WPA as isolated land subject to flooding, and will not require WPA regulation at the state or local level. In addition, a small vegetated wetland was delineated along the Neponset River, outside of the site boundary.

3.5.2. Environmental Consequences

No Build Alternative

Under the No Build Alternative, improvements would not be made to South Station and the two layover facilities. As a result, no impacts to wetlands would occur.

Build Alternative

South Station

No wetlands would be impacted as a result of the work performed within the project footprint of South Station. At the South Station site, resource impacts would include approximately 2.9 acres of LSCSF and approximately 700 linear feet (lf) of coastal bank due to raising a depressed section of the seawall along Dorchester Avenue by 1.5 feet to match the elevation of the wall to the north and south. Approximately 7.9 acres of 100-foot buffer zone to coastal bank would also be impacted as a result of the Build Alternative.

Layover Facilities

There are no wetlands in the project footprint or surrounding vicinity of Widett Circle, and no WPA jurisdictional resources would be affected within the Widett Circle project footprint.

At the Readville – Yard 2 site, resource impacts would include approximately 0.01 acres of riverfront area, and approximately 0.6 acres of WPA isolated vegetated wetlands. The impact will fill the five isolated vegetated wetlands. Approximately 0.3 acres of 100-foot buffer zone associated with the Neponset River bank would also impacted. MassDOT will consult with the U.S. ACE as design advances in order to determine whether the five isolated vegetated wetlands fall under the jurisdiction of Section 404 of the Clean Water Act.

3.5.3. Mitigation Measures

South Station

In accordance with the WPA, construction at South Station would need to be preceded by a Notice of Intent (NOI) and Orders of Condition(s) per the requirements of 310 CMR 10.00. In the project NOI,[19] demonstration of consistency with WPA performance standards would be required. Given the proposed project footprint and anticipated resource impacts, construction activities at the South Station site would meet the performance standards of the WPA. No mitigation would be required by WPA regulations.

Layover Facilities

No mitigation related to wetlands would be required or proposed at the Widett Circle layover facility site.

In accordance with the WPA, construction at Readville – Yard 2 would need to be preceded by a NOI and Orders of Condition(s) per the requirements of 310 CMR 10.00. In the project NOI, demonstration of consistency with WPA performance standards would be required. The determination by the U.S. ACE would establish whether a 404 permit from the U.S. ACE and a Section 401 water quality certification are needed from MassDEP for impacts to the five isolated vegetated wetlands. If deemed jurisdictional, mitigation for impacts to these disturbed wetland areas would be determined through consultation with the U.S. ACE. In the event that a Section 404 permit and a Section 401 water quality certification is required, MassDOT will take the appropriate steps to file the applications and to meet the prescribed performance standards.

3.6. Floodplains and Sea Level Rise

The federal, state, and local regulations and guidance documents applicable to floodplains and sea level rise (SLR) at the project sites include: Executive Order 11988: Floodplain Management; Executive Order 13690: The Federal Flood Risk Management Standard; U.S. DOT Order 5650.2, Floodplain Management; Massachusetts Executive Order No. 149: Federal Emergency Management Agency (FEMA) and Flood Plain Use**;** Massachusetts Wetlands Protection Act, M.G.L. c. 131, Section 40, and its implementing regulations, 301 CMR 10; FTA, *Flooded Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation*, August 2011; EEA and the Adaptation Advisory Committee, *Massachusetts Climate Change Adaptation Report*, 2011; The Boston Harbor Association's *Preparing for the Rising Tide*; and publications issued by U.S. EPA and National Oceanic and Atmospheric Administration (NOAA) related to climate change and Sea Level Rise (SLR).

For the floodplains analysis, the Project Team:

- Identified and characterized areas of 100-year and 500-year floodplain, floodway, and coastal flood hazard zones within the project area/setting;
- Addressed potential impacts to floodplains and floodways; and
- Compared the results of the Boston Harbor Flood Risk Model (BH-FRM) with FEMA data.

[19] One or more Notices of Intent could be required for the SSX project depending upon construction staging and requirements of the Commission.

3.6.1. Existing Conditions

South Station

Fort Point Channel and some of the surrounding areas contain both 1% annual chance (100-year; zone AE) and 0.2% annual chance (500-year; zone X) floodplains.[20, 21] No V zones (coastal flood zone with velocity hazard [wave action]; no base flood elevation determined) are present. Zone AE, a type of special flood hazard area (SFHA), is the flood insurance rate zone that corresponds to the 100-year floodplain. The base flood elevation (BFE) for Zone AE in Fort Point Channel is 10 feet NAVD 88.[22] The extent of the SFHA, shown in Figure 3-3, includes a portion of the site along Dorchester Avenue between the USPS and the Fort Point Channel, and a portion of the area between the tracks as they split into the NEC Main Line headed west and the Fairmount/Old Colony Railroad lines headed south. The seawall is not at a consistent elevation throughout the site, however, and locations where the 100-year coastal flood zone encroaches into the site correspond to the lower areas of seawall. Zone X areas occur in the southern part of the study area, extending beyond I-90 and Foundry Street, completely covering the Widett Circle site boundary.

MassDOT, partnering with the FHWA, released updated information on Boston's vulnerability to different flooding scenarios using the Boston Harbor Flood Risk Model (BH-FRM).[23] The model was used to show the 1% coastal flood exceedance probability (CFEP) for the area around South Station and Widett Circle, as well as flooding depths for 1% coastal flood exceedance probability scenarios in these locations. A 3.2-foot rise in sea level would cause inundation over much of the South Station project footprint, as well as much of the areas surrounding South Station, during the 1% annual chance flood event. By 2070, portions of the South Station platform areas could flood to a depth of between 0.5 feet and 1.5 feet under the conditions of a 3.2-foot rise in sea levels. The portion of the South Station project footprint including tracks extending both west away from South Station and south towards Widett Circle could flood to depths of up to 3.0 feet.

Layover Facilities

The current SFHA does not encroach on the Widett Circle project footprint. However, areas of Zone X extend south of the Zone AE boundary in Fort Point Channel to completely cover the Widett Circle site and much of the area immediately to the south. Based on existing elevations throughout Widett Circle, there could be added risks of flooding through unknown underground connections, such as storm drainage pipes, which could inundate the site during a 100-year flood.

According to the BH-FRM, Widett Circle would not be impacted by the 1% CFEP event until approximately 2070, at which point it could experience flooding at depths of between 1.5 and 2.0 feet.

Within the Readville – Yard 2 layover facility vicinity, the Zone AE flood hazard areas do not encroach on the project site.

[20] Federal Emergency Management Agency. *Flood Insurance Study, Suffolk County Massachusetts.* Revised March 16, 2016.

[21] Federal Emergency Management Agency. *Flood Insurance Rate Maps for Suffolk County Massachusetts*. Revised March 16, 2016.

[22] The North American Vertical Datum of 1988 (NAVD 88) is the vertical control datum of orthometric height established for vertical control surveying in the United States of America based upon the General Adjustment of the North American Datum of 1988.

[23] MassDOT-FHWA. *Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery.* June 2015.

3.6.2. Environmental Consequences

No Build Alternative

Flood events will continue to occur within the project area due to SLR and changes in storm patterns caused by climate change. Under the No Build Alternative, improvements would not be made to the South Station site and two layover facilities. As a result, the existing depressed seawall would present further risk for flooding at South Station during 1% annual chance flood events.

Build Alternative

South Station

The project would include construction and development in areas of both the 100-year and 500-year floodplain within the South Station site boundary. The area of 100-year floodplain within the project footprint affected by the project would be approximately 2.9 acres, and impacts to the 500-year floodplain would total approximately 13.2 acres. The potential impacts to the 500-year floodplain would occur along the rail corridor south of South Station and adjacent to the Widett Circle site. All areas of floodplain occurring at the site are currently developed land; therefore, project activities at the South Station site would not convert natural ground habitat floodplains into floodplain representative of developed land. Impacts to floodplains at the South Station site would include redevelopment of existing developed areas.

Layover Facilities

The proposed project would not include construction or development in any areas of the 100-year floodplain at Widett Circle or Readville – Yard 2. The project would affect approximately 29.7 acres of the 500-year floodplain within the Widett Circle site boundary.

3.6.3. Mitigation Measures

South Station

No significant impacts to floodplains are anticipated as a result of the SSX project. Therefore, no mitigation of project-related impacts is required. However, in an effort to minimize South Station's vulnerability to potential future flooding events, MassDOT proposes to raise an approximate 700-foot depressed section of seawall bordering the Fort Point Channel and the adjacent portion of Dorchester Avenue by approximately 1.5 feet to make it consistent with the height of the adjacent seawall. Elevating both the seawall and Dorchester Avenue in this manner could reduce the area of 100-year floodplain reaching the South Station site boundary significantly for the near term.

MassDOT will consider additional adaptation measures to minimize South Station's vulnerability to potential future flooding events. Measures may include elevating power/heating, ventilation and air conditioning (HVAC) sources; relocating critical systems to higher levels; designing infrastructure and critical equipment to accommodate seawater flooding; water-proofing subsurface site elements; and using corrosion protection elements and materials for underground structures.

SLR could affect three CSO outlets to Fort Point Channel. Additional adaptation measures may be necessary to minimize seawater entering back into the combined sewer lines. BWSC has plans to modify CSO and storm drain outfall operations. MassDOT will coordinate with BWSC and comply with all related BWSC requirements.

Layover Facilities

No mitigation related to floodplains would be required or proposed at the layover facility sites.

3.7. Waterways and Coastal Zone Management

The following state and federal statutes and regulations establish jurisdiction over the SSX project because of its location on land created by the placement of fill within former tidal waters of Boston Harbor, and within the Massachusetts Coastal Zone: M.G.L. Chapter 91, as amended and its implementing regulations, the Massachusetts Waterways Regulations, 310 CMR 9.00; U.S. Coastal Zone Management Act of 1972, 16 U.S.C. 1451-1464, Chapter 33, Public Law (PL) 92-583, October 27, 1972, as amended; MEPA regulations, 301 CMR 11.00; M.G.L. Chapter 21A, sections 2, 4A and the Massachusetts Coastal Zone Management Regulations, 301 CMR 21.00 (Federal Consistency Review); Massachusetts St. 2007, Chapter 168 and the Massachusetts Public Benefit Regulations, 301 CMR 13.00; and Massachusetts Municipal Harbor Plan Regulations, 301 CMR 23.00.

The methodology that was used to determine the geographic extent of CZM and Chapter 91 jurisdiction at the South Station and layover facility sites was developed in consultation with MassDEP, in accordance with the Waterways regulations, 310 CMR 9.00, and as recommended by the Secretary of EEA in the Certificate on the ENF[24]. It included:

- A review of readily available historic maps, charts, surveys, and selected acts and resolves of the Massachusetts General Court pertaining to the filling and development of the project sites and Fort Point Channel;
- Preparation of MassGIS-based draft Chapter 91/CZM jurisdictional plans;
- Identification of proposed activities within filled and landlocked tidelands subject to licensing under Chapter 91 under 310 CMR 9.00 and/or Public Benefit Review under 301 CMR 13.00;
- Identification of potential impacts to the public rights in tidelands, along with potential measures to avoid, minimize or mitigate those impacts; and
- Documentation of the project's compliance with the regulations applicable to each project element.

3.7.1. Existing Conditions

The methodology used to determine the geographic extent of Chapter 91 and CZM jurisdiction at the South Station and layover facility sites was developed in consultation with MassDEP, in accordance with the Waterways regulations, 310 CMR 9.00, and as recommended by the Secretary of EEA in the Certificate on the ENF issued April 19, 2013. Table 3-9 identifies the coastal regulatory jurisdiction applicable to South Station and the layover facility sites.

[24] South Station Expansion Project, Environmental Notification Form, Secretary of Energy and Environmental Affairs Certificate. April 9, 2013. Available at: https://www.massdot.state.ma.us/southstationexpansion/Documents.aspx

Table 3-9 — Coastal Jurisdiction of SSX Project Sites

Project Element	CZM Federal Consistency Review	Chapter 91 Licensing	Public Benefit Determination
South Station	Yes	Yes[a]	Yes[b]
Widett Circle	Yes	N/A	Yes[b]
Readville – Yard 2	N/A	N/A	N/A

a Construction on filled tidelands located within 250 feet of the high water mark of flowed tidelands (i.e. Fort Point Channel) are subject to Chapter 91.
b Filled tidelands located greater than 250 feet from the high water mark of flowed tidelands are "landlocked" and not subject to Chapter 91. Construction on landlocked tidelands requires a Public Benefit Determination.

South Station

The South Station site occupies approximately 49 acres located adjacent to Fort Point Channel and is within the Massachusetts Coastal Zone. The historic shoreline in the Fort Point Channel area has been reviewed in detail by the Massachusetts EEA's *Massachusetts Chapter 91 Mapping Project*,[25] which identifies a portion of the South Station site as being seaward of Boston's original shoreline and including filled tidelands. Nearly all filled tidelands within the South Station site are held by the Commonwealth or a quasi-public agency or authority for the benefit of the public and therefore meet the regulatory definition of Commonwealth Tidelands.[26]

Layover Facilities

Widett Circle contains a small area of filled landlocked tidelands and is not subject to Chapter 91 licensing pursuant to Chapter 368 of the Acts of 2007 and 310 CMR 9.00. Pursuant to this statute, the construction of a layover facility at this site would require a Public Benefit Determination. Widett Circle is located in the Massachusetts Coastal Zone. The Readville – Yard 2 site does not contain any filled tidelands subject to the licensing requirements of Chapter 91, nor is it located in the Massachusetts Coastal Zone.

3.7.2. Environmental Consequences

No Build Alternative

The No Build Alternative would maintain the existing conditions relative to compliance with M.G.L. Chapter 91 and the Massachusetts Waterways Regulations, and would not require any new Chapter 91 licensing or approvals. No SSX project construction activities would occur within the Massachusetts Coastal Zone.

Build Alternative

The Build Alternative would fully comply with M.G.L. Chapter 91, the Massachusetts Waterways Regulations, and the Massachusetts CZM regulations. It would require a new nonwater-dependent infrastructure license for all transportation improvements related to (a) demolition of the existing USPS GMF (b) the track improvements and related construction within 250 feet of the flowed tidelands of Fort Point Channel, and (c) reopening approximately one-half mile of Dorchester Avenue and its rededication to publicly accessible uses. The project also must comply with the Public Benefit Determination

[25] Massachusetts Executive Office of Environmental Affairs, Office of Coastal Zone Management. *Massachusetts Chapter 91 Mapping Project.* 2006.

[26] 310 CMR 9.02 defines Commonwealth Tidelands as "tidelands held by the Commonwealth, or by its political subdivisions or a quasi-public agency or authority, in trust for the benefit of the public; or tidelands held by a private person by license or grant of the Commonwealth subject to an express or implied condition subsequent that it be used for a public purpose," and notes that "the Department shall presume that tidelands are Commonwealth tidelands if they lie seaward of the historic low water mark or of a line running 100 rods (1650 feet) seaward of the historic high water mark, whichever is farther landward.

(301 CMR 13.00) criteria established for nonwater-dependent projects located completely or partially within filled tidelands or landlocked tidelands. There are no Chapter 91 jurisdictional filled tidelands at the layover facility sites and therefore no licensing actions are required at those sites.

The regulations require the proponent to demonstrate and the Massachusetts Office of Coastal Zone Management Program to certify that projects subject to such review are consistent with the regulatory policies and management principles listed in 301 CMR 21.98. If a U.S. ACE Section 404 Permit is required, a formal CZM consistency determination will be sought. Table 3-10 lists the CZM policies, which are applicable to the SSX project at the South Station and Widett Circle sites, and assesses the consistency of the SSX project with those applicable policies.

3.7.3. Mitigation Measures

No mitigation related to waterways or coastal zone management would be required or proposed at the South Station or layover facility sites.

Table 3-10 — Consistency of SSX Project with Applicable Massachusetts Coastal Zone Management Policies

CZM Policy	Summary of Policy	Summary of Consistency Statement
Water Quality Policy #1	Ensure that point-source discharges do not comprise water quality standards.	Project does not propose new untreated point-source discharges; systems would comply with stormwater regulations.
Water Quality Policy # 2	Implement nonpoint pollution controls.	Project would use BMPs to minimize non-point source pollution.
Habitat Policy # 1	Protect coastal, estuarine, and marine habitats to preserve wildlife habitats.	Project would obtain an Order of Conditions from Boston Conservation Commission for work in buffer zone of coastal bank.
Habitat Policy # 2	Advance the restoration of degraded or former habitats in coastal areas.	Project would comply with MassDEP and U.S. EPA requirements.
Protected Areas Policy # 3	Minimize adverse effect to historic properties and districts.	Project planning includes ongoing coordination with MHC.
Coastal Hazards Policy # 3	Ensure that state and federally funded public works projects would be safe from flood and erosion-related damage.	Project design would meet applicable regulations for work in coastal floodplain.
Ports Policy # 4	Preserve and enhance waterfront for vessel-related activities.	Project would provide open space along Fort Point Channel shoreline for water-dependent uses.
Public Access Policy # 1	Ensure that development would promote general public use and enjoyment of waterfront.	Project would create new recreational opportunities through restoration of five acres of filled tidelands, including extension of the Harborwalk, and a cycle track along Fort Point Channel waterfront.
Public Access Policy # 2	Improve public access to coastal recreational facilities; facilitate multiple uses; minimize adverse impacts of developments.	Project would improve rail capacity, enhance public access to coastal recreational facilities, and reduce automobile traffic and parking problems.
Public Access Policy # 3	Expand coastal recreational facilities and develop new public areas for recreational activities.	Project would provide extension of the Harborwalk and a cycle track along Fort Point Channel waterfront.
Energy Policy # 2	Encourage energy conservation and use of renewable sources.	Project would incorporate energy conservation measures and includes assessment of renewable energy potential.

CZM Policy	Summary of Policy	Summary of Consistency Statement
Growth Management Policy #1	Encourage sustainable development that is consistent with state, regional, and local plans.	Project would incorporate sustainable design elements, and is consistent with state, regional, and local plans.
Growth Management Policy #2	Ensure that state and federally funded infrastructure projects serve developed urban areas.	Project would improve public infrastructure to benefit the Boston metropolitan area.
Growth Management Policy #3	Encourage revitalization and enhancement of existing development in the coastal zone.	Project would revitalize neighborhoods and activate the site on a year-round basis.

3.8. Energy and Greenhouse Gas Emissions

The federal, state, and local regulations and guidance documents applicable to the use of energy and greenhouse gas (GHG) emissions at the project sites include:

- Council on Environmental Quality, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews,* dated August 1, 2016 (the CEQ GHG Guidance);
- Sections of 42 U.S.C., which address energy conservation, decreased dependence on foreign oil, the use of alternative fuels, and increased efficiency in energy use;
- U.S. EPA Greenhouse Gas Emissions Standards for light-and heavy-duty vehicles in 2010 and 2011, respectively;
- The Massachusetts Clean Energy and Climate Plan for 2020 (January 19, 2016);
- Revised MEPA GHG Emissions Policy and Protocol, dated May 5, 2010;
- U.S. Green Building Council's *Leadership in Energy and Environmental Design* (LEED) rating system;
- Massachusetts State Building Code (780 CMR) and Stretch Code (780 CMR 120.AA);
- Boston Zoning Code, Article 37, *Green Buildings;* and
- City of Boston Environment Department Guidelines for High Performance Buildings and Sustainable Development.

A full air quality evaluation is provided in the DEIR Appendix 12, *Greenhouse Gas Emissions Technical Report*[27] with updated results in Section 3.13 of the FEIR[28].

Following the CEQ GHG Guidance, projected GHG emissions associated with proposed actions are used as a proxy for assessing proposed actions' potential effects on climate change. Per the NEPA GHG Guidance, agencies must consider the direct, indirect, and cumulative effects of the proposed action as well as both the context and intensity. For this analysis, direct effects are the emissions that result from on-site fuel usage. Indirect effects are the emissions that result from the generation of the electricity that the site uses. Cumulative effects are the total effects that result from the proposed action. In the case of South

[27] Additional information is provided in South Station Expansion Project. *Draft Environmental Impact Report*, *Appendix 10, Air Quality Technical Report*. October 2014. Available at: http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

[28] South Station Expansion. *Final Environmental Impact Report* June 2016. http://www.massdot.state.ma.us/southstationexpansion/Documents/FEIR.aspx

Station, the cumulative effects not only include direct and indirect emissions from the site but also the related carbon dioxide (CO_2) emission reductions from avoided automobile trips.

Per the CEQ Guidance, GHG emissions are quantified as CO_2 instead of carbon dioxide equivalent (CO_{2e}) because the CO_2 emissions are the majority of CO_{2e} emissions from combustion sources and the small amounts of methane (CH_4) and nitrous oxide (N_2O) that would be emitted would not have a significant impact on the results of the analysis.

3.8.1. Existing Conditions

Existing conditions at South Station include:

- Direct stationary source GHG emissions from building heat and other fuel usage at the existing South Station facility and the USPS facility;
- Indirect stationary source GHG emissions from electricity use at the existing South Station facility and the USPS facility;
- Direct transportation-related GHG emissions from fuel combustion associated with automobile trips, bus trips, and train trips associated with the existing South Station facility and the USPS facility; and
- Indirect transportation-related GHG emissions from electricity use associated with the existing Amtrak electric trains.

Similarly, existing conditions at the layover facilities include direct stationary source GHG emissions from on-site fuel use, indirect emissions associated with electricity use, and transportation-related GHG emissions associated with rail trips to and from the layover facilities.

3.8.2. Environmental Consequences

No Build Alternative

In the No Build Alternative, the layout of the overall South Station Terminal is unchanged. This means that the stationary source direct emissions are the same as in the existing conditions, and stationary source indirect emissions are based on the same electricity use as in the existing conditions (and changes in GHG emissions will be due to changes in the GHG emissions at the electric generating stations serving the electric distribution grid). The transportation sources evolve with time in the No Build Alternative. This evolution is consistent with the descriptions of public transportation ridership and roadways, and intersections in Section 3.10.2, and with changes in train, bus, and automobile fuel economy. Increasing number of trips increases GHG emissions, and improvements in fuel economy reduce GHG emissions.

Build Alternative

In the Build Alternative, direct and indirect stationary source emissions associated with the expanded South Station Terminal facilities would be added. The removal of the USPS facility would remove direct and indirect stationary source emissions from that facility (to be relocated elsewhere). Transportation-related GHG emissions would change from the No Build Alternative to the Build Alternative based on changes to the expected train and bus trips, and changes to the street traffic associated with roadway and intersection changes.

Table 3-11 presents net project-related CO_2 emissions calculated for SSX project-related transportation sources. The impacts associated with the Build Alternative are based on the net difference between the CO_2 emission rates of the No Build Alternative and the Build Alternative.

Table 3-11 — 2035 Project Related Net CO_2 Emission Increases at South Station (metric tpy)

Parameter	Net Build Alternative CO_2 Potential Emissions Increase (metric tpy)	Description of change
Stationary Source Direct Emissions	144	Natural gas combustion at expanded South Station Terminal (removal of USPS facility not quantified)
Stationary Source Indirect Emissions	1,844	Electricity use at expanded South Station Terminal (removal of USPS facility not quantified)
Motor vehicles near South Station Direct Emissions	217	Automobile and truck fuel combustion in the South Station study area (consistent with Section 3.10.2)
Intercity buses near South Station Direct Emissions	31	Intercity bus fuel combustion in the South Station study area (consistent with Section 3.10.2)
Locomotives near South Station Direct Emissions	-665	Fuel combustion from locomotives idling at South Station and moving from and to the Tower 1 Interlocking
Locomotives to/from layover sites Direct Emissions	7,494	Fuel combustion from locomotives moving from and to the layover sites
Amtrak trains Indirect Emissions	202	Electricity use from eight Amtrak trains per day idling at South Station and moving from and to the Tower 1 Interlocking
Indirect emissions from plug-ins	2,465	Electricity use from locomotives connected to shore power at layover facilities (mitigation measure – see Section 3.8.3 below)
Total	**11,732**	**Sum of all other changes in this table**

tpy = tons per year

Consistent with Section 3.18 below, GHG emissions could result from project construction activities associated with the Build Alternative. Construction-related impacts could include direct emissions from construction (diesel) equipment, indirect emissions from construction (electric) equipment, and increased emissions from motor vehicles on local streets due to traffic disruption. The anticipated temporary construction activity does not appear to be exceptional or atypical for this type of project.

Table 3-11 above quantifies direct and indirect CO_2 emissions associated with the Build Alternative. The Build Alternative also has the cumulative effect of reducing GHG emissions regionally based on avoided commuter trips. The CTPS 2035 travel demand forecasts show a decrease in region-wide[29] CO_2 emissions associated with the transportation improvements at South Station of approximately 41,700 metric tpy. Because the study covers a much wider area, and uses a different methodology, these results cannot be

[29] The Boston Region MPO region encompasses 101 cities and towns, stretching from Boston to Ipswich in the north, Duxbury in the south, and to approximately Interstate 495 in the west.

directly compared to the South Station-specific GHG emission calculations presented in Table 3-11, but the results do show that the transportation elements of the project further the goal of GHG emissions.

3.8.3. Mitigation Measures

The Build Alternative incorporates measures that serve to mitigate project-related GHG emissions impacts. The stationary source CO_2 emissions in Table 3-11 above reflect an 8% reduction beyond strict compliance with the 8th edition of the Massachusetts Building Code; this reduction is made using improved HVAC and improved lighting. The use of "plugins" at the layover facilities allows an improvement of 17,200 metric tpy of CO_2 by using the ground power receptacles instead of idling on the diesel engine.

Use of renewable energy may further reduce project-related GHG emissions impacts. These may include: use of solar photovoltaic (PV) panels to generate electricity for the proposed South Station headhouse expansion; use of solar hot water heating to supplement a typical gas-fired domestic hot water heating system; use of a gas-fired Combined Heat and Power (CHP) system to produce electricity and hot water; or potential connection to use of district steam. The final decision will be based on economic, reliability, complexity, and environmental factors. As examples, the feasibility of PV will depend on availability of non-shaded roof area, CHP use may be constrained by electrical interconnection logistics, and the GHG emissions benefit of district steam will depend on the energy efficiency of the district steam system. An analysis of each alternative is presented in FEIR Section 3.13. DEIR Chapter 5, *Sustainable Design and Climate Change Adaptation*, further details the sustainable design methodology.[30]

3.9. Aesthetics and Design Quality Impacts

The federal, state, and local regulations applicable to aesthetic and design quality impacts at the project sites include: FRA's *Procedures for Considering Environmental Impacts.* The following steps were completed to conduct an analysis of aesthetic and design quality impacts at the project sites:

- Conducted visual assessments for existing conditions, as well as the No Build and Build Alternative, based on views of South Station from Purchase Street (from the north), Dewey Square (from the northwest), Surface Road (from the west), Hudson Street (from the southwest), the Gillette site (from the southeast), Summer Street (from the east), directly across the Fort Point Channel (from the east), and from the Congress Street Bridge (from the northeast).
- Considered aesthetic and design quality conditions and impacts for the layover facilities.

3.9.1. Existing Conditions

South Station

The historic South Station headhouse faces multi-story commercial buildings flanking Atlantic Avenue and Summer Street at Dewey Square. Dewey Square is a dynamic intersection that processes considerable vehicular, bicycle, and pedestrian traffic. Across the intersection from South Station are the Dewey Square Parks and Rose Fitzgerald Kennedy Greenway. Across Atlantic Avenue from the station is Chinatown and the Leather District, which consists mostly of mid-rise brick office buildings in this area. The USPS GMF building dominates the landscape between the Fort Point Channel and the South Station Terminal. The four-story industrial style building is a mix of masonry and metal siding and totals over 1.1 million square feet. The majority of the logistics operations at this facility are handled on Dorchester Avenue and there is

[30] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Chapter 5, Sustainable Design and Climate Change Adaptation*. October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

significant truck activity along the entirety of this section of roadway. As shown in Figure 3-5, the headhouse is highly visible from the open plazas of Dewey Square and the Federal Reserve building across Summer Street. The headhouse has a lower profile in the Boston skyline in comparison to the adjacent buildings, including the Federal Reserve building (614 foot), One Financial Center (590 foot) across Atlantic Avenue, and 245 Summer Street (175 foot) on the same block.

To the west, South Station extends along Atlantic Avenue. Adjacent to South Station along Atlantic Avenue is the five-story South Station Bus Terminal and across Atlantic Avenue are the Chinatown and Leather District neighborhoods. From the southwest, views of South Station, which are largely from I-93, are dominated by the extensive rail infrastructure network of Tower 1 Interlocking. As shown in Figure 3-6, views of Dorchester Avenue include the narrow sidewalk and metal railing delineating the edge of Fort Point Channel and the USPS GMF.

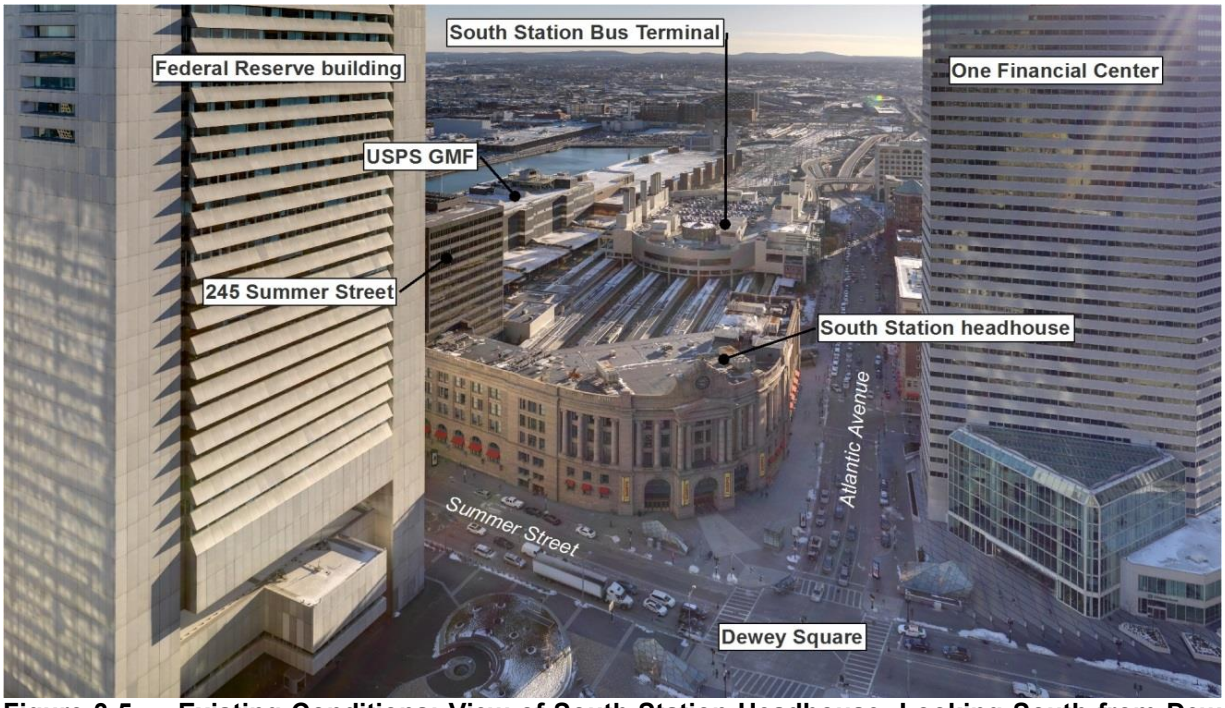

Figure 3-5 — Existing Conditions: View of South Station Headhouse, Looking South from Dewey Square

Figure 3-6 — Existing Conditions: View of Dorchester Avenue, Looking South from Summer Street

Layover Facilities

Figure 3-7 — View of Widett Circle, Looking North

As shown in Figure 3-7, the Widett Circle site is comprised primarily of a complex of food storage and processing facilities, including companies in the seafood and beef industry, on Widett Circle and Foodmart Road. Existing buildings on the Widett Circle site total approximately 292,400 square feet, and consist primarily of single- and two-story warehouse structures with expansive loading bays. The majority of the area around the structures and tracks is paved and used for truck and car parking. The area in the immediate vicinity of the site is dominated by industrial warehouses and associated paving and rail operations and support facilities, including Amtrak's Front Yard and Southampton Street Yard, and the MBTA's South Side Service and Inspection Facility, and Cabot Yard (the primary Red Line maintenance facility).

The Readville – Yard 2 site is an industrial property owned by the MBTA and occupied by the MBTA Readville Layover Facility. It contains a maintenance and repair structure, several mobile office trailers, and rail storage for up to 10 MBTA commuter rail trainsets of varying lengths. An area for materials storage is located along the eastern border of the site.

3.9.2. Environmental Consequences

No Build Alternative

As shown in Figure 3-8, a future condition at the South Station site is the planned SSAR project,[31] which includes a high-rise tower (Phase I) behind the headhouse, rising approximately 670 feet in height from grade. Three smaller mid-rise structures (Phase II and Phase III) will extend south over the bus terminal along Atlantic Avenue. These three structures will be taller than the existing South Station headhouse, but will be similar in height to 245 Summer Street.

In both the No Build and the Build Alternatives, the proposed SSAR project structures would be a major feature in Dewey Square, particularly SSAR Phase I. SSAR Phases II and III would be visible from Atlantic Avenue and generally would be in scale with the existing buildings of the Leather District. The South Station headhouse faces Summer Street and the 245 Summer Street building is just beyond the headhouse. The Federal Reserve building is to the left on the north side of Summer Street. SSAR Phase I would be visible rising above the South Station headhouse.

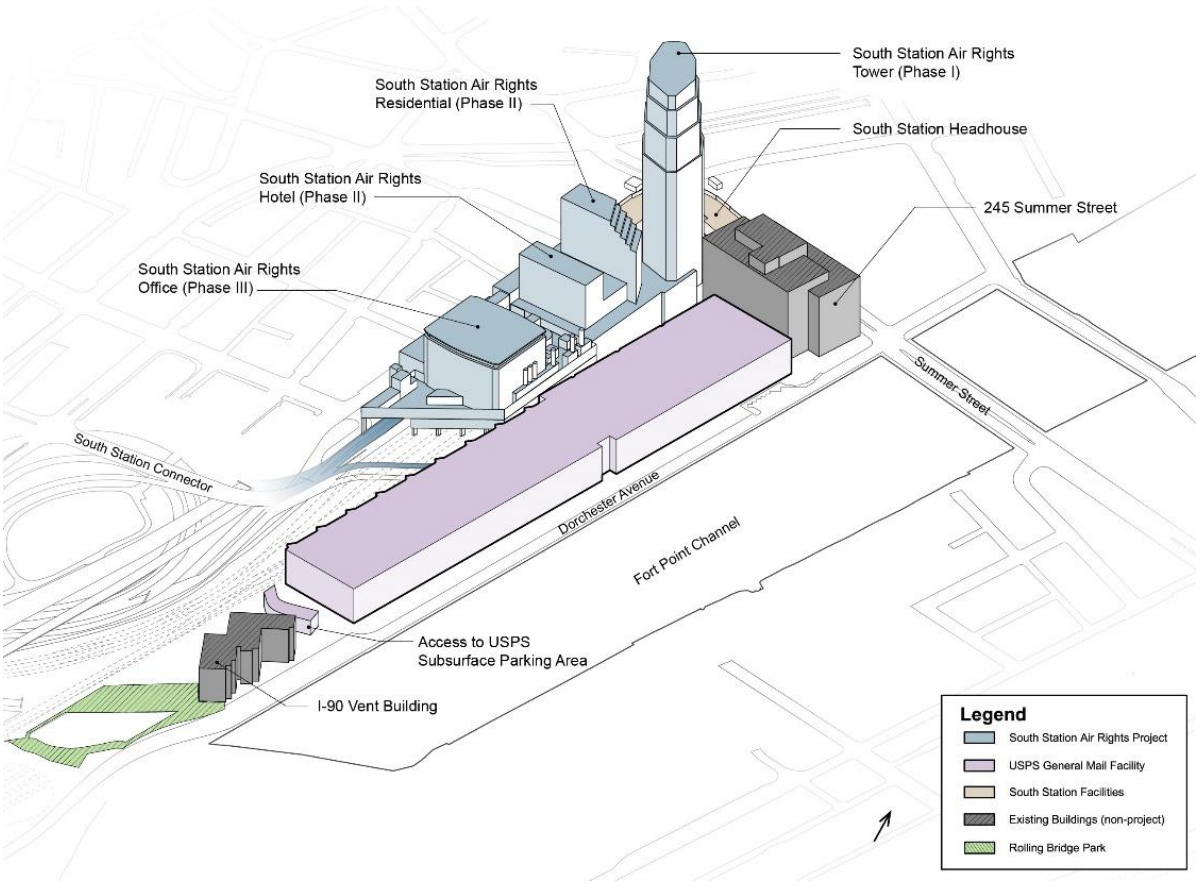

Figure 3-8 — Proposed SSAR Project

[31] The SSAR project was approved by the Secretary of the EEA in 2006 (EEA No. 3205/9131).

Build Alternative

South Station

The improvements proposed as part of the Build Alternative include structures and infrastructure that, when completed, would not be visible from Dewey Square, Atlantic Avenue, Chinatown, or the Leather District as the height of the proposed structures would be lower than the existing South Station headhouse, the bus terminal, and the SSAR project. The improvements proposed as part of the Build Alternative include construction of building or building elements that, when completed, would not be visible along Summer Street north of the intersection with Dorchester Avenue as the height of the structures would be lower than the 245 Summer Street building.

The view of the proposed South Station improvements along Dorchester Avenue and from across the Fort Point Channel would change dramatically. The section of Dorchester Avenue currently occupied by the USPS will be converted back to a public right-of-way, upgraded to meet MassDOT and City of Boston Complete Streets criteria. As shown in Figure 3-9, it would include landscaping and improved pedestrian and cycling connections and facilities, including sidewalks and crosswalks. Restoration also would include construction of an extension of the Harborwalk along the reopened Dorchester Avenue. Dorchester Avenue would be further activated by a new headhouse and passenger drop-off area that would provide both a physical and visual link to the waterfront. The new headhouse would be no more than 80 feet tall, with a proposed footprint of approximately 137,000 square feet. It would be designed to have a prominent entrance along Dorchester Avenue, bringing passengers directly into an atrium programmed with passenger amenities and services, station retail, and food and beverage concessions. The elevated concourse would also touch down on Dorchester Avenue and present another station entrance. The entrances would be designed with enough transparency for visual connections to and from the station. The noise wall would abut the easternmost track and would be the backdrop to the station entrances and open areas adjacent to them along Dorchester Avenue.

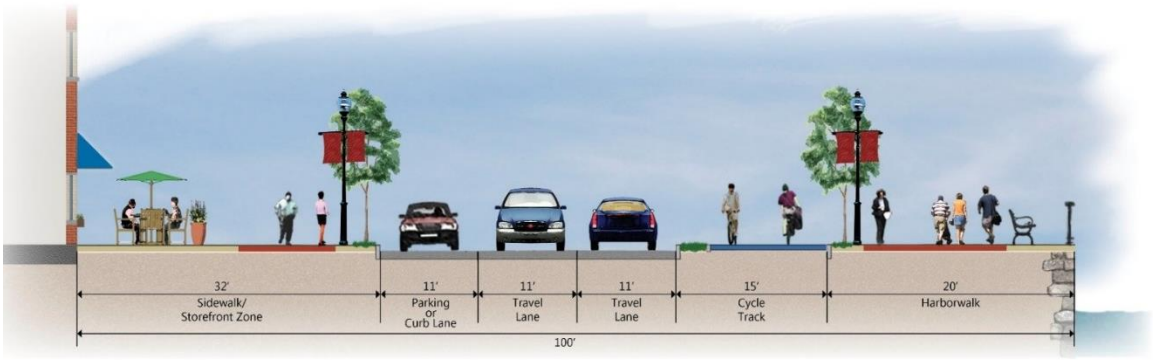

Figure 3-9 — Proposed Dorchester Avenue Cross-Section Looking Northeast

Layover Facilities

The proposed layover facility at Widett Circle would consist of a series of tracks separated by paved access roads and multiple support buildings. There would likely be three separate buildings totaling approximately 45,000 square feet and would be of similar height and materials of the buildings that exist today. Although the layout of the area will change from today, the visual effects would be minimal due to the consistent appearance of the proposed alternative with the existing area. The proposed layover facility at Readville –

Yard 2 would be an expansion of an existing rail layover facility. No significant visual impact would be created by the proposed expansion at either facility.

3.9.3. Mitigation

No mitigation related to aesthetics of design quality impacts would be required or proposed at the South Station or layover facility sites.

3.10. Transportation

This section describes the multimodal public transportation system, as well as vehicular, pedestrian, and bicycle traffic in and around the project sites. Detailed information is contained in the transportation technical reports prepared for the SSX DEIR.[32]

FRA's *Procedures for Considering Environmental Impacts*[33] requires an assessment of "the impacts on both passenger and freight transportation, by all modes, from local, regional, national, and international perspectives... (and) include(s) a discussion of both construction period and long-term impacts on vehicular traffic congestion."

Other applicable state and local statutes, regulations, and guidance include:

- MEPA Regulations, 301 CMR 11.00;
- City of Boston Zoning Code and Boston Complete Streets Guidelines;
- BTD Traffic Signal Operations Design Guide (2004);
- BTD Traffic Signal Design Submission Requirements (2004);
- BTD Traffic Engineering Standard Plans and Specifications;
- MassDOT Highway Division Traffic and Safety Engineering 25% Design Submission Guidelines;
- Boston Fire Prevention Code Section 7.09, Access for Fire Department Apparatus and Personnel; and
- City of Boston PIC Ordinances of 1961, Chapter 21, Section 36.

The Project Team conducted a transportation assessment of the project sites, which:

- Defined the study area;
- Collected data and conducted field observations;
- Completed a safety assessment;
- Developed a traffic model;
- Developed traffic generation and parking rates;
- Prepared a travel demand forecast;

[32] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 9 (Parts 1-4), Traffic Analysis Technical Report, Pedestrian Analysis Technical Report, Ridership Forecasting Technical Report, and Transit Capacity Analysis Technical Report*. October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

[33] Federal Railroad Administration. *Procedures for Considering Environmental Impacts, Federal Register 28545, Vol. 64, No. 101, Wednesday, May 26, 1999. https://www.fra.dot.gov/eLib/Details/L02710*

- Conducted a traffic operations assessment and transit crowding analysis; and
- Identified mitigation and transportation demand management (TDM) strategies.

The Project Team considered three sites (South Station, Widett Circle, and Readville-Yard 2) in this evaluation. As an initial step, City officials from the BTD and BPDA (formerly the BRA) were contacted to identify key intersections and roadways to be included in the transportation assessment.

3.10.1. Existing Conditions

South Station

Public Transportation

South Station currently handles approximately 128,000 daily combined Amtrak, MBTA, and intercity/commuter bus boardings and alightings. All 13 intercity and commuter rail tracks at South Station are fully utilized by Amtrak and the MBTA. Similarly, all 29 bus gates are assigned to one of the 11 private bus companies operating at the bus terminal. Table 3-12 summarizes Amtrak's service at South Station. There are eight MBTA commuter rail routes serving South Station. Each weekday, South Station serves approximately 42,000 commuter rail passenger boardings and alightings, which are listed by route in Table 3-13.

Table 3-12 — Amtrak Service at South Station

Route	Destination	Major Cities Served	Weekday Round Trips
Acela Express	Washington, DC	Boston – Providence – New Haven – New York – Philadelphia – Baltimore – Washington, D.C.	10
Northeast Regional	Newport News/ Lynchburg, VA	Boston – Providence – New Haven – New York – Philadelphia – Baltimore – Washington, D.C. – Lynchburg / Richmond – Newport News	9
Lake Shore Limited	Chicago, IL	Boston – Albany – Buffalo – Cleveland – Toledo – Chicago	1

Source: Amtrak website www.amtrak.com .

Table 3-13 — Existing Weekday MBTA Commuter Rail Boardings and Alightings at South Station

MBTA Route	Total Boardings and Alightings at South Station
Fairmount Line	767
Framingham/Worcester Line	7,197
Franklin Line	5,775
Greenbush Line	3,817
Kingston/Plymouth Line	4,853
Middleborough/Lakeville Line	4,301
Needham Line	3,517
Providence/Stoughton Line	11,487
Total	**41,714**

Source: CTPS, *MBTA Commuter Rail Passenger Count Results*, December 21, 2012.

In addition to intercity and commuter rail service, South Station also provides rapid transit service connections to the MBTA's Red Line (heavy rail) and Silver Line (bus rapid transit). Existing Red Line ridership at South Station totals approximately 54,000 combined weekday boardings and alightings.

Table 3-14 shows the total boardings and alightings for the Silver Line 1 and Silver Line 2 routes, which provide service between South Station and Logan Airport, and South Station and the Design Center in the Boston Marine Industrial Park, respectively. The Silver Line 4 provides service from South Station (at Essex Street and Atlantic Avenue, across from the existing station headhouse) to Dudley Square.

Table 3-14 — Existing Weekday MBTA Bus Rapid Transit Boardings and Alightings at South Station

Route	Total Boardings and Alightings at South Station
Silver Line 1 – Logan Airport – South Station via Waterfront and Silver Line 2 – Design Center – South Station via Waterfront	12,700[a]
Silver Line 4 – Dudley Station – South Station at Essex Street via Washington Street	2,208

Source: MBTA ridership counts provided by Greg Strangeways, Fall 2012.
a Per *Final SSX Ridership Results* provided in DEIR Appendix 9 (Part 3), *Ridership Forecasting Technical Report.*

Local bus service connections at South Station include six local bus routes with stops immediately adjacent to the South Station headhouse on Summer Street. Table 3-15 presents the current total weekday boardings and alightings at bus stops adjacent to South Station.

Table 3-15 — Existing Weekday MBTA Local Bus Boardings and Alightings at South Station

Route	Total Boardings and Alightings at South Station
Route 4 – North Station – Tide Street via Federal Courthouse and South Station	42
Route 7 – City Point – Otis and Summer Streets via Summer Street and South Station	1,865
Route 11 – City Point – Downtown Bay View Route	405
Route 448 – Marblehead – Downtown Crossing via Paradise Road	19
Route 449 – Marblehead – Downtown Crossing via Paradise Road	11
Route 459 – Salem Depot – Downtown Crossing via Logan Airport and Central Square, Lynn	109

Source: MBTA ridership counts provided by Greg Strangeways, Fall 2012.

There are 11 privately owned bus companies (including, for example, Bolt Bus, Megabus, Peter Pan, and Greyhound) that operate out of the South Station Bus Terminal, which is located directly over the rail tracks. The bus terminal has a total of 29 gates and is owned by the MBTA, with property management services contracted to a private company. Private bus carriers provide commuter services between South Station, and the surrounding Greater Boston area, Cape Cod, and Worcester, as well as nearly 24-hour intercity service to other locations in New England and beyond, including substantial express service to New York City and long distance service to major cities such as Philadelphia and Washington, D.C.

Roadways and Vehicular Traffic

The key roadways and 21 intersections evaluated in the South Station traffic study area are described in DEIR Appendix 9 (Part 1), *Traffic Analysis Technical Report*.[34] The primary roadways in the vicinity of South Station are Atlantic Avenue, Dorchester Avenue, Summer Street, and the South Station Connector. The three most heavily traveled roadways in the immediate vicinity of South Station are Summer Street, Kneeland Street, and Congress Street. Summer Street carries 20,800 vehicles per day, Kneeland Street carries 16,900 vehicles per day, and Congress Street carries 15,900 vehicles per day. Immediately adjacent to South Station, Atlantic Avenue carries 13,600 vehicles per day.

South Station generates 5,400 vehicle trips per day. Curbside activity along Atlantic Avenue has a major influence on traffic flow. This includes 3,400 curbside trips along Atlantic Avenue made up of 1,900 taxicab trips and 1,500 trips made by passenger vehicles and commercial delivery vehicles, all of which are competing for limited curb space along Atlantic Avenue. On a typical weekday, 13% of the traffic on Atlantic Avenue is for curbside operations. During the peak hours (morning peak hour between 8:00 and 9:00 a.m.; evening peak hour between 5:00 and 6:00 p.m.), congestion on Atlantic Avenue caused by heavy commuter traffic volumes is exacerbated by the curbside activity.[35]

Pedestrians

Pedestrian counts conducted in 2012 and 2013 as part of the SSX DEIR indicate that during the morning peak hour surge (between 8:00 and 9:00 a.m.), approximately 2,430 pedestrians travel from South Station to Dewey Square Plaza at street level. During the evening peak hour surge (between 5:00 and 6:00 p.m.), approximately 2,330 pedestrians travel from Dewey Square to South Station at street level. The majority of pedestrians leaving South Station cross Atlantic Avenue, and many of these pedestrians proceed to cross Summer Street toward Dewey Square Plaza in very large surges, corresponding to commuter rail train arrivals.

Of the pedestrians headed to Dewey Square Plaza, many do not cross at the crosswalk across Summer Street, but choose to cross diagonally. If the signal phasing is not favorable, most pedestrians do not wait for the walk phase and execute a diagonal crossing across Summer Street. This identical pattern, in reverse, occurs in the evening peak.

There is no pedestrian access allowed along the private portion of Dorchester Avenue. There is no Harborwalk along this portion of Fort Point Channel.

Bicycles

Growth in bicycle transportation in the Boston metropolitan area has increased substantially over the past decade. Bicycle counts conducted in September 2012 and 2013 as part of the SSX DEIR indicate peak hours similar to pedestrian peak hours. The highest bicycle volumes in the area were observed on Essex Street and on Summer Street adjacent to South Station. A high number of bicyclists cross Fort Point Channel along Summer Street, Congress Street, and Seaport Boulevard. Bicyclists were also observed during both the morning and evening peak hours along Kneeland Street in the vicinity of the I-90/I-93 highway access ramps.

[34] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 9, Traffic Analysis Technical Report*. October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

[35] *Ibid.*

Hubway is the Boston area's bicycle sharing system, providing more than 1,600 bicycles at 180 stations throughout Boston, Brookline, Cambridge, and Somerville. Hubway's bicycle sharing system has a seasonal bicycle station located along Atlantic Avenue at South Station where 47 bicycle slots are available. A review of the entire Hubway system use in the downtown area from October 2012 to October 2013 indicates that South Station consistently ranks as the busiest or second busiest station in the entire system.

Roadway/Intersection Level of Service

Table 3-16 presents the existing LOS for the South Station study area intersections. LOS is the traffic engineering metric used to denote the different vehicle[36] operating conditions that occur on a given roadway or intersection under various volume loads. LOS A (under 10 seconds of delay) represents the best operating conditions, while LOS F (over 80 seconds of delay) represents the worst operating conditions. Typically, an overall LOS D or better is considered acceptable for motor vehicles in an urban environment, which equates to under 55 seconds of delay. In some cases, LOS E conditions, or between 55 and 80 seconds of delay, are acceptable for motor vehicles in an urban environment in order to accommodate pedestrians or bicyclists. Under existing conditions, the two unsignalized intersections in the South Station study area (Atlantic Avenue at East Street and Dorchester Avenue at West 2nd Street) operate at LOS D or better during the morning and evening peak hours. The majority of the 19 signalized intersections operate at an overall LOS D or better during the morning and evening peak hours.

Table 3-16 — Existing Conditions at South Station Area Intersections – Levels of Service

Intersection	Morning Peak Hour Overall LOS	Evening Peak Hour Overall LOS
Congress Street at Dorchester Avenue	C	B
Summer Street at Dorchester Avenue	E	D
Atlantic Avenue at I-93 On-Ramp / Seaport Boulevard	F	F
Atlantic Avenue at Congress Street	C	C
Purchase Street at Congress Street	C	E
Atlantic Avenue at Summer Street	F	D
Purchase Street at Summer Street	C	B
Atlantic Avenue at Essex Street	C	C
Surface Road at Essex Street/Lincoln Street	C	D
Atlantic Avenue at East Street (unsignalized)	B	B
Atlantic Avenue at Beach Street	A	A
Atlantic Avenue at Kneeland Street	E	D
Kneeland Street at Lincoln Street	C	D
Surface Road at Kneeland Street	D	E
Lincoln Street at South Station Connector	A	B
Surface Road at South Station Connector	A	A
Dorchester Avenue at West 2nd Street (unsignalized)	C	C
Dorchester Avenue at West Broadway/Traveler Street	F	F
Dorchester Avenue at West 4th Street	F	F
Purchase Street at I-93 Off Ramp/Seaport Boulevard	C	D
Congress Street at A Street/Thompson Place	C	C

[36] The DEIR analyzed LOS for vehicles within the study area. While pedestrian LOS was analyzed within South Station itself, it was not analyzed for the traffic study area. Bicycle LOS was not analyzed.

Safety Review – South Station

MassDOT reviewed latest available crash data records on the 21 study area intersections for January 2012 through December 2014 to determine if safety concerns exist for vehicles, pedestrians, and/or bicyclists in the South Station area. Within the study area, all intersections were below the average crash rate for MassDOT District 6 intersections (0.70 for signalized intersections and 0.53 for unsignalized intersections).

Layover Facilities

Traffic data were collected at the two layover facility sites to assess how well the site driveways handle traffic entering and exiting the sites. The traffic entering and exiting the layover facilities is largely commercial trucks, service vehicles, and crew passenger vehicles.

Two intersections were assessed in the vicinity of the Widett Circle site: Frontage Road/Widett Circle Access Road, and Widett Circle/Widett Circle Access Road. Operations at the Widett Circle site show an overall intersection LOS A at the signalized Frontage Road/Widett Circle Access Road intersection during all peak hours. The Widett Circle Access Road operates at LOS C during all peak hours. The unsignalized intersection of Widett Circle and Widett Circle Access Road operates at LOS A throughout the day, with all approaches also operating at LOS A.

Two intersections were assessed in the vicinity of Readville – Yard 2: Hyde Park Avenue/Neponset Valley Parkway/Wolcott Court/Wolcott Square, and Wolcott Court/Layover Driveway. The Readville – Yard 2 signalized intersection of Hyde Park Avenue/Neponset Valley Parkway/Wolcott Court/Wolcott Square operates at an overall LOS C during the morning peak period. All intersection approaches operate at LOS D or better. During the midday, the intersection operates at an overall LOS B. During the evening peak period, it operates at an overall LOS D. The Neponset Valley Parkway westbound approach operates at LOS E during the evening peak hour; all other approaches operate at LOS D or better. The unsignalized intersection of Wolcott Court/Wolcott Street/Layover Driveway operates at LOS A throughout the day, with all approaches also operating at LOS A.

Safety Review – Layover Facility Sites

MassDOT reviewed crash data records for the two layover facility sites for January 2012 through December 2014[37] to determine if safety concerns exist for vehicles, pedestrians, and/or bicyclists in the vicinity of the two layover facility sites. All intersections at the layover facility sites were below the average crash rate for District 6, indicating that based on the volume of traffic traveling through the intersections, the crash frequency is below average.

3.10.2. Environmental Consequences

South Station

The impacts of the No Build Alternative and Build Alternative on public transportation and roadways and intersections at South Station are described below.

[37] Crash data records from January 2009 through December 2011 are the most recent data available.

Public Transportation

Ridership

Projected ridership data were provided by the Boston Region MPO, CTPS, and Amtrak.[38] The 2035 travel demand forecasts provided by CTPS assume the implementation of several transportation projects by 2035, consistent with the currently adopted Regional Transportation Plan (RTP) of the Boston Region MPO. Details of the methodology used to develop ridership data are provided in DEIR Appendix 9, *Ridership Forecasting Technical Report.*[39] Table 3-17 presents the projected ridership at South Station for two time horizons, 2025 and 2035, associated with the No Build Alternative and the Build Alternative, compared to existing conditions.

By 2035, total South Station ridership for the Build Alternative would result in approximately 198,000 daily combined boardings and alightings, a 13% increase over 2035 No Build Alternative ridership. Of the total ridership, Amtrak and MBTA commuter rail ridership would increase to approximately 81,000 daily combined boardings and alightings in the Build Alternative, a 33% increase over 2035 No Build Alternative ridership. Projected ridership growth between the No Build Alternative and the Build Alternative is directly attributable to increased commuter rail and Amtrak intercity rail service made possible by the expansion of South Station.

Table 3-17 — Daily Combined South Station Boardings and Alightings

Alternative	Amtrak	MBTA Commuter Rail	Amtrak and Commuter Rail Total[a]	MBTA Red Line	MBTA Silver Line	MBTA Local Bus	Intercity/ Commuter Bus	Total[a]
Existing Conditions	4,100	42,000	46,000	54,000	12,700	2,900	12,200	128,000
No Build Alternative (2025)	5,200	53,000	58,000	68,000	22,800	3,600	12,700	165,000
Build Alternative (2025)	8,100	65,000	74,000	70,000	23,200	3,600	12,500	183,000
No Build Alternative (2035)	5,500	56,000	61,000	72,000	25,600	3,800	12,800	175,000
Build Alternative (2035)	9,300	72,000	81,000	74,000	26,100	3,800	12,600	198,000

Source: *Final SSX Ridership Results* provided in Appendix 9 (Part 3), *Ridership Forecasting Technical Report*.
Note: All results rounded to the nearest 100, except for Commuter Rail, Red Line and Total results, which are rounded to the nearest 1,000.
a Total values are calculated using precise/unrounded results. As such, the sum of rounded individual ridership results may not add up to the rounded Total ridership results presented in this table.

As discussed in Chapter 1 of this EA, FRA used a 2040 horizon year for making ridership projections and determining future travel conditions when developing alternatives and conducting the analysis in FRA's NEC FUTURE program; here, the Project Team developed the SSX project based on a 2035 horizon year. In order for South Station to accommodate the 2040 service levels in the NEC FUTURE Preferred Alternative, additional infrastructure improvements beyond those proposed in this SSX project would need

[38] Amtrak. *South Station Boston Expansion Project Projected Intercity Train Movement and Ridership Data to Support the Evaluation of Yard and Train Servicing Needs and Pedestrian Modeling of the Station.* September 26, 2013.

[39] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 9 (Part 3), Ridership Forecasting Technical Report*. October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

to occur at South Station as well as throughout the NEC. FRA is advancing the NEC FUTURE program concurrent and in coordination with the SSX project. The SSX project will not preclude the improvements proposed by the NEC FUTURE program; rather, the SSX project includes investments that can later be leveraged by MassDOT and FRA to implement the additional improvements proposed by the NEC FUTURE program to accommodate service levels beyond 2035.

Transit Capacity

MassDOT assessed the impacts of the predicted increase in ridership at South Station due to the Build Alternative upon future capacity on the MBTA's commuter rail, rapid transit, and local bus routes. MassDOT also evaluated how projected ridership increases would affect station and platform capacities for MBTA operations both within South Station and at key stations within the downtown core of the MBTA rapid transit system. MassDOT compared projected ridership demands to available vehicle capacities as identified by the MBTA's *Service Delivery Policy,*[40] which defines levels of crowding that are acceptable by time period and mode of transportation. The assessment included a station capacity analysis of South Station, including an analysis of projected pedestrian flows resulting from the Build Alternative. Details of the methodology and results are provided in DEIR Appendix 9 (Part 4), *Transit Capacity Analysis Technical Report.*[41]

The Build Alternative would not result in crowding impacts to rapid transit or local bus routes that would exceed the MBTA's *Service Delivery Policy* maximum load over and above impacts anticipated in the No Build Alternative. SSX project-related ridership increases at stations in the Downtown core would be unnoticeable. Ridership growth between 2012 existing conditions and the 2035 No Build Alternative condition is anticipated due to forecasted growth in population, households, and employment, as well as changes in land use and transit services.

For commuter rail, 2035 Build Alternative passenger loading on the outbound Canton/Stoughton/Proposed South Coast Rail Line is projected to exceed the MBTA *Service Delivery Policy's* acceptable level of crowding during the peak evening hour, defined as 110 percent of seat capacity. Over the entire three-hour evening peak period, however, there would be more than sufficient capacity to accommodate the projected passenger load demands. As South Coast Rail operations are further defined, minor schedule adjustments could be made to provide additional capacity during the peak hour and alleviate any capacity issues during the maximum load time.

From the SSX DEIR Appendix 9 (Part 4), *Transit Capacity Analysis Technical Report*, pedestrian flow increases at South Station due to the Build Alternative would result in a 2% increase in daily Silver Line platform activity (measured in passenger boardings and alightings) above the 2035 No Build Alternative conditions. The Build Alternative would increase passenger activity on South Station's Red Line platforms by less than 5% above No Build Alternative levels.

Pedestrian Circulation

The existing passenger waiting area and circulation zone are inadequately sized and configured to accommodate the current daily demand. This often results in an unacceptable passenger experience of LOS E/F (minimum five square feet per person) that occurs for short periods during periods of peak

[40] Massachusetts Bay Transportation Authority. *Service Delivery Policy*. June 2, 2010. https://www.mbta.com/uploadedfiles/About_the_T/T_Projects/T_Projects_List/2010ServiceDeliveryPolicy.pdf

[41] South Station Expansion Project. *Draft Environmental Impact Report, Appendix 9 (Part 4), Transit Capacity Analysis Technical Report*. October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

boarding and alighting. An LOS E/F indicates that passing and cross flows are very difficult and flow is sporadic with frequent stopping.

In the No Build Alternative, passengers would experience unacceptable LOS more frequently due to projected increases in pedestrian flow through the station.

By 2035, Amtrak's and MBTA's commuter rail future service plans would add approximately 20,000 passengers per day arriving at South Station over the No Build Alternative, and the new station design would provide adequate space and appropriate facilities to safely and conveniently manage the projected peak-hour pedestrian demand. The station's size is designed relative to the pedestrian circulation elements that are fundamental to servicing the passenger demand. To create a comfortable and contemporary transportation facility, MassDOT established an overall goal of LOS C during peak periods to accommodate passengers of the South Station public circulation, waiting areas, and station platforms. This goal is typically established for a facility of this type as this LOS safely and conveniently accommodates passengers during peak times, while not being oversized for the non-peak times. The introduction of additional station access points will help to reduce pedestrian congestion at all access points during peak periods. The station design will also include a concourse level to allow passenger access mid-platform and reduce pedestrian circulation to and from the trackhead concourse.[42]

Pedestrians and Bicycles

The SSX project would provide substantial benefits to pedestrians and bicyclists.

- The project would improve the separation of vehicle traffic from non-vehicular traffic. The reopening of Dorchester Avenue prioritizes pedestrian and bicycle accommodations on the Fort Point Channel side of the roadway, separated from the vehicular curbside activity at the new station headhouse on Dorchester Avenue.

- The project would enhance the pedestrian realm through the reopening of Dorchester Avenue as a public street, and extending the existing Harborwalk by approximately one-half mile along the Fort Point Channel.

- The project would improve bicycle infrastructure along the reopened segment of Dorchester Avenue by providing a new cycle track, connect existing bicycle infrastructure such as the South Bay Harbor Trail, and complement future plans developed by the City such as the Summer Street bicycle enhancements.

Roadways and Intersections

The SSX project would provide substantial benefits to vehicular traffic, pedestrians, and bicyclists in the Build Alternative.

- From the traffic demand forecasting conducted as part of the SSX DEIR, the project would reduce curbside traffic on Atlantic Avenue due to the diversion of 30% to 40% of curbside traffic from Atlantic Avenue to Dorchester Avenue.

- The project would minimize parking, support BTD's parking management program,[43] and advance MassDOT's Healthy Transportation Policy Directive goal to promote healthy transportation and

[42] The trackhead concourse refers to the exterior passenger circulation area between the enclosed headhouse and the tracks.

[43] Boston Transportation Department. *Access Boston 2000 – 2010*. http://www.cityofboston.gov/TRANSPORTATION/accessboston/

livable communities. The Build Alternative would result in a net decrease of 242 structured parking spaces on the site due to the relocation of the USPS facility. Table 3-18 presents a comparison of the South Station study area intersections, comparing overall intersection LOS in the No Build Alternative and the Build Alternative in 2025 and 2035. In each alternative, the intersections are tallied by their LOS ratings.

Table 3-18 — South Station Area Intersections – Levels of Service, 2025/2035

Alternative	A.M. Peak Hour Overall Intersection Capacity		P.M. Peak Hour Overall Intersection Capacity	
	LOS D or better	LOS E or LOS F	LOS D or better	LOS E or LOS F
No Build	14/11	7/10	11/9[a]	10/12
Build Alternative	15[a]/13[a]	6/8	12/11	9/10

[a] The overall LOS rating applies with the exception of one approach, which operates at a lower LOS.
For more detail, see Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 9 (Part 4), Transit Capacity Analysis Technical Report*. October 2014.
http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

Layover Facilities

For the Widett Circle and Readville – Yard 2 layover facility sites, intersection traffic operations would not be degraded as a result of the layover facility operations in the Build Alternative. The Build Alternative would have low passenger vehicle and service vehicle traffic generation for the layover facility sites. The layover facilities are projected to generate six or fewer vehicle trips during the commuter morning and evening peak hours, amounting to less than one vehicle trip every 10 minutes. During the midday, traffic generation would vary from one vehicle every three minutes to one vehicle every five minutes, depending on the site.

3.10.3. Mitigation Measures

While the MassDOT or BTD guidelines set no defined threshold limits, the analysis presented in the DEIR Appendix 9 (Part 1), *Traffic Analysis Technical Report*, shows there are insignificant operational impacts (LOS grade changes due to high increases in delay) to the study area intersections due to the SSX project. The proposed intersection improvements discussed below (where project impacts are insignificant) would improve overall operations for the surrounding area inclusive of the SSX project.

South Station

The station design for the Build Alternative would reduce areas of congestion and poor pedestrian LOS, including projected pedestrian congestion on at-grade rail platforms and within the trackhead concourse, by providing improved pedestrian circulation accommodations. Passenger boarding and alighting would occur from both the trackhead and a new elevated concourse, which would facilitate mid-platform boarding and alighting during normal operations, thereby reducing the overall congestion level on the platforms and concourses. No mitigation measures would be required to address transit system capacity constraints beyond minor schedule adjustments recommended by MassDOT or the MBTA for peak period commuter rail service.

Layover Facilities

No mitigation related to transportation would be required or proposed at the layover facility sites.

Intersection and Roadway Mitigation

In the Build Alternative, MassDOT would implement intersection and roadway improvements at several locations to address LOS deficiencies, improve traffic flow, and increase pedestrian and bicycle mobility. DEIR Appendix 9 (Part 1), *Traffic Analysis Technical Report,* provides additional information. The roadway and intersection mitigation includes the following commitments:

- Improve bicycle accommodations on Atlantic Avenue as determined by the city, such as provision of a bicycle lane;
- Provide dedicated curbside space for taxicabs and drop-off/pick-up activity; and
- Remove six parking meters and reprogram the curb to accommodate drop-off or taxicabs.

The following intersection improvements would improve traffic flow, reduce queuing, and improve pedestrian and bicycle mobility:

- **Atlantic Avenue at Summer Street.** Restripe the shared left/through lane (to an exclusive through lane) and increase the timing for the exclusive pedestrian crossing along with corresponding pavement markings to allow diagonal pedestrian crossings to more efficiently accommodate pedestrians through Dewey Square.
- **Purchase Street at Summer Street.** Add a crosswalk across Summer Street to improve pedestrian crossing options.
- **Surface Road/Essex Street/Lincoln Street.** Simplify traffic movements to the extent possible and shorten crosswalks to improve existing intersection geometry.
- **Atlantic Avenue at Kneeland Street/Frontage Road/I-90 Off-Ramp.** Update MBTA access drive loop detection with the ability to skip the phase if there is no vehicle present. Update and optimize intersection timing, phases, and offset.

Due to the reopening of Dorchester Avenue in the Build Alterative, signal timing changes and associated improvements would be required at the following intersections: Summer Street at Dorchester Avenue, Congress Street at Dorchester Avenue, Dorchester Avenue/West Broadway/Traveler Street, and Dorchester Avenue/West 4th Street.

Transportation Demand Management Measures

In addition to intersection improvements, and consistent with MassDOT's efforts to reduce automobile dependency, TDM commitments for the SSX project would include the following:

- Incorporate bicycle parking in the new headhouse on Dorchester Avenue;
- Participate in the U.S. EPA SmartWay Transport Program to increase energy efficiency and reduce greenhouse gas emissions;
- Provide electronic signage displaying transit schedule information;
- Accommodate curbside space for a shuttle bus stop along Dorchester Avenue for shuttle buses that currently serve the South Boston Waterfront/Innovation District;
- Collaborate with the City of Boston to improve bicycle accommodations along Atlantic Avenue from Kneeland Street to Summer Street; and

- Prepare a Construction Management Plan (CMP) for BTD to minimize disruption in the area throughout construction.

Details of each element of the TDM plan for the project would be refined throughout the engineering design phase. MassDOT would coordinate with the City of Boston to identify elements of the CMP to minimize disruption to transit users, pedestrians, bicyclists, and drivers in the area throughout construction.

3.11. Possible Barriers to Handicapped and Elderly

The federal, state, and local regulations applicable to possible barriers to handicapped and the elderly at the project sites include:

- The Americans with Disabilities Act of 1990 ("ADA"), 42 U.S.C. § 12101; and
- CMR Section 521: Massachusetts Architectural Access Board (MAAB).

The following steps were taken to conduct an assessment of the possible barriers to handicapped and the elderly at the project sites:

- Compared existing conditions to applicable regulations; and
- Consulted and adhered to applicable regulations during the design of the Build Alternative.

3.11.1. Existing Conditions

Under existing conditions, there is no pedestrian access allowed along the private portions of Dorchester Avenue nor is there a convenient/continuous accessible route along this portion of Dorchester Avenue. Within the existing South Station headhouse, the passenger waiting area and circulation zone is inadequately sized to accommodate the current peak demands, creating a mobility barrier during surge commute times. This crowding condition during surge periods is particularly problematic for the elderly and handicapped patrons.

Information is currently unavailable regarding possible barriers to handicapped or the elderly within the existing private properties at Widett Circle. The existing Readville – Yard 2 layover facility is not open for public access, and therefore not required to be accessible.

3.11.2. Environmental Consequences

No Build Alternative

In the No Build Alternative, the site would continue to restrict access to Dorchester Avenue, and the South Station headhouse would continue to create mobility barriers during surge commute times. Widett Circle and Readville – Yard 2 are not open to public access, and therefore not required to be accessible.

Build Alternative

In the Build Alternative, the new portions of South Station would be designed to be compliant with the ADA and MAAB regulations. This includes interior circulation within the new headhouse as well as exterior circulation along the reopened portion of Dorchester Avenue and the new Harborwalk along the Fort Point Channel.

The SSX project would create an integrated station for bus, rail, subway, and intercity patrons that will enhance access for the elderly and handicapped. The new expanded station will provide both a physical and visual link to the waterfront via a reopened Dorchester Avenue and an extension of the Harborwalk, a fully accessible walking path.

The new station design would provide adequate space and appropriate facilities to safely and conveniently manage the projected peak-hour pedestrian demand. Passenger amenities (such as comfortable waiting areas and restrooms), passenger services, station retail, and food and beverage concessions would be designed to be fully accessible.

In order to comply with the current egress capacity and travel distance requirements, at least three points of egress would be provided at all platforms, including stairs, escalators, and elevators as needed. Elevators would be conveniently located for the mobility-impaired and disabled to prevent possible conflict with general passenger flows. All new platforms would be 26 feet wide to meet current ADA standards.

The ADA and MAAB require access to the public right-of-way for people with disabilities. Access to traffic and signal information is a key feature of accessible sidewalks and street crossings for pedestrians who are disabled or have vision impairments. The design of Dorchester Avenue includes wide sidewalks and compliant transition ramps at crosswalks with detectable warning pads. New and upgraded traffic signals would include installation of Accessible Pedestrian Signals (APS), consistent with MassDOT's APS Installation Policy (effective June 1, 2012) and City of Boston Transportation Department Traffic Engineering Design Standards.

The Widett Circle and Readville-Yard 2 layover facilities would not be open for public access, therefore not required to be accessible.

3.11.3. Mitigation Measures

No mitigation related to barriers to the handicapped or elderly would be required or proposed at the South Station or layover facility sites.

3.12. Land Use and Zoning

The following federal, state, and local regulations and guidance provide the regulatory context for the land use and zoning analysis:

- MEPA Regulations, including 301 CMR 11.07(6)(g), "*...zoning districts, and other relevant land-use designations or plans (e.g., local or regional capital improvement plans or infrastructure investments, economic development, growth planning and open space plans, etc.), business districts, industrial parks, housing stock, and vacancy rates*...;" and
- City of Boston Zoning Regulations and local plans.

For the land use and zoning assessment at the project sites, the Project Team:

- Defined the land use study areas;
- Documented existing land use conditions and local zoning and master plans in the study areas,
- Evaluated the proposed project for consistency with existing land use, zoning, and land use plans, noting that while the project is not subject to local zoning ordinances, every effort will continue to

be made during the design process to develop the project to be consistent with the BPDA land use policies and objectives; and

- Identified the range of mitigation measures.

3.12.1. Existing Conditions

South Station

The one-half-mile South Station study area for land use and zoning includes several neighborhoods including Downtown to the north, the South Boston Waterfront/Innovation District to the east, and Chinatown and the Leather District to the south and west. These neighborhoods are dominated by commercial and mixed-use buildings, interspersed with high-density residential uses. The BPDA (formerly BRA) designates the 49-acre South Station site land use as exempt/institutional, which includes social, institutional, and infrastructure-related uses. Both the South Station Rail Terminal and the South Station Bus Terminal contain commercial land uses, including eateries and retail stores/services/kiosks geared toward rail and bus patrons. The South Station headhouse also contains retail uses and office space on the upper floors.

Layover Facilities

The Widett Circle study area is located in an industrially zoned area in South Boston, dominated by industrial uses and rail operations and support facilities, including Amtrak's Front Yard and Southampton Street Yard; the MBTA's South Side Service and Inspection Facility; and Cabot Yard, the primary MBTA Red Line train maintenance facility.

The BPDA designates existing land use on the Widett Circle site as commercial and exempt/institutional. The site is currently used for private non-rail related uses in the food processing, food storage, and food logistics industry. The site also contains two public roads owned by the City of Boston: Widett Circle and Foodmart Road.

Readville – Yard 2, which is owned by the MBTA and currently used as a layover facility for its south side operations, is located within the Readville Industrial Area in the Hyde Park neighborhood. Land uses within the study area include residential, commercial, and light industrial uses directly south of the site, and the Neponset River and the Neponset River Reservation, located east/southeast of the site. The BPDA designates Readville –Yard 2 as an exempt/institutional land use. A portion of the project site, currently owned by the James G. Grant Co. LLC, is used for demolition and debris and does not contain any permanent structures.

3.12.2. Environmental Consequences

No Build Alternative

In the No Build Alternative, there would be no impacts to land use or zoning.

Build Alternative

South Station

The expansion of South Station is consistent with city-wide and neighborhood planning and development policies and programs. The City of Boston is undergoing a city-wide planning process called Imagine

Boston 2030 to create a framework to preserve and enhance Boston. Concurrently, the City is considering a master plan for the South Station/USPS area that will reflect the goals of the Imagine 2030 process. The BPDA's goals for the South Station Master Plan are to coordinate major public and private planning and development and prepare a comprehensive, long-range plan for land use, multimodal transportation, urban design, and the public realm. While the SSX project conceptual plans are being developed prior to the completion of the City's master planning process, MassDOT is collaborating with the City to ensure that the SSX project will be consistent with Imagine 2030 and the City's South Station Master Plan.

Land use impacts associated with the project at South Station include:

- The acquisition of the USPS property (approximately 14 acres) will convert the use of the site from USPS mail distribution to an expanded public transportation facility and will be consistent with existing zoning (potential impacts associated with the relocation of the USPS GMF facility are discussed in Section 3.19 and Appendix B – *Indirect and Cumulative Impacts Analysis*);

- The acquisition of a parcel located adjacent to 245 Summer Street (approximately 0.2 acres) will convert the parcel from a private patio area to a public right-of-way as part of conversion of Dorchester Avenue and will be consistent with the existing zoning; and

- The reopening of Dorchester Avenue (currently part of the USPS property) to a public right-of-way (approximately 5.0 acres) will convert the use from predominantly private use for USPS only to a multimodal public right-of-way and will be consistent with existing zoning.

Layover Facilities

Locating layover facilities at the Widett Circle site would be consistent with current zoning. A storage yard accessory to a railroad operation is an allowed use within the I-2 District, provided that the yard is located at least 150 feet from every residential use. The nearest residential land use is located more than 700 feet from the Widett Circle site boundary and no residential projects are under construction or proposed within 150 feet of Widett Circle. Land use impacts associated with the project at Widett Circle include acquisition of the Cold Storage and New Boston Food Market properties (approximately 25.1 acres); acquisition of a portion of Department of Public Works/City of Boston property (approximately 0.1 acres) to accommodate work at Broad Interlocking; and acquisition of Foodmart Road and Widett Circle (approximately 6.2 acres).

Locating layover facilities at Readville – Yard 2 would maintain the existing industrial use and would be consistent with current zoning. An accessory railroad storage yard is an allowable use within the LI-1 subdistrict. Proposed activities within the Neponset River Riverfront Protection Overlay District may entail compliance with special site design requirements. Land use impacts associated with the project at Readville – Yard 2 include the potential acquisition of a portion of the James G. Grant Co. LLC property (approximately 0.7 acres).

3.12.3. Mitigation

Any required property acquisitions would be carried out in a manner that would minimize impacts, as described further in this section. Acquisition would be limited to the minimum footprints required to support each function, including access roads, stormwater management facilities, and employee parking areas, where required. All property acquisitions and relocations would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 United States Code (U.S.C.) 4601; CFR 49 Part 24 and/or M.G.L. 79; M.G.L. 79A through the MBTA's real estate acquisition team. The preferred goal of MassDOT/MBTA is to reach agreements with owners for the purchase of

properties required for the SSX project. Property owners would be offered just compensation based on fair market value established by a certified appraiser.

3.13. Socioeconomic

FRA's *Procedures for Considering Environmental Impacts* requires consideration of the potential impacts of the project on the socioeconomic environment, including the number and kinds of available jobs, the potential for demographic shifts, impacts of commerce, including existing business districts, metropolitan areas, and the immediate area of the alternative. For the socioeconomic assessment, the Project Team:

- Defined study areas as the 2010 U.S. Census blocks within a one-half-mile radius surrounding the existing South Station headhouse and a one-quarter mile radius of the two layover facility sites;
- Compiled a socioeconomic profile of each study area;
- Described the economic effects of the project components; and
- Identified the range of mitigation measures.

CTPS provided existing, No Build, and Build Alternatives estimates of population and employment for the South Station study area. CTPS used the Transportation Economic Development Impact System (TREDIS) model to estimate the economic impacts of permanent household population gains and employment gains due to the Build Alternative at the South Station site. These estimates were then used to estimate increases in business sales, gross regional product, jobs, and wage income for the Boston MPO region. CTPS also used the TREDIS model to estimate the economic impacts of the project's construction for the MPO region, as well as travelers' cost savings. DEIR Appendix 4 (Part 1), *Socioeconomic Conditions Technical Report,*[44] presents additional information and the results from the CTPS economic analysis.

3.13.1. Existing Conditions

Boston is the 10th largest metropolitan area and ninth largest national economy. Boston is a hub for finance, higher education, medicine, a broad range of professional services, and government activities at all levels. Healthcare comprises the largest sector of the Boston economy, followed by professional/ scientific/technical services, finance/insurance, and government. Boston is also an important tourist destination, as the tenth most visited city in the U.S.[45]

Boston's economy and employment has steadily expanded since 2010, and this growth is projected to continue. Since 2009, Boston's economy has grown at a rate of 4.8%, the highest among all major U.S. metropolitan areas.[46] In the South Station study area, employment in 2035 is expected to increase, with the largest increases occurring in the South Boston Waterfront/Innovation District. Boston has more jobs than residents and far more jobs than resident workers.[47] In the heart of the Downtown area, jobs outnumber residents by roughly seven to one. Commuters from outside the City fill 62% of its jobs. Although the total

[44] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 4 (Part 1), Socioeconomic Conditions Technical Report.* October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

[45] Traveler's Digest. *The 10 Most Visited Cities in the United States by Foreign Travelers (2013)*. August 30, 2013. http://www.travelersdigest.com/7528-10-most-visited-cities-in-the-united-states-by-foreign-travelers-in-2013/

[46] The Brookings Institution, "The 10 Traits of Globally Fluent Metro Areas: Boston," 2013.

[47] BRA (now BPDA). *Boston by the Numbers: Economy and Jobs*. March 2011. Accessed July 1, 2014, http://www.bostonredevelopmentauthority.org/getattachment/946803b2-6f1c-40b2-8b6b-c01c8c4bced1/; CTPS; U.S. Census data, 2000 and 2010

number of jobs has fluctuated with expansions and recessions, the trend is toward economic expansion, particularly in recent years.

Boston's population has also been growing in recent decades, and its growth compares favorably to most other northeastern cities. Over a two-year span culminating in July 2012, Boston grew 3.1% from the 2010 census to 636,479 people, at a rate faster than the suburbs and any urban area northeast of New Jersey.[48]

South Station

The South Station study area population and employment for existing conditions (2009) and 2035 No Build and Build Alternatives, as well as projections for travel demand forecasting, were based upon five transportation analysis zones (TAZs) within the one-half-mile South Station study area.[49] The 2009 estimated population in the TAZs around South Station totaled 13,190 people and the 2009 estimated jobs in the TAZs around South Station totaled 91,410. These TAZs population and employment estimates are consistent with the Boston Region MPO RTP.

In 2010, the City of Boston designated a portion of the South Boston Waterfront as the Innovation District, comprised of one thousand acres directly east of South Station across Fort Point Channel. In the South Boston Waterfront neighborhood, more than 4,000 jobs have been created since 2010 at more than 200 small businesses.[50, 51]

According to the 2010 Census, the one-half-mile South Station study area experienced an increase in housing by 67% between 2000 and 2010 to 6,444 housing units. This population/housing expansion is expected to continue, particularly in the South Boston Waterfront/Innovation District.

Located in the heart of Boston's Financial District, South Station is surrounded by a number of businesses and large employers[52], such as Fidelity Investments; Tufts Medical Center; Suffolk University; Gillette, the City's largest industrial/manufacturing employer; and General Electric Co., who recently announced they will be moving their headquarters directly across Fort Point Channel. Current staffing to support railroad operations at South Station (both on-site and off-site) for Amtrak and the MBTA is estimated to be close to 900 personnel, of which at least 20% are housed at South Station. In addition, the South Station headhouse features 15 eateries and 15 retail stores/services geared toward rail patrons. The headhouse includes retail space (CVS Pharmacy) on the second level and office space for Amtrak, the Massachusetts Division of Public Utilities, and approximately five private companies. The bus terminal also houses eateries and retail outlets/services/kiosks.

Layover Facilities

Both layover facility sites are located within existing industrial areas. The population within the one-half-mile Widett Circle study area generally is concentrated in the South End neighborhood, located west of the Widett Circle layover facility site; and to a lesser extent, in the eastern portion of the study area in South

[48] Boston Globe, *Boston's Population Boom Speeds Up.* June 16, 2013. Accessed July 23, 2014, http://www.bostonglobe.com/ideas/2013/06/16/boston-population-boom-speeds/WUb5OlqaNWj9gKDhtqXIkI/story.html?s_campaign=sm_tw.

[49] A transportation analysis zone or TAZ is the unit of geography most commonly used in conventional transportation planning models.

[50] *The Northeast Corridor and the American Economy*. April 2014.

[51] City of Boston, Boston Redevelopment Authority. *Innovation Boston.* Accessed September 12, 2016, http://www.bostonredevelopmentauthority.org/business-dev/initiatives/innovationboston/overview.

[52] BPDA (formerly BRA) defines large employers as private employers employing over 500 people.

Boston. Readville – Yard 2 is located in the Hyde Park neighborhood, with the one-half-mile study area population located primarily south and northwest of the layover facility site.

Table 3-19 — Population Trends, Layover Facility Study Areas, 2000-2010

Area	Population 2000	Population 2010	% Change 2000 to 2010
Widett Circle Study Area[a]	7,405	11,299	52.6
South Boston	31,005	33,311	7.4
South End	21,911	24,577	12.2
Readville – Yard 2 Study Area	5,615	5,111	-9.0
Hyde Park	30,076	30,637	1.9
City of Boston	589,141	617,594	4.8
Suffolk County	689,807	722,023	4.6
Massachusetts	6,349,097	6,547,629	3.1

Sources: 2010 Census, Summary File 1, Boston Redevelopment Authority Research Division Analysis; 2010 Census
a The Widett Circle study area includes the Suffolk County House of Correction, which had 1,512 residents in 2010.

As shown in Table 3-19, from 2000 to 2010, the Widett Circle study area grew in population by 53%, substantially more than any other study area or neighborhood. With the exception of the Readville – Yard 2 study area, which lost population from 2000 to 2010, the growth rate of the study area populations exceeded the city, county or state growth rates over the same time period.[53]

The Widett Circle site includes a complex of food-related storage and processing businesses. The site is comprised primarily of three privately-owned parcels on two public roads, Widett Circle and Foodmart Road. The parcel at 100 Widett Circle is referred to as the Cold Storage parcel. Cold Storage currently contains a temperature-controlled food storage and distribution facility, owned by Art Mortgage Borrower Propco 2006 2 LP, and operated by Americold/Crocker & Winsor Seafoods. The two parcels on Foodmart Road contain the New Boston Food Market Development Corporation, which consists of approximately 30 units leased to multiple businesses in the food processing, food storage, and food logistics industry. Created as an Urban Renewal Corporation, the property is tax-exempt under M.G.L. Chapter 121A (760 CMR 25).

A privately owned demolition and debris management company is located east of the existing Readville – Yard 2, proximate to a larger industrial district in the immediate Hyde Park area.

3.13.2. Environmental Consequences

No Build Alternative

South Station

As detailed in DEIR Appendix 4, *Socioeconomic Conditions Technical Report*,[54] in 2035, population within the South Station TAZs is anticipated to increase by 160%, increasing to approximately 34,260 people from existing conditions. This total includes the SSAR development. The largest increases would occur within the South Boston Waterfront/Innovation District, where population is anticipated to increase 212%, to 17,230 people.

[53] Boston Redevelopment Authority Research Division Analysis. *2010 Census-Summary File 1.* November 2011. http://www.bostonredevelopmentauthority.org/getattachment/9cdc8bc3-7224-4af1-9ce8-a9fe79ec0ad6

[54] Massachusetts Department of Transportation, South Station Expansion Project. *Draft Environmental Impact Report, Appendix 4 (Part 1) - Socioeconomic Conditions Technical Report*. October 2014. http://www.massdot.state.ma.us/southstationexpansion/Documents/DEIR.aspx

In 2009, employment in the South Station TAZs totaled 91,410 workers. In 2035, employment is estimated to increase 20% to approximately 109,540 workers. The South Boston Waterfront/Innovation District would experience a 74% increase for a total of approximately 26,000 jobs.

In the No Build Alternative, employment would be unchanged at the South Station site. The total employment within the South Station headhouse, excluding bus terminal employees, is approximately 640 personnel, including employees for railroad operations of Amtrak and the MBTA, 100 retail/service employees, and 360 office employees on the upper floors. The USPS facility would continue to employ approximately 1,000 workers at South Station.

Layover Facilities

In the No Build Alternative, employment would be unchanged at the layover facility sites. There would be no impact to Widett Circle's food-related storage and processing businesses, or the demolition and debris management company located east of the MBTA's existing Readville – Yard 2 facility.

Build Alternative

South Station

The station expansion onto the site of the existing USPS facility site would displace approximately 1,000 USPS jobs. It is anticipated that these jobs would be relocated to a site within South Boston and there would be no net loss of USPS jobs within the Boston area (additional information regarding the relocation of the USPS GMF facility is in Section 3.19 and Appendix B – *Indirect and Cumulative Impacts Analysis*). MassDOT intends to replicate the USPS retail functions currently operating at the facility within the expanded South Station headhouse.

The station expansion in the Build Alternative is anticipated to more than double the retail and building management/cleaning staff within the headhouse. Assuming the South Station rail and building management staff would expand, this could yield a total of approximately 844 employees based at the South Station headhouse, an increase of roughly 200 employees. The station expansion also is anticipated to result in an increase in rail-related employment. Based on discussions with the MBTA, increases in staff for railroad operations could be 30%.

In addition to the direct employment changes associated with the Build Alternative, the SSX project would support continued economic growth and expansion of the Downtown Financial District and adjoining South Boston Waterfront/Innovation District. Given the importance of Boston as an employment center reliant on a commuter workforce, the proposed station improvements would be important to support the City's continued growth and economic health. An improved South Station transportation complex would provide enhanced transportation improvements to the adjoining Innovation District and other neighboring districts (Financial District, Leather District, and Chinatown) for businesses and residents.

Population and household numbers for the South Station TAZs are not expected to change from the No Build Alternative to the Build Alternative.

While the loss of 1,000 USPS jobs at the site would be partially offset by the increase in rail-related and retail jobs associated with the South Station Terminal expansion, a net decrease of approximately 500 total jobs is anticipated in the Build Alternative as comparted to the No Build Alternative. However, the lost jobs are represented by USPS jobs that are expected to be relocated to another location in Boston.

Layover Facilities

Direct business displacements required for the project would occur at the Widett Circle layover facility site, due to the required acquisition of the Cold Storage and New Boston Food Market properties. MassDOT and the City of Boston would coordinate with these businesses to find relocation options in the Boston area.

MassDOT would also potentially require a partial taking of approximately 0.7 acres of the adjacent James G. Grant Co. LLC property to complete the expansion of the MBTA's Readville – Yard 2 facility.

3.13.3. Mitigation Measures

MassDOT would provide acquisition and, if required, relocation assistance for affected property owners at the Widett Circle and Readville – Yard 2 layover facility sites in accordance with the procedures outlined in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The Act provides benefits and protection for persons or businesses whose real property is acquired or who are displaced by federally funded projects, and require just compensation. Relocation assistance would be provided to affected owners. It is anticipated that suitable relocation sites are available within the industrial sites in the immediate South Boston area for the displaced Widett Circle businesses.

3.14. Environmental Justice

The federal regulations and guidance documents applicable to environmental justice issues include: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations; U.S. Civil Rights Act Title VI; U.S. DOT Order 5610.2(a), Actions to Address Environmental Justice in Minority Populations and Low Income Populations; and FTA Circulars 4702.1A Title VI and Title VI-Dependent Guidelines for FTA Recipients, and 4301.1 Environmental Justice Policy Guidance for Federal Transit Administration Recipients.

Title VI prohibits discrimination on the basis of race, color, or national origin. Guiding EJ principles followed by U.S. DOT include avoiding, minimizing, or mitigating disproportionately high and adverse human health and environmental effects on minority and low-income populations; and ensuring the full and fair participation by all potentially affected communities in the transportation decision-making process. The federal definition of low-income is based on the federal poverty level, and a minority is defined to include persons who are American Indian and Alaska Native, Asian, Black or African American, Hispanic or Latino, and Native Hawaiian and other Pacific Islander.

The effects of the project alternatives were evaluated relative to their effects on all populations in order to determine whether impacts in the No Build and Build conditions would be disproportionate or adverse on EJ communities or populations. For the purposes of the SSX analysis, the state definition for an EJ population was used as outlined in the Massachusetts Executive Office of Environmental Affairs[55] Environmental Justice Policy, October 9, 2002 and Environmental Justice maps. EJ populations are defined as those segments of the population that EEA has determined to be most at risk of being unaware of or unable to participate in environmental decision-making or to gain access to environmental resources. The Commonwealth of Massachusetts requirements provide an expanded definition of EJ populations, to include persons who are foreign born or are not proficient in the English language, and have higher thresholds for low income. EJ 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

[55] Now the EEA.

of environmental laws, regulations, and policies. An EJ community is defined as a neighborhood (consisting of a U.S. Census Bureau census block group) that meets one or more of the following criteria:

- The median annual household income is at or below 65.49% of the statewide median income ($62,133) for Massachusetts ($40,673 in 2010);
- 25% of the residents are minority;
- 25% of the residents are foreign born; or
- 25% of the residents have limited English proficiency (LEP), defined as households in which no one aged 14 and over speaks English only or speaks English "very well."

Throughout the project, MassDOT targeted outreach to EJ communities and provided accommodations for disadvantaged populations, as further described in Chapter 5, *Public Involvement and Agency Coordination*. SSX project public outreach has included a variety of methods to reach and involve members of the public and EJ communities, as summarized below.

The Project Team has prepared a Public Involvement Plan for the SSX project that outlines the public outreach program, and MassDOT has, and would continue to, implement the public outreach specified in the plan. MassDOT maintains a SSX project website, which is used to disseminate information and includes the project brochure translated into Chinese, Spanish, and Portuguese, the three most commonly spoken languages in Massachusetts for limited English proficiency populations in the 2010 census. The brochure also includes a TTY number for the hearing impaired. Project website materials are accessible for use by screen readers (for the visually impaired). The project website states that project materials posted on the website can be translated or alternative formats (such as large print) made available upon request, and a web link for such requests is provided.

MassDOT sends regular email updates, including when significant documents are uploaded to the SSX project website and public meetings are scheduled, to an extensive database that includes 2,500 groups and individuals and nearly 1,000 abutters. Email notifications include contacts for requests for access accommodations or interpreter services. A TTY number for the hearing impaired is also included. This interpreter information in the notification is translated into Chinese (both traditional and simplified characters), Spanish, and Portuguese.

Two open houses were held in November 2012 at Atlantic Wharf, 290 Congress Street, a block from South Station, to kick off the SSX project. These open houses were widely advertised and noticed. One meeting was held in the morning and the other meeting was held in the late afternoon/early evening to accommodate individuals with different schedules. Meeting notices were sent via e-mail to the SSX project database. Flyers advertising the open houses were distributed to abutters door-to-door in the Leather District, Chinatown, and South Boston (along Fort Point Channel). Signs advertising the events were displayed at South Station, and copies of the meeting flyer were available at the station's information desk. Meeting advertisements included a display ad posted in the Chinese newspaper, SamPan, in Chinese.

A MEPA scoping session on the ENF was held at South Station on April 1, 2013. The meeting was noticed in newspapers ads, including SamPan, and e-mail notifications were sent out. Signs advertising the MEPA scoping session were displayed in South Station, and a Chinese interpreter attended the meeting. Interpreter services would be made available for future meetings upon request.

MassDOT periodically conducts information sessions about the project. To date, there have been five information sessions at South Station and an additional session at the Farmer's Market in Dewey Square. These sessions are advertised through e-mail notifications to the project database. At an information session in September 2013, a sign language interpreter was provided upon request.

MassDOT has provided briefings to neighborhood organizations, local institutions, and businesses. Meetings were held with local community organizations in EJ neighborhoods. For neighborhood organizations alone, there have been eleven briefings on the project to date. Project briefings were held with a number of civic and community organizations, including Chinatown Coalition, Chinatown Safety Committee, Leather District Neighborhood Association, Friends of Fort Point Channel, Allston Civic Association, and Andrews Square Civic Association. MassDOT's public informational materials and notices have included an offer to hold project briefings upon request.

MassDOT has conducted two online surveys in English, Chinese, and Spanish on the SSX project to gauge public preferences and obtain public input into the station design and planning process. The first survey was conducted during the fall of 2013 to gather feedback on current and future amenities at South Station. Nearly 800 people responded to this survey. The second survey opened in May 2014 and focused on gathering information on pedestrian and bicycling in the South Station/Dewey Square area. Print versions of the surveys were made available upon request. The surveys were promoted via the following: the project website, e-mail notifications to the project database, information sessions at South Station, the large display screens at South Station, printed bookmarks distributed at the South Station information desk, other organizations' mailing lists, and the MassDOT blog.

MassDOT has commissioned a task force for the I-90 project to examine replacement of the highway viaduct on the north/northeast side of BPY that carries I-90 south of Soldiers Field Road and over the railroad (on the east side). One of the principal purposes of the I-90 project is to present and review MassDOT's plans for the portion of the BPY that it owns or has a right-of-way to operate on. As the layover facility site screening advances, outreach to EJ communities would continue for future public meetings and project briefings at and around South Station, and would expand as needed to include other prospective layover facility sites.

3.14.1. Existing Conditions

The racial and ethnic composition of the City of Boston has changed dramatically over the last several decades, from a city that was predominantly white in 1980 (70%) to a majority-minority city (47% white) in 2010. The City of Boston is one of the most diverse cities in the nation and has one of the highest percentages of foreign-born populations (approximately 27%) in the U.S.[56] Boston also has the highest concentration of "affordable" subsidized housing among major U.S. cities. Approximately 20% of the City's housing is dedicated to low- and moderate-income families.[57] Table 3-20 presents the percentages of environmental justice populations within the one-half-mile study areas of the SSX project sites. Population estimates in this table are based only on the census blocks located entirely or partially within the one-half-mile study area. Table 3-21 presents race and ethnicity characteristics of the SSX project areas in comparison to the City of Boston, Suffolk County, and Massachusetts.

[56] Boston Redevelopment Authority. *Demographic and Socio-economic Trends in Boston: What we've learned from the latest Census data*. November 29, 2011. Accessed June 15, 2014. http://www.bostonredevelopmentauthority.org/getattachment/83972a7a-c454-4aac-b3eb-02e1fddd71e3/.

[57] Boston Redevelopment Authority. *Boston by the Numbers: Housing*. November 2013. Accessed July 1, 2014. http://www.bostonredevelopmentauthority.org/getattachment/76bd9781-55ee-4545-928c-706d571523a3/.

Table 3-20 — Percentages by Population and Area of SSX Project Study Areas Meeting Criteria to be Defined as an Environmental Justice Population

Study Area	Minority		Low Income		Limited English Proficiency		Meets All EJ Criteria		EJ Community Totals	
	Population %	Area %	Population %	Area %	Population %	Area %	Population %	Area %	Population %	Area %
South Station	78.1	36.0	51.7	17.5	43.0	15.5	43.0	15.5	84.9	36.0
Widett Circle	81.1	46.3	42.1	34.8	27.7	11.4	27.7	11.4	88.3	65.8
Readville – Yard 2	97.2	84.7	0	0	0	4.4	0	0	97.2	84.7

Sources: Massachusetts Office of Geographic Information (MassGIS), U.S. Census Bureau

Table 3-21 — Race and Ethnicity Characteristics in SSX Project Study Areas, 2010

Study Area	White	%	Minority	%	Black	%	Asian	%	Hispanic	%	Other	%
South Station	7,305	57.7	5,354	42.4	463	3.7	4,013	31.7	602	4.8	276	2.2
Widett Circle	5,288	46.8	6,011	53.2	1,958	17.3	1,298	11.5	2,468	21.9	287	2.5
Readville – Yard 2	2,375	46.5	2,736	53.5	1,476	28.9	103	2.0	982	19.2	175	3.4
City of Boston	290,312	47.0	327,282	53.1	138,073	22.4	54,846	8.9	107,917	17.5	26,446	4.3
Suffolk County	346,979	48.1	375,044	51.9	142,980	19.8	58,963	8.2	143,455	19.8	29,646	4.1
Massachusetts	4,984,800	76.1	1,562,829	23.9	391,693	6.0	347,495	5.3	627,654	9.6	195,987	3.0

Sources: 2010 U.S. Census; Boston Redevelopment Authority, U.S. Census – Summary File 1 Data, 2010

a Racial and ethnic categories are further defined as follows: White (White alone, not Hispanic or Latino); Black (Black or African American alone, not Hispanic or Latino); Asian (Asian alone, not Hispanic or Latino); Hispanic (Hispanic or Latino; persons of Hispanic origin may be of any race); Other (American Indian and Alaska Native alone, not Hispanic or Latino; Native Hawaiian and other Pacific Islander alone, not Hispanic or Latino; some other race alone, not Hispanic or Latino; two or more races alone, not Hispanic or Latino).

South Station

According to the 2010 U.S. Census, the total population of the one-half-mile study area around South Station is 12,659, with 6,444 households. EJ communities cover 36% of the study area and contain 85% of the total population (10,571 persons). The designated EJ blocks are located primarily west of the Central Artery (I-93) and the Surface Road. The racial and ethnic composition of the South Station study area (Asian population of 32%) reflects the Chinatown population. Most of the areas to the north in Downtown and to the east in South Boston Waterfront, consisting of commercial high-rises and buildings or industrial/transportation uses, are largely unpopulated. The South Station EJ study area and adjoining neighborhoods generally had a smaller percentage of non-whites in 2010 than the City and county, but a higher percentage than the state as a whole.

Layover Facilities

According to the 2010 U.S. Census, the total population of the one-half-mile study area around the Widett Circle layover facility site is 11,299, with 4,797 households. EJ communities cover 66% of the study area and contain 88% of the total population (9,973 persons). This area is west of the Southeast Expressway (I-93) and east of the MBTA Red Line. Transportation and industrial uses occupy most of the largely unpopulated area surrounding the project site between these two transportation routes. The most populous block group, which also has the second highest percentage of minorities (82%), includes the Suffolk County

House of Correction, which influences the EJ population percentages.[58] Other EJ block groups with elevated minority populations include the Boston University Medical campus. The minority population percentages in the Widett Circle layover facility study area are similar to that of the City and county, but are higher than that for the state.

The total population of the one-half-mile study area at the Readville – Yard 2 layover facility site is 5,111, with 2,128 households. EJ communities cover 85% of the study area and contain 97% of the total population (4,967 persons). The percentage of the black population is higher (29%) than that of the City, county, and state, while the Asian population is lower (2%).

3.14.2. Environmental Consequences

No Build Alternative

In the No Build Alternative, there would be no changes in accessibility and mobility for EJ and disabled populations; no direct impacts due to relocations and other indirect property impacts; and no change in indirect impacts due to visual, air quality, and noise impacts.

Build Alternative

The proposed station improvements would benefit EJ populations that use the station by providing improved transportation facilities and additional areas of open space, including the new Harborwalk on Dorchester Avenue.

The Boston MPO and CTPS assessed the regional accessibility changes within the TAZs covering nearly all of Eastern Massachusetts as a result of the SSX project using the Boston MPO's regional travel demand model. This analysis compared accessibility for environmental justice/disabled populations and non-disadvantaged populations, including access to employment opportunities, hospitals, and higher education destinations located within a 40-minute transit trip and a 20-minute automobile trip.

This assessment determined that accessibility to needed services (hospitals and colleges) and jobs (basic, retail, and services), mobility and congestion, or environmental impacts would not be permanently impaired as a result of the project. Furthermore, changes would be negligible for both EJ and non-disadvantaged population zones in the Build Alternative as compared to the No Build Alternative. CTPS determined that none of the EJ populations, including low-income, minority, LEP, or disabled populations, would experience a greater burden than any non-EJ population resulting from the SSX project Build Alternative. In fact, the project is expected to benefit EJ populations by improving accessibility to public transportation. An improved station design would also improve public access within the station.

The proposed South Station improvements would not directly displace any EJ populations, as no residential property takings would occur. The acquisition of the USPS facility would result in the relocation of all employees to another site in Boston. The number of employees at the USPS facility meeting EJ criteria is not known. Assuming that the percentage of workers that represent EJ populations is similar to the statistics for the City of Boston, roughly half (or 500) of USPS workers could represent EJ populations.

The SSX project would result in only a temporary loss of the on-site USPS retail functions as a community service since MassDOT anticipates that there would be the ability to replace the retail mail functions within the terminal expansion. There are two other USPS post offices within close proximity (a five- to 10-minute

[58] The Suffolk County House of Correction (South Bay) accounts for 62% of the block group population. MassGIS eliminates from EJ designation those block groups with 65% or more of their total population living in group (institutional) house. At 62%, the Suffolk County House of Correction (South Bay) is included in the MassGIS count of EJ communities.

walk from South Station) that could be utilized during construction. Therefore, no disproportionate impacts on EJ populations are anticipated to occur as a result of the USPS relocation.

SSX project-related property displacements would occur at Widett Circle, with the displacement of approximately 30 private businesses. The number of employees at these businesses meeting EJ criteria is not known. Assuming that the percentage of workers that represent EJ populations is similar to the statistics for the City of Boston, roughly half of the workforce could represent EJ populations. MassDOT and the City of Boston would coordinate with these businesses to find relocation options in the Boston area.

Increases in rail operations and associated increases in noise at the Readville – Yard 2 site would adversely impact nearby residences, including EJ communities. The midday peak activity noise level at Readville – Yard 2 would impact residences located along Wolcott Street and Riley Road. A Noise barrier is proposed to mitigate adverse impacts.

No disproportionately high and adverse human health and environmental effects, including air quality, visual, social, and economic effects, are anticipated to occur to EJ populations due to the SSX project. Steps would be taken at the Readville – Yard 2 site to reduce any noise and/or vibration levels that may affect all populations. Section 3.3, Noise and Vibration provides additional information.

3.14.3. Mitigation Measures

No EJ-related mitigation would be required or proposed at the South Station or layover facility sites.

3.15. Public Health and Safety

The following section addresses passenger safety concerns at the station as well as hazardous materials research. The following federal, state, and local regulations and guidance provide the regulatory context for the public health and safety analysis:

- FTA's *Safety and Security Management Guidance for Major Capital Projects*, FTA C 5800.1, August 1, 2007;
- *The Manual for Development of System Safety Program Plans for Commuter Railroads*, prepared by the American Public Transportation Association (APTA) in cooperation with FRA, dated May 15, 2006, which provides guidance for development of a System Safety Program Plan (SPPP) for commuter railroads for project contracts;
- *NFPA Standard for Fixed Guideway Transit and Passenger Rail Systems* (NFPA 130);
- FTA's *State Safety Oversight Program* (49 CFR 659.19 - *System Safety Program Plan*);
- FRA proposed rulemaking that would require commuter and intercity passenger railroads to develop and implement a system safety program to improve the safety of their operations;[59] and
- *MBTA South Station Community Emergency Management Plan and Evacuation Protocol*, March 31, 2010.

[59] "System Safety Program, A Proposed Rule by the Federal Railroad Administration, 9/7/2012, https://www.federalregister.gov/articles/2012/09/07/2012-20999/system-safety-program.

For the public health and safety assessment at the project sites, the Project Team:

- Assessed existing pedestrian safety and LOS at South Station; and
- Designed all facilities in accordance with applicable regulations, including Amtrak, MBTA, FRA, APTA, American Railway Engineering and Maintenance-of-Way Association (AREMA), ADA, NFPA, Massachusetts State Building Code, Massachusetts Fire Prevention, and MAAB regulations.

Site contamination and hazardous materials in Massachusetts are regulated through multiple federal and state regulations. The applicable regulations for asbestos-containing materials (ACM) are the U.S. EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP)[60] and the Massachusetts Air Pollution Control Regulations.[61] MassDEP implements the Massachusetts Contingency Plan (MCP) to address releases or threats of releases of oil and/or hazardous material (OHM) into the environment.[62]

The study area for the evaluation of site contamination, including soil and groundwater contamination, and hazardous materials is defined as the site boundary where permanent or temporary construction is likely to take place.

Phase I Environmental Site Assessments (ESAs) were conducted for the South Station site (with the exception of the USPS property, which was not available to be investigated) and the Widett Circle and Readville – Yard 2 layover facility sites. A Phase 1 ESA is a report that summarizes a site visit and records review of a property and its surrounding area to determine if any additional environmental investigation is warranted to understand the liability risks associated with the identified property. The goal of these assessments was to identify Recognized Environmental Conditions (RECs) and Historical Recognized Environmental Conditions (HRECs) associated with the properties.

3.15.1. Existing Conditions

South Station

The existing passenger waiting area and circulation zone at South Station is inadequately sized and configured to accommodate the current daily demand. The existing station lacks adequately sized platforms and passenger circulation areas. The station can be accessed from the east via Atlantic Avenue, the north via Dewey Square/Summer Street, and the east via Dorchester Avenue. The USPS and the railyard inhibit any station access from the south. Currently the station is policed by the City of Boston, MBTA, and Amtrak and emergency response is regulated by each agency. The MBTA is in the process of developing a composite Emergency Response Plan for South Station in conjunction with the SSAR project.

The South Station site has a history of coal storage and has been used as a railyard since the late 1800s. The Phase I ESA completed in January 2016[63] identified three RECs and six HRECs at the site. The RECs include historical use of the site as a railroad transportation facility. The historical fill present at the site has been documented as containing elevated concentrations of polynuclear aromatic hydrocarbons (PAH) and metals. A release of hydraulic oil has also been documented at the site. A Class A-3 Response Action

[60] 40 CFR Part 61.

[61] 310 CMR 7.15

[62] Per the Massachusetts Contingency Plan (310 CMR 40.0000), a release is defined as any spilling, leaking, pumping, pouring, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, excluding certain emissions or applications of pesticides, fertilizer, or residuals.

[63] South Station Expansion. *Final Environmental Impact Report* June 2016. http://www.massdot.state.ma.us/southstationexpansion/Documents/FEIR.aspx

Outcome (RAO) for the hydraulic oil release was submitted for the approximately 980 square foot disposal site area, which is located within the South Station Bus Terminal on Atlantic Avenue near Beach Street, asserting that remedial work has been completed and a level of "no significant risk" was achieved. Contamination has not been reduced to background levels and an Activity and Use Limitation (AUL) has been implemented for this disposal area. AULs are legal restrictions used in the context of the Massachusetts Contingency Plan to limit future exposure to contaminants remaining at a site.

Layover Facilities

The Widett Circle site was created by the filling of South Bay, which was completed approximately 1967. Two RECs and seven HRECs were identified during the completion of the Phase I ESA. The RECs included the fill material used during the creation of the land area and the surrounding property's use as a railroad storage and maintenance facility. The seven HRECs identified included a 100-gallon release of diesel fuel and six releases of anhydrous ammonia, all of which were closed in accordance with MassDEP regulations.

The Readville – Yard 2 site has been used as a railyard since approximately 1917. The Phase I ESA completed in January 2016 identified four RECs and zero HRECs for the site. The first two RECs are associated with Release Tracking Number (RTN) 3-15991, and include impact of onsite soils with PCBs, asbestos, heavy metals, and petroleum compounds and impacts of PCBs, heavy metals, asbestos, and petroleum compounds the adjacent property owned by James G. Grant Co, Inc. (the Grant property). The remaining RECs include stained soils in the area of the fire pump building and historical use of the site as a railroad storage and maintenance facility. An AUL has been recorded for the Grant property under RTN 3-15991.

Based on the RECs identified, a Phase II ESA would be conducted in accordance with the applicable regulations at each layover facility to determine the potential impact to future development caused by the identified RECs.

3.15.2. Environmental Consequences

No Build Alternative

In the No Build Alternative, the safety and security conditions would remain the same at South Station. The passenger circulation deficiencies of the existing passenger waiting area and circulation zones would remain. The anticipated increase in ridership would further exacerbate the deficiencies and could present a safety concern due to inhibited passenger flow. Currently, there is only one means of egress from the platform, and it is through the trackhead. Existing platform widths are 17 feet and six inches wide. Amtrak's and the MBTA's commuter rail future service plan will add approximately 35,000 passengers per day by 2035 to the already congested station.

Build Alternative

South Station

The project would improve rail safety, passenger safety within the station areas, and traffic safety. The proposed station expansion would reduce congestion by providing adequate space and appropriate facilities to safely and conveniently manage the projected peak-hour pedestrian flows. MassDOT established an overall goal of LOS C to accommodate passenger circulation and waiting areas. The design would meet this requirement with adequate platform, walkway, stairway, and waiting area sizing.

In order to comply with the *NFPA Standard for Fixed Guideway Transit and Passenger Rail Systems* (NFPA 130) egress capacity and travel distance requirements, all existing and new platforms would require at least three points of egress. As shown on Figures 2-3 and 2-4, the trackhead at the northern terminus of the platforms would provide one egress point, while the other points would be served by stairs for emergency egress connecting to the track level at the southern terminus of each platform and a vertical means of egress composed of stairs and/or escalators connecting to an elevated concourse or egress bridge. As shown in Figure 2-4, the overhead concourse and egress bridge would span all platforms and provide a means of passage between the platform level and a defined point of safety. The width of this egress bridge and elevated concourse would be designed to handle passenger loads from all of the platforms that it would serve.

The station design would eliminate nooks, recesses, and "places to hide," wherever possible to minimize surveillance problems. Sufficient lighting would be provided in stairs, ramps, the pedestrian overpass, elevator areas, and exits, so that the failure of any one unit will not leave any area dark or endanger persons leaving the platform. The design would also provide open areas with long sight lines to eliminate all dark or obscure areas.

The project would provide for increased capacity for curbside drop-off and pick-up, by reopening Dorchester Avenue for curbside activity and bus operations. Use of Dorchester Avenue would reduce curbside traffic on Atlantic Avenue and would provide improved safer accommodations for pedestrian and bicycle activities on Dorchester Avenue.

The SSX project would require the acquisition and demolition of the USPS facility. Prior to construction, further investigation would be required to identify the presence, location, and quantity of suspect ACM and potential hazardous materials, including sampling and analysis of materials. Should the additional investigation identify issues, they will be conducted in accordance with the applicable regulations. MassDOT would consult with the MassDEP regarding the planning and implementation of demolition and management of contaminated materials to ensure consistency with applicable regulations, and provide adequate protection to workers and sensitive receptors. Response actions could be required, including development of a site-specific health and safety plan. Should any SSX project activities occur within the area of the AUL, or other impacted areas identified as part of the Phase 2 ESA where conditions are above regulatory criteria at the South Station Bus Terminal, MassDEP would require oversight by a Licensed Site Professional (LSP) during excavation or handling of contaminated soils in compliance with a Soil Management Plan.

A Phase II is a comprehensive site assessment during which the risks posed to public health, welfare, and the environment are determined. Based on the RECs identified, Phase II ESA activities would be conducted in accordance with the applicable regulations. This would determine the potential impact to future development caused by the identified RECs. In addition, Phase I and II ESAs would be conducted in accordance with the applicable regulations when the USPS site is available to be investigated.

Layover Facilities

Based on the compliance status of historic releases at the Widett Circle site, no likely residual contamination exists and significant issues associated with the historic releases would not be anticipated during project layover facility construction. Based on RECs identified, Phase II ESAs would be conducted at Widett Circle and Readville – Yard 2. The project would require demolition of multiple existing facilities at Widett Circle. Prior to demolition activities, further investigation would be required to identify ACM and potential hazardous materials. Response actions could be required, including development of a site-specific health and safety plan.

Based on the historic and current use of Readville – Yard 2, it is likely that some contamination would be encountered during SSX project layover facility construction. Construction activities at Readville – Yard 2 could also include remediation of the disposal site (RTN 3-15991) (contaminants include PCBs, petroleum compounds, asbestos, and metals), to reach a Permanent Solution.

3.15.3. Construction Requirements and Mitigation Measures

The MBTA *South Station Community Emergency Management Plan and Evacuation Protocol*, March 31, 2010, would be incorporated and referenced, as appropriate, in the preparation of safety plans, protocols, and procedures, as described in this section, and will be updated as appropriate to incorporate the proposed station facilities.

A Safety and Security Program would be developed for the SSX project governing the implementation of safety and security requirements during the planning, construction, and site operation. To that end, a Safety and Security Program Plan (SSPP) would be prepared outlining the safety and security resources, policies, practices and procedures for South Station and the layover facility sites.

A System Safety Certification Program for the South Station and the layover facility sites will be developed to verify compliance with applicable safety requirements. MassDOT will coordinate proposed safety and security programs/measures with Amtrak, the railroad operator, law enforcement agencies, emergency responders, and the City of Boston.

A Preliminary Hazard Analysis (PHA) would be performed of South Station and the layover facility sites to systematically assess conditions associated with the expansion of the station, its ancillary infrastructure, and the development of the new layover facilities, which could affect the safe subsequent operation of the station facilities and rail system. A Threat and Vulnerability Assessment (TVA) would be performed for South Station and the layover facilities using U.S. Department of Homeland Security and Transportation Security Agency methodologies and processes for Critical Asset Protection.

A Preliminary Safety and Security Design Criteria Manual would be developed to prescribe those safety and security requirements in addition to those required by codes, standards, and guidelines, which will be incorporated into the project design. MassDOT will coordinate proposed safety and security programs/measures with FRA, Amtrak, law enforcement agencies, emergency responders, and the City of Boston.

Construction Period Mitigation

A program will be developed for the SSX project to implement safety and security requirements during the construction phase. The construction plans will be developed to comply with all applicable federal, state, and local laws and regulations, including requirements of Occupational Safety and Health Administration (OSHA), FRA, U.S. EPA, MBTA, MassDEP, and, as applicable, the State Fire Marshall and/or local fire departments.

Draft Site Specific Health and Safety Plans (HASPs), as provided in FEIR Appendix C,[64] have been prepared outlining the safety and security resources, policies, practices and procedures for South Station and the layover facilities. Final HASPs will be required to be prepared by each construction contractor to meet all applicable OSHA and U.S. EPA requirements. The contractor's HASP will include procedures for site inspections/audits, safety briefings/meetings, employee training, incident investigation/reporting. The

[64] South Station Expansion. *Final Environmental Impact Report, Appendix C – Site Specific Health and Safety Plan*. June 2016. http://www.massdot.state.ma.us/southstationexpansion/Documents/FEIR.aspx

plan will incorporate requirements for designated safety supervisor/contacts, emergency contact list, first aid facilities, protective equipment, housekeeping, and protection of public safety.

Based on RECs identified, Phase II ESAs would be conducted at South Station, Widett Circle and Readville – Yard 2. MassDOT would implement a soil and groundwater sampling and analysis program to provide information to establish the presence and extent of contaminated material; determine options available to manage and dispose of surplus soil generated during construction; establish requirements for existing groundwater or soil contamination in design for construction; and meet the performance standards of 310 CMR 40.0000 with regard to construction in contaminated areas. Based on the Phase II investigation results, MassDOT would determine if Massachusetts Contingency Plan (MCP) reportable conditions exist. Potential effects of construction on existing areas of environmental contamination and conditions that may pose a significant risk to human health, safety, public welfare, or the environment, including Imminent Hazards and/or Critical Exposure Pathways, would be identified. MassDOT would develop recommendations for specific response actions to maintain compliance with the MCP related to OHM on the property. MassDOT would identify response actions to be conducted prior to construction.

MassDOT would conduct a visual inspection of buildings to be demolished to identify the presence, location, and quantity of suspect ACM and other regulated materials. Work plans would be developed for sampling based on the facility walk-throughs once the inspections are complete. Bulk samples of potential hazardous materials would be collected for laboratory analysis. Once the laboratory results are received, types, conditions, and quantities of potential hazardous materials and universal wastes would be documented and inventoried. Finally, response actions that would be required prior to demolition would be identified.

3.16. Parks and Recreation Areas

Section 4(f) of the U.S. Department of Transportation Act (U.S. DOT Act) provides protection for publicly owned parks, recreation areas, wildlife and waterfowl refuges, and historic properties or archaeological sites on or eligible for listing on the National Register of Historic Places. Section 4(f) stipulates that U.S. DOT agencies cannot approve the transportation use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent avoidance alternative to the use of land; and the action includes all possible planning to minimize harm to the property resulting from such use; or
- The agency determines that the use of the property will have a de minimis impact.

The following steps were taken to complete the analysis of parks and recreational areas:

- Identified potential parkland resources in the immediate vicinity and within one-half mile of South Station, and within one-quarter mile of the proposed layover facilities;
- Conducted an assessment of the project's impacts upon non-site specific activities and non-activity-specific sites; and
- Performed a Section 4(f) evaluation (see Chapter 4).

This section discusses the parks and recreation areas, Section 3.17 discusses the historic resources, and Chapter 4 – *Draft Section 4(f) Determination* presents the evaluation of the parks and historic resources protected under Section 4(f), addresses potential impacts of the SSX project on these resources, and describes plans to minimize harm.

3.16.1. Existing Conditions

South Station

The South Station study area includes a number of parks and publicly owned squares created as mitigation by the Central Artery/Tunnel (CA/T) project, including: Dewey Square Plaza, directly north of South Station on Summer Street and Atlantic Avenue, the adjoining Dewey Square Parks within the Rose Kennedy Greenway, and sections of the Harborwalk.

The Rose Kennedy Greenway encompasses 15 acres extending 1.5 miles from Chinatown to the North End along the Surface Road between Atlantic Avenue and Purchase Street. Owned by MassDOT and operated by the non-profit Rose Kennedy Greenway Conservancy, the Greenway's public gardens, promenades, and plazas received over 1.19 million visitors in 2015[65] to events such as festivals and concerts. Dewey Square Plaza hosts a seasonal farmer's market and daily food trucks.

To the south, the South Station site adjoins Rolling Bridge Park, a plaza and green space owned and maintained by MassDOT as part of Central Artery Tunnel project mitigation. Completed sections of the Harborwalk border the South Station site to the north and south. The Fort Point Channel Harborwalk extends northeast of the South Station site at the Federal Reserve Bank and south of the existing USPS facility at Rolling Bridge Park. The Harborwalk provides waterfront access to the public, with amenities such as cafes, seating, and parking areas. Portions of the Harborwalk (on the east side of Fort Point Channel) also accommodate the South Bay Harbor Trail, which extends 3.5 miles from the Ruggles MBTA Station to Fan Pier.

Layover Facilities

The closest recreation area, park, or playground is at least 500 feet from the Widett Circle site. The study area includes the Union Park Street Playground (a city park), and the South Bay Harbor Bicycle Trail.

The Massachusetts Department of Conservation and Recreation (MassDCR) Neponset River Reservation adjoins the northeast corner of the Readville – Yard 2 site. The Fowl Meadow and Ponkapoag Bog Area of Critical Environmental Concern (ACEC) is located within the southern half of the study area, approximately 600 feet south of the layover facility site. Nearby publicly owned parks include MassDCR Moynihan Playground and two City parks, Iaccona/Readville Playground and Jeremiah Hurley Memorial Park. The Neponset River Greenway Corridor, also called the Neponset Extension bicycle trail, is an existing/proposed trail that follows the Neponset River and, in the study area, follows Truman Highway. When completed, it will stretch 15 miles from the Blue Hills to Boston Harbor, with connections planned to the Readville area and the Dedham Rail Trail.

3.16.2. Environmental Consequences

No Build Alternative

In the No Build Alternative there would be no impacts to parks and recreational areas. The Harborwalk would not be extended through Dorchester Avenue, and public pedestrian and bicycle access to the waterfront in this location would remain prohibited. Access to Rolling Bridge Park would remain limited.

[65] Rose Kennedy Greenway Conservancy. *Website viewed on September 7, 2016.* http://www.rosekennedygreenway.org

Build Alternative

South Station

The SSX project will not adversely impact any park and/or recreational sites. The conversion of Dorchester Avenue from a private road to a public right-of-way will provide significant benefits and recreational opportunities for the area. The roadway reconstruction will include a cycle track connecting two planned City of Boston bicycle infrastructure projects. In addition, the Harborwalk extension will complete one of the final links missing in the Downtown portion of the Harborwalk facility. Finally, the reopening of Dorchester Avenue will increase access and exposure to Rolling Bridge Park and will also increase public access to the Fort Point Channel.

Layover Facilities

No impacts to recreational areas are anticipated in the vicinity of the Widett Circle or Readville – Yard 2 sites.

3.16.3. Mitigation Measures

No mitigation related to parks and recreational areas is required or proposed at the South Station or layover facility sites.

3.17. Cultural Resources

This section presents an evaluation of the impact of the SSX project on historic architectural and archaeological resources in accordance with Section 106 of the National Historic Preservation Act as amended the Advisory Council on Historic Preservation's implementing regulations for Section 106 (36 CFR 800), and State Register Review procedures (950 CMR 71.00). Additional standards and guidance included *Public Planning and Environmental Review: Archaeology and Historic Preservation* (MHC 1985), and National Park Service's *Recovery of Scientific, Prehistoric, Historic, and Archaeological Data* (36 CFR Part 66 Appendix A).

Section 106 consultation among FRA and MassDOT, the MHC, Boston Landmarks Commission (BLC), and other interested parties consisted of the following:

- The establishment of the Areas of Potential Effects (APEs), defined as "the geographic area within which the undertaking may cause changes in the character of or use of historic properties if any such properties exist;"[66]
- The identification and evaluation of historic properties[67] within the APEs; and
- A determination of whether or not the project would have an adverse effect upon historic properties within the APEs.

[66] 36 CFR 800.16(d)

[67] An historic property is defined in 36 CFR 800.16(1) as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior."

Agency correspondence is provided in Appendix D. APEs were established for the three project sites (South Station, and the Widett Circle and Readville – Yard 2 layover facilities, as defined in Chapter 2) based on the potential of the SSX project to directly or indirectly affect aboveground historic properties, such as historic districts, buildings, objects, and structures, or belowground historic properties, consisting of archaeological sites. DEIR Appendix 13 – *Historic Architectural Resources Technical Report*[68] contains descriptions of the historic properties identified within the APEs. Following its review of the technical report, MHC concurred with the APEs and the identification of historic properties for the SSX project.[69]

3.17.1. Existing Conditions

South Station

Table 3-22 and Figures 3-10, 3-11, and 3-12 present the architectural properties within the SSX APE, their current historic designation, and determinations regarding NR eligibility.

There are no recorded archaeological sites within, and no archaeological sensitivity is assigned to, the South Station APE. The Project Team performed a Phase I Archaeological Reconnaissance Survey Technical Report (dated January 2014) that provided an archaeological sensitivity assessment for the project. The Project Team conducted the assessment under State Archaeologist's Permit Number 3397 issued on June 18, 2013. In a letter to FRA dated August 13, 2013, MHC concurred with the identification and evaluation findings presented in this report, which concluded that no recorded archaeological sites or sites of archaeological sensitivity were identified in the APE at the SSX project sites due to the filling and disturbances that have historically occurred at these urbanized sites.[70] In that letter, MHC concurred with the results of the archaeological reconnaissance survey that the majority of the project parcels possess low archaeological sensitivity and recommended no further archaeological survey for the project parcels.

[68] South Station Expansion, *Draft Environmental Impact Report, Appendix 13 (Part 1) – Phase I Archaeological Reconnaissance Technical Report.* October 2014.
South Station Expansion, *Draft Environmental Impact Report, Appendix 13 (Part 2) – Historic Architectural Resources Technical Report*. October 2014.

[69] Brona Simon, State Historic Preservation Officer, Massachusetts Historical Commission, *South Station Expansion Project, Summer Street & Atlantic Avenue, Boston (Downtown), MA; MHC #RC.53253. EEA No. 15028,* Correspondence to U.S. Department of Transportation, Federal Railroad Administration, August 13, 2014.

[70] Further information is presented in South Station Expansion Project, Draft Environmental Impact Report, Appendix 13 (Part 1), P*hase I Archaeological Reconnaissance Survey Technical Report*, October 2014.

Table 3-22 — Historic Resources within the SSX Areas of Potential Effects

Name	Historic Designation/Recommendation
SOUTH STATION APE	
Properties listed in the National and/or State Registers of Historic Places	
Fort Point Channel Historic District	Listed in National and State Registers
Leather District	Listed in National and State Registers
Russia Wharf Buildings	Listed in National and State Registers
South Station Headhouse	Listed in National and State Registers
Commercial Palace Historic District	Determined National Register Eligible by the Keeper of the Register Listed in State Register
Fort Point Channel Landmark District	Listed in State Register (Boston Landmark District)
Properties included in the Inventory of Historic and Archaeological Assets of the Commonwealth	
Chester Guild, Hide and Leather Machine Company	Determined National Register Eligible [a]
Chinatown District	Determined National Register Eligible [a]
Federal Reserve Bank of Boston	Determined National Register Eligible [a]
Kneeland Street Steam Heating Plant	Determined National Register Eligible [a]
South End Industrial Area	Determined National Register Eligible [a]
Keystone Building	Not evaluated – To be evaluated when building is 50 years old
Weld Building	Determined National Register Eligible [a]
USPS GMF/South Postal Annex	Determined Not National Register Eligible [a]
MBTA Operations Center Power Substation	Not evaluated – To be evaluated when building is 50 years old
245 Summer Street	Not evaluated – To be evaluated when building is 50 years old
Properties Not Previously Surveyed	
Gillette	Determined National Register Eligible [a]
READVILLE – YARD 2 APE	
Properties included in the Inventory of Historic and Archaeological Assets of the Commonwealth	
Readville Industrial Survey Area – Standard Oil Company Depot Complex	Determined Not National Register Eligible [a]
Readville Industrial Survey Area – Frank Kunkel & Son Hammered Forgings	Determined Not National Register Eligible [a]

[a] Consensus Determination of Eligibility between FRA and MHC
Source: South Station Expansion Project, *Historic Architectural Resources Technical Report*, March 2016 UPDATE.

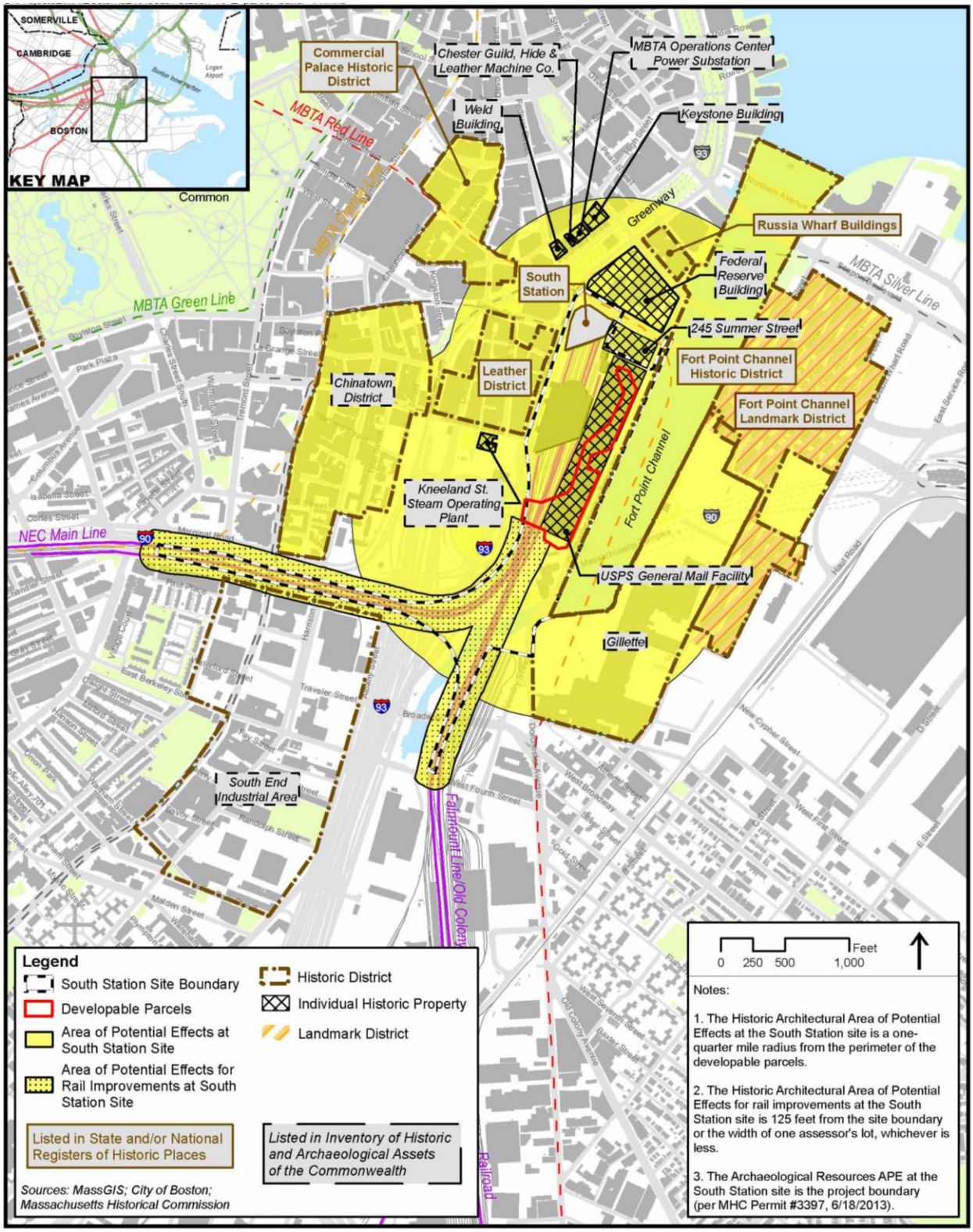

Figure 3-10 — South Station Historic Architectural Area of Potential Effects

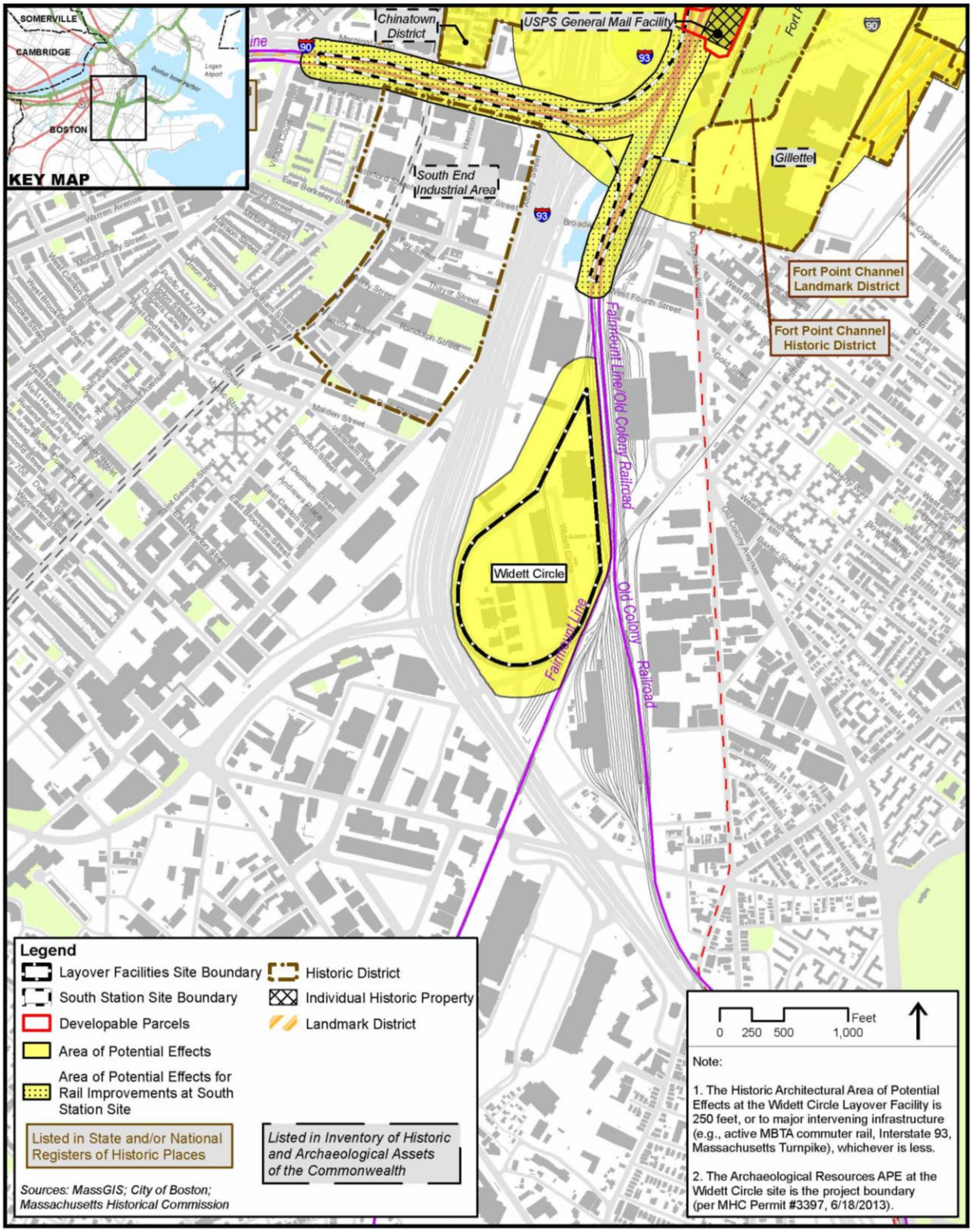

Figure 3-11 — Widett Circle Layover Facility Historic Architectural Area of Potential Effects

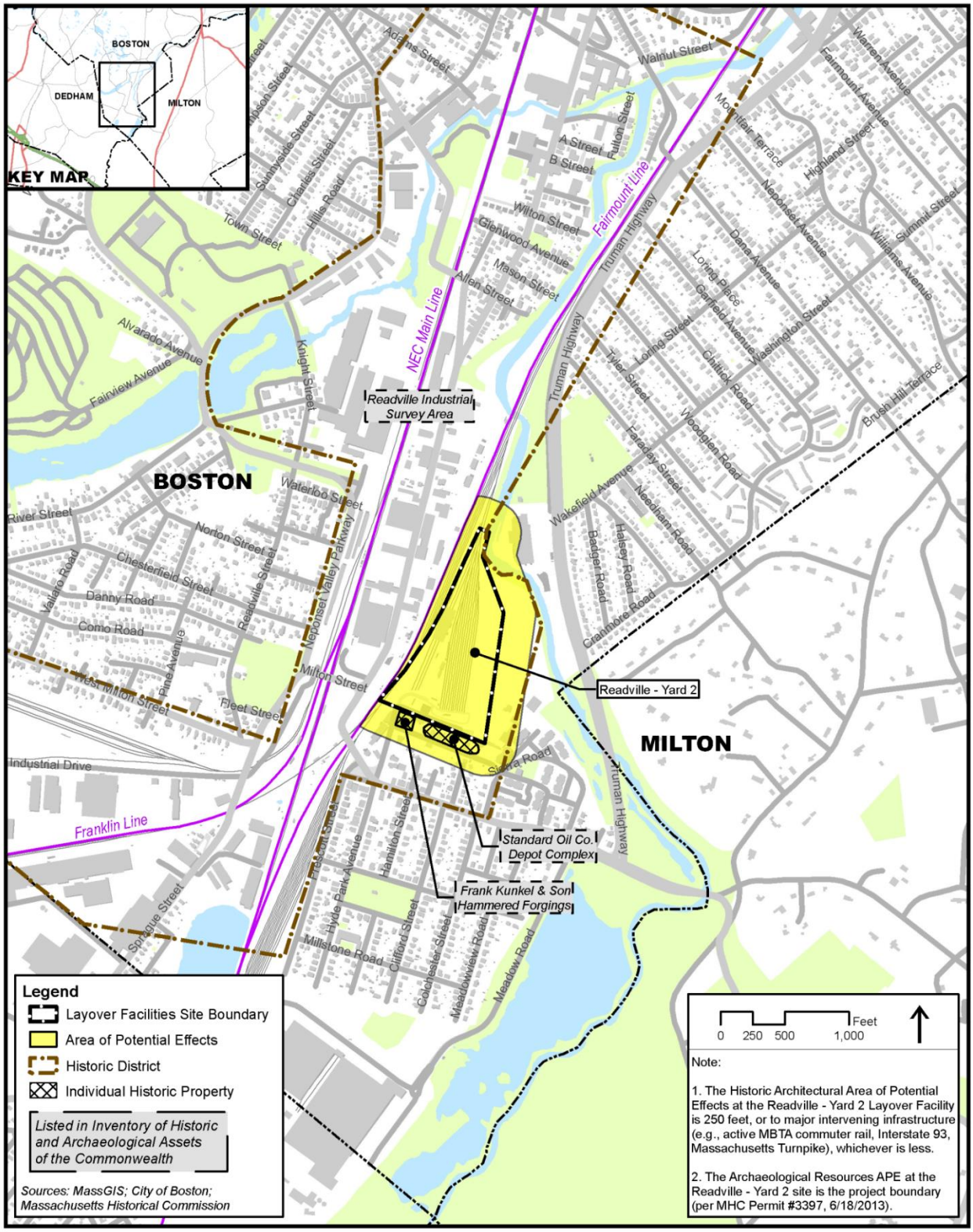

Figure 3-12 — Readville – Yard 2 Layover Facility Historic Architectural Area of Potential Effects

Layover Facilities

The identification and evaluation of historic properties concluded that there are no historic buildings or structures listed or eligible for inclusion in the National or State Register of Historic Places within the Widett Circle and Readville – Yard 2 layover facility sites. No archaeological sensitivity is assigned to either layover facility site.

3.17.2. Environmental Consequences

No Build Alternative

The No Build Alternative would have no visual impact on historic properties within the South Station, Widett Circle, or Readville – Yard 2 APEs. Noise and vibration from the No Build Alternative would be similar to the existing conditions.

Build Alternative

South Station

MassDOT assessed potential project impacts to historic properties within and in the vicinity of the South Station site relative to demolition activity, noise, vibration, visual, and historic rehabilitation impacts to historic properties as described below. At South Station, the project, implemented with noise mitigation and designed consistent with the Secretary of the Interior's Standards (SOI) for Rehabilitation. The new construction will be designed consistent with the SOI Standard 10 and guidelines for new construction: "New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment." [71]

Neither direct alteration nor temporary construction impacts to the South Station headhouse are anticipated as a result of the project. The USPS facility, which is located within the South Station APE would be demolished; however, FRA determined and MHC concurred that this property is not eligible for listing on the NR.

A moderate noise increase is expected east of the South Station Rail Terminal, including the National and State listed Fort Point Channel Historic District, due to the removal of the USPS facility along Dorchester Avenue. As mitigation, a noise barrier would be installed along the easternmost track on the Dorchester Avenue side of the station to minimize or eliminate adverse noise impacts to properties to the west of the station, including the Fort Point Channel Historic District. Train activity at South Station is not expected to result in any ground-borne noise inside the building.

The west side of Fort Point Channel along Dorchester Avenue adjacent to the USPS facility is not currently accessible to the public. The completion of the Harborwalk along Dorchester Avenue would allow public access and views within the Fort Point Channel Historic District across Fort Point Channel that are currently not available to the public.

[71] The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings. U.S. Department of the Interior, National Park Service, Heritage Preservation Services, Washington, DC. 1992

The project would have no adverse visual effect on views to or from historic properties within the South Station APE because the physical improvements of the station expansion would be consistent with the scale of the existing South Station headhouse. In addition, the aforementioned SOI guidelines for new construction will be followed.

The Fort Point Channel east and west seawalls are contributing structures to the Fort Point Channel Historic District. The SSX project includes raising an approximately 700-foot section of the east seawall along Dorchester Avenue by 1.5 feet to match the elevation of the adjacent east seawall to the north and south. MassDOT's proposal to raise the seawall is in response to recent projections of sea level rise of nearly two feet by the year 2050 and is necessary to help mitigate potential future flooding on the South Station site. The historic character of the seawall would be retained and preserved and the material, size, and configuration of the new 1.5-foot course of granite block would match the existing seawall. The seawall improvements would not introduce any elements that are out of character with the Fort Point Channel Historic District and would be designed to be consistent with the SOI Standards for Rehabilitation.

Layover Facilities

New construction at the two layover facility sites would include minimal vertical components; consequently, FRA does not anticipate noise, vibration, and visual impacts to historic properties within the APE. No recorded archaeological sites or archaeologically sensitive areas where undocumented sites would be expected were identified for the layover facility APEs. FRA does not anticipate the SSX project construction activities to have potential impacts on significant archaeological resources. No further archaeological investigations are recommended for the layover facility APEs.

3.17.3. Determination of Effect

FRA and MassDOT applied the Section 106 and MHC effect criteria (36 CFR 800.5 and 950 CMR 71.07(2)(b)) to determine if the project would have "no effect," "no adverse effect," or an "adverse effect" on historic properties located within the APE.

FRA determined that the SSX project would have a Conditional **No Adverse Effect** on historic properties, provided the following conditions are implemented during project design and construction:

- Implementation of a CMP/Noise Control Plan, including BMPs for noise and vibration control;
- Construction of a noise barrier at South Station;
- Rehabilitation of the Fort Point Channel seawall along Dorchester Avenue, consistent with the Secretary of the Interior's Standards for Rehabilitation; and
- MHC review of 30% and 60% design plans.

FRA anticipates the SHPO will concur with this finding, although this determination is not expected prior to publication of the draft EA. FRA will present the final determination in the final EA. Because impacts to archaeological resources are unlikely, no mitigation measures related to archaeological resources are proposed. To address the possibility of encountering previously undocumented archaeological resources during construction, an unanticipated discoveries plan would be prepared prior to construction.

3.18. Construction Period Impacts

This section describes the project's anticipated construction period impacts on rail services, transit, and pedestrians, and discusses construction sequencing and schedule.

3.18.1. Environmental Consequences

No Build Alternative

No construction related to the SSX project would take place in the No Build Alternative; therefore, there would be no construction period impacts.

Build Alternative

Air Quality

As detailed in DEIR Sections 6.3.1, Air Quality Impacts, and 6.4.2, Emissions Control Plan, temporary air quality impacts could result from construction activities associated with the project, including fugitive dust emissions, direct emissions from construction equipment, and increased emissions from motor vehicles on local streets due to traffic disruption. Fuel combustion would also cause GHG emissions. The anticipated temporary construction activity does not appear to be exceptional or atypical for this type of project. Due to the close proximity of construction activities to nearby businesses and other public areas, however, mitigation measures during construction would be required. The CMP would include an emissions control plan to address impacts of fugitive dust, construction equipment and vehicle exhaust, and any additional dust control considerations. The details of specific mitigation measures are included in the DEIR.[72]

Water Resources

The contractor would be required to implement Soil Erosion and Sediment Control measures prior to beginning construction, and maintain and/or replace these measures throughout construction as required by the controlling agency. These requirements are defined in section 767, Mulching, Seed for Erosion Control in MassDOT's *Supplemental Specifications to the 1988 English Standard Specifications for Highways and Bridges*, dated July 1, 2015. Additionally, the contractor would be required to follow the provisions set forth by the BWSC Stormwater Permit, and the MWRA 8(m) Permit. If groundwater is encountered during the construction activities, an MWRA Temporary Construction Site Dewatering Discharge Permit will be required pursuant to 360 CMR 10.091-10.094. Construction at all SSX project sites would require a NPDES Construction General Permit. The contractor would prepare a Stormwater Pollution Prevention Plan (SWPPP), as required by the NPDES Construction General Permit, that documents all of these efforts for construction prior to beginning any work. The SWPPP is to be approved by MassDOT and state and federal agencies prior to the commencement of work.

Noise and Vibration

The FTA construction noise criteria are based on an hourly Leq level of 90 dBA for residential receptors and 100 dBA for commercial/office receptors during daytime hours (7 a.m. and 10 p.m.), and 80 dBA for residential receptors during nighttime hours (10 p.m. to 7 a.m.). The City of Boston construction noise criteria are more stringent, and are based on the L10 noise metric (the noise level exceeded 10 percent of the time). The City of Boston L10 construction noise limits are 75 dBA for residential receptors and 80 dBA

[72] Massachusetts Department of Transportation, South Station Expansion Project, Draft Environmental Impact Report, Chapter 6 – *Construction*. October 2014. https://www.massdot.state.ma.us/southstationexpansion/Documents.aspx

for commercial/office receptors during daytime hours (7 a.m. to 6 p.m.), and measured baseline L10 + 5 dBA during evening and nighttime hours (6 p.m. to 7 a.m.). The results of the construction noise assessment are based on the more stringent City of Boston construction noise limits.

The results of the detailed construction noise assessment indicate that the highest construction noise levels in the South Station APE would occur during the demolition of the USPS facility and the construction of the headhouse. Because of the close proximity of the office building at 245 Summer Street to the construction activity, the construction noise levels at this location are expected to exceed the City of Boston construction noise limits during the demolition of the USPS facility, the construction of the headhouse, and the construction of the tracks and platforms. In addition to noise, vibration during the demolition of the USPS facility and the construction associated with the expansion of South Station is also a major concern at 245 Summer Street because of the vibration-sensitive computer equipment in the basement of the building. The construction noise levels at residential locations along Atlantic Avenue and the Fort Point Historic District are expected to exceed the City of Boston construction noise limit of 75 dBA if pile driving is required. Without pile driving, the construction noise levels at these residential locations would not exceed 75 dBA. If pile driving is required, the construction noise level would exceed the City of Boston construction noise limit of 80 dBA for commercial receptors such as the main South Station headhouse. Because of their distance from the demolition/construction activity at South Station, the residential locations along Atlantic Avenue and the Fort Point Historic District are not expected to exceed the FTA annoyance criterion of 72 VdB.

The construction noise levels for the Widett Circle layover facility would be below the City of Boston L10 construction noise limit of 75 dBA because of the distance (1,200 feet) to the nearest residential receptors along Albany Street from the Widett Circle construction activity. However, the construction noise levels at the Readville – Yard 2 layover facility would exceed the construction noise limit at the single-family residences along Wolcott Street and Wingate Road, and the apartment buildings on Riley Road and Sierra Road.

Based on the equipment anticipated to be used in the construction of the Widett Circle and Readville – Yard 2 layover facilities, vibration levels are expected to be below the building damage criterion of 100 VdB and the FTA human annoyance criterion of 72 VdB. At the Widett Circle layover facility, vibration levels during construction are expected to be below 50 VdB at the nearest sensitive receptors along Albany Street, and below 60 VdB at the nearest sensitive receptors at the Readville – Yard 2 layover facility.

Transportation

In the Build Alternative, construction activities would impact rail services, transit, and pedestrians. Any outages along the NEC would impact Amtrak operations and maintenance activities. Such outages could require overnight closures of South Station for Amtrak with use of Back Bay Station as a temporary replacement. Closures that would impact Amtrak's access to maintenance facilities would have to be planned in advance. Freight operations would not be impacted as freight operations are not in the construction vicinity. Construction associated with the South Station Bus Terminal connection would be coordinated to minimize any potential disruptions to bus service. Final construction staging/phasing would be determined as part of final design through discussions with MassDOT and project stakeholders.

Travel to and from the South Station project site for workers would be divided into on-site vehicles, off-site shuttles, and transit. For the South Station site, an analysis of the construction sequencing and the proposed work shows the total vehicles generated would average 280 single occupancy vehicles (SOVs) per work day. This was calculated by estimating the number of workers based on construction value for each major work element including track, layover, headhouse, and Dorchester Avenue construction and USPS

demolition. The project site can accommodate the projected necessary construction vehicles along Dorchester Avenue and areas outside of the building footprint during USPS demolition and South Station Terminal Expansion. Additional vehicles, if required, would be accommodated at offsite parking locations, where shuttles would be provided to minimize the construction-related traffic.

For the two layover sites, 205 vehicles at Widett Circle and 58 vehicles at Readville – Yard 2 are expected to be generated. Parking capacity is adequate at both locations; therefore, no additional shuttling would be required.

All three project construction areas can be fully enclosed without changes to existing pedestrian, bicycle and motor vehicle paths. Short term closures (typically a week or less) may occur for tie-in construction, and would require approved plans submitted by the contractor.

Land Use

Work at the layover facilities and within Dorchester Avenue and the USPS property could occur with minimal impact to abutting properties and railroad operations, subject to state, local and agency provisions.

Passenger use would not be affected during peak hours for the station. Disruptions would be largely minimized by completing utility connection work in non-public spaces, and utilizing non-revenue hours for public space connections. Once areas are no longer needed for construction activities, they would be returned to public use.

Public Health and Safety

The construction sites would be secured by fence enclosures that can also be closed completely during non-work hours. During work hours, workers on site would be required to carry proper identification and training cards. Visitors would be required to sign in at the construction entrance. Construction sites would maintain a security guard presence, as determined by state, local, and agency requirements.

Draft HASPs, as provided in FEIR Appendix C,[73] have been prepared outlining the safety and security resources, policies, practices, and procedures for South Station and the layover facilities. Final HASPs will be required to be prepared by each construction contractor to meet all applicable OSHA and U.S. EPA requirements. The contractor's HASP will include procedures for site inspections/audits, safety briefings/meetings, employee training, incident investigation/reporting. The plan will incorporate requirements for designated safety supervisor/contacts, emergency contact list, first aid facilities, protective equipment, housekeeping, and protection of public safety. During preliminary design, Hazardous Building Material Evaluations would be conducted at the SSX project sites to identify any recognized hazardous building materials, including lead-based paint, PCBs, universal wastes, and ACM. Response actions could be required prior to building demolition, including notifications to MassDEP and the Massachusetts Division of Occupational Safety (MassDOS). If asbestos, lead, or other hazardous/regulated materials are identified in any project buildings to be demolished, notification to the appropriate regulatory agency (U.S. EPA, MassDEP, or MassDOS) would be required. Construction activities at Readville – Yard 2 could require remediation activities in compliance with the MCP. Subsurface work in the proposed expansion areas would require the oversight of a LSP in conjunction with a Soil Management Plan.

[73] South Station Expansion. *Final Environmental Impact Report, Appendix C – Site Specific Health and Safety Plan*. June 2016. http://www.massdot.state.ma.us/southstationexpansion/Documents/FEIR.aspx

3.18.2. Mitigation Measures

Prior to the start of work, the SSX project contractors would develop a detailed CMP. The CMP would consist of a detailed plan to address construction period impacts to various environmental resources, and would address vehicular traffic, pedestrian and bicycle facilities, on-street parking, public access, emergency access to local businesses and residences, dust, noise, odor, rodents, and construction-related nuisance conditions. MassDOT would coordinate the development and review of the CMP with the City and emergency personnel to ensure that appropriate safety measures would be incorporated throughout construction.

Contract specifications would be developed to address potential sustainability and recycling initiatives, as well as requirements for monitoring and proper utilization of water in the construction process.

SSX project construction would also require the preparation of a Construction Waste Management Plan (CWMP). Solid waste would be generated as part of the SSX project, particularly related to demolition, excavation for utilities and foundations, and grading for Dorchester Avenue, the USPS GMF, station substructure components, and the layover facilities.

To mitigate construction noise, a temporary 18-foot high noise barrier would be installed between the construction site and the office building at 245 Summer Street. If pile driving is required during the construction of the headhouse, then a temporary noise barrier would be installed, or other noise mitigation measures would be implemented such as pre-auguring to reduce the amount of pile driving required, and selecting a pile driver with a smaller hammer and foot-pound force rating.

As with other major construction projects in the City of Boston, the contractor would be required to submit a CMP/Noise Control Plan to indicate the methods to mitigate construction noise levels, and to provide noise monitoring during construction to determine compliance with the City of Boston construction noise limits.

In addition to noise, vibration is also a major concern at 245 Summer Street, which has critical computer systems located in the basement of the building. Outdoor vibration measurements would be obtained at 245 Summer Street during construction to ensure that the vibration levels do not exceed the FTA vibration criterion of 65 VdB for buildings where low vibration levels are essential for interior operations. During pile driving activity, vibration levels would also be obtained inside the basement of 245 Summer Street to ensure that they do not exceed the specification limits of the computers.

3.18.3. Project Phasing and Schedule

Construction activities are generally categorized as rail, vertical construction, utility relocation and installation, and site and roadway development. The rail-related construction activities would be performed in close coordination with the operating railroads, including the MBTA and its commuter rail operator (Keolis), Amtrak, and CSX Transportation, Inc. (CSXT). Flagging (protection of trains and employees) and inspection services would be provided by the operating railroad for a given section of track. Other non-rail-related construction activities would be coordinated with the City of Boston, utility companies, and other public and private entities as appropriate. Staging/laydown locations are envisioned at Dorchester Avenue for South Station staging; within the limits of the Widett Circle site; and within the limits of the Readville – Yard 2 site.

The proposed construction sequencing would be as follows:

- Demolish the USPS facility;
- Reconstruct Dorchester Avenue and the Harborwalk;
- Construct South Station rail improvements (additional tracks and platforms, and reconstruct interlockings);
- Expand South Station Terminal; and
- Construct the rail layover facility sites.

To minimize impacts to rail services and passengers a construction phasing schedule would be utilized that balances and optimizes the duration and impact of overnight work windows, weekend work outages, and strategic track closures. As the project advances through preliminary design, MassDOT would coordinate with transportation providers and rail agencies to identify opportunities for strategic closures and alternatives for replacement services. MassDOT will also develop a communication plan for coordination with passengers, communities, and businesses potentially impacted by service disruptions. An example of a strategic track closure would be to shut down for a period of time the Old Colony Line coming into South Station and allow around-the-clock construction at South Station on tracks impacted by this route. Commuter rail passengers could be bused to South Station or transferred from the Old Colony Line at Braintree to the Red Line. This could allow the contractor an extended work window.

3.19. Indirect and Cumulative Impacts

Indirect impacts are defined as those impacts caused by an action that occur later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts are the effect on the environment that 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 actions. MassDOT conducted an indirect and cumulative impacts analysis for the SSX project and the results from this analysis are presented in detail in a technical memorandum that is appended to this EA as *Appendix B – Indirect and Cumulative Impacts* is provided below. Included below is a summary of that analysis.

3.19.1. Indirect Impacts

South Station

There would be positive indirect impacts on social and economic conditions related to enhanced accessibility for residents, workers, and tourists within and beyond the Downtown Boston area. By accommodating improved rail service frequency and reliability, the SSX project would support continued economic development and job and population growth. The reopening of Dorchester Avenue would provide another key link between South Boston and the Financial District and would relieve traffic congestion along Atlantic Avenue, but is not expected to result in substantial negative indirect impacts, as the area is already urbanized and heavily travelled.

Layover Facilities

The areas adjacent to both layover facilities are largely urban areas that currently support industrial uses and rail operations facilities and are not anticipated to experience substantial negative impacts. It is anticipated that these businesses would relocate to currently developed sites or properties in area

neighborhoods. Readville – Yard 2 is an active MBTA layover facility and the expansion is not expected to result in significant indirect impacts.

United States Postal Service

The primary indirect impact of the SSX project would be the relocation of the USPS facility from Dorchester Avenue to a new location. For the purposes of this indirect assessment, it is assumed that the USPS could be relocated to a site in South Boston on the Reserved Channel in Boston's Seaport District that the USPS had previously identified as potentially being appropriate to accommodate a relocated USPS GMF. The actual relocation would be subject to negotiations between the USPS and MassDOT/the Commonwealth of Massachusetts. The eventual relocation of the USPS GMF to any site would be subject to all applicable federal, state and local permitting and environmental review processes should it move forward.

The SSX project assumes the relocation of the USPS GMF to a specific location in South Boston to perform potential impact analysis and also assumes the existing facilities and operations would continue unchanged. Portions of the program that were assumed to conduct the impact assessment could be conveyed on an alternate location:

- USPS GMF facility totals approximately 1.4 million sq ft
- Approximately 1,000 total employees
- USPS GMF peak traffic times are: 6:00 AM – 7:00 AM (454 trips, including 100 USPS trucks) and 2:00 PM – 3:00 PM (389 trips, including 46 USPS trucks)

This analysis qualitatively discusses the potential impacts of the USPS GMF relocation to a site in South Boston on the Reserved Channel in Boston's Seaport District on traffic, the human environment, historic and archaeological resources, waterways and wetlands, floodplains, ecology, air quality, noise and vibration, and site contamination and hazardous materials. A summary of the analysis that is further detailed in Appendix B – Indirect and Cumulative Impacts below.

- **Traffic** – The relocation of the USPS facility would have a minor impact on the roadway network and would eliminate or substantially reduce the existing USPS trips that travel through the Financial District and the congested Dewey Square intersection at Atlantic Avenue and Summer Street.

- **Land Use** – Existing land use in the vicinity of the potential relocation site includes marine-based and general industrial and commercial uses. Recent development in the South Boston Waterfront/Innovation District has focused on mixed uses including residential, light industrial, office, and commercial projects. The potential relocation of the USPS GMF facility to this area would be compatible with the mixed uses and diverse types of industry in the area.

- **Environmental Justice** – There are only a small number of residences located in the vicinity of the potential USPS relocation site, and of those residences, none include EJ populations. No disproportionately high and adverse human health and environmental effects, including air quality, visual, social, and economic effects, are anticipated to impact EJ populations due to the relocation of the USPS GMF.

- **Visual** – The majority of the potential relocation site and the area surrounding the site are paved for surface parking and vehicle and materials storage. Therefore, no negative visual impacts are anticipated as a result of the potential USPS GMF relocation.

- **Historic and Archaeological** – A database review found that the potential USPS relocation site does not contain any archaeological sites that are listed in, or eligible to be listed in, the SR or the NR, and identified no historic properties within the project site.

- **Waterways and Wetlands** – The potential facility site is near, but not directly abutting, the Reserved Channel. Due to the distance from the potential site, no impacts to the surface waters of the channel are anticipated. The only WPA jurisdictional resource that would be affected at the site of the potential USPS relocation is LSCSF. There are no specific performance standards for LSCSF in the WPA; therefore, the potential USPS relocation site would meet all performance standards of the WPA.

- **Floodplains** – As indicated by FEMA Flood Insurance Rate Maps (FIRMs), a 100-year flood would inundate the northern portion of the potential relocation site via overland flooding from the Boston Inner Harbor main channel. A 500-year flood would further inundate the site via flood waters from the Reserved Channel. Results of the flood risks for Boston from a more detailed evaluation using the BH-FRM outputs published by MassDOT-FHWA[74] present a less severe outcome where minimal flood encroachment to portions of the north and northeastern areas of the relocation site would occur for both the 100-year and 500-year flood scenario.

- **Ecology** – There are no Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife present at the potential USPS relocation site and no federal or state endangered or threatened species are known to be present. No impacts to fisheries or other aquatic resources within the nearby Reserved Channel are anticipated.

- **Air Quality** – It is highly unlikely that emissions from the potential USPS relocation project would create a new violation of any of the National or Massachusetts Ambient Air Quality Standards; would increase the frequency or severity of any existing violations; or would delay the attainment of any National or Massachusetts Ambient Air Quality Standards. Construction-related activities could result in short-term impacts on ambient air quality.

- **Noise and Vibration** – No noise or vibration impact is expected from the operations at the potential new location for the USPS facility.

- **Site Contamination and Hazardous Materials** – Based on a database search, there are no instances of an historic release or threat of release into the environment within the boundaries of the Reserved Channel site.

3.19.2. Cumulative Impacts

The cumulative impact assessment considered both public transportation improvements and private developments. Public transportation improvements were identified through review of Amtrak Master Plans and state transportation plans. Private developments were identified from the BPDA's (formerly BRA) lists of reviews under Article 80. The complete listing of the projects considered can be found in Appendix B – *Indirect and Cumulative Impacts*.

[74] MassDOT-FHWA, *Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery*, June 2015.

With the SSX project, the proposed intercity and regional passenger rail improvements planned as part of FRA's NEC FUTURE program, as defined in Chapter 1, could be implemented, along with other south side commuter rail improvements planned by Amtrak/MBTA. The implementation of the SSX project would also allow the projected total buildout of the South Boston Waterfront/Innovation District projected and planned by the City of Boston. Both of these (NEC improvements and continuing development of the Boston Innovation District) represent substantial economic gains for the greater Northeast region, the City of Boston, and the nation as a whole. Beyond the South Boston waterfront, the projects with the largest potential cumulative land impacts include FRA's NEC FUTURE Program and the South Coast Rail projects. The South Coast Rail project involves restoring commuter rail service from South Station in Boston to the South Coast of Massachusetts. FRA is addressing impacts of their NEC FUTURE program through a tiered environmental review that includes preparation of a Tier 1 EIS. A FEIS/FEIR was prepared for South Coast Rail in August 2013.

The SSX project is critical to regional economic growth, as it supports both FRA's NEC FUTURE initiative and projected build-out occurring in the South Boston waterfront, the fastest growing urban area in the Commonwealth. The SSX project would improve Amtrak intercity passenger rail/MBTA commuter rail/transit ridership, reduce greenhouse gas emissions, and would not result in substantial impacts, beyond those associated with supporting the continued economic growth and expansion already occurring on the NEC and in the South Boston/Innovation District.