

BARNUM STATION

Environmental Impact Evaluation *Barnum Station Project*

State Project Number 0015-0373

January 2017

Bridgeport, Connecticut



Connecticut Department of Transportation

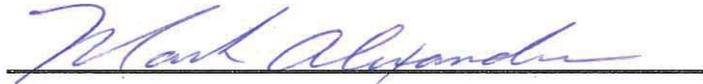
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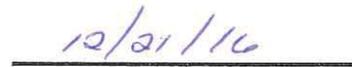
January 2017

Prepared pursuant to:

Connecticut General Statutes 22a-1a to 1h and
Regulations of Connecticut State Agencies 22a-1a-a through 12



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Date of Approval

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Executive Summary

ES.1 Introduction

This Environmental Impact Evaluation (EIE) has been prepared in accordance with the Connecticut Environmental Policy Act (CEPA) and its implementing regulations at Sections 22a-1a-1 through 12, inclusive of the regulations of Connecticut State Agencies. A Categorical Exclusion (CE) has also been prepared for the Proposed Project in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Federal Transit Administration's (FTA) implementing regulations. These regulations establish processes that require detailed environmental review for federally and state funded projects. They provide the public and federal, state, and local agencies with the assurance that the agencies have evaluated, addressed, and documented project-related environmental concerns.

The proponent of the proposed project is the City of Bridgeport, Connecticut, and the lead agency for this EIE is the Connecticut Department of Transportation (CTDOT). The FTA is the lead federal agency for the NEPA compliance.

The CEPA regulations require that an EIE be prepared for state actions that may have a significant impact on the environment. CTDOT is required to undertake an EIE for any project that involves the construction of a new rail facility per the Proposed Project's Environmental Classification Document (ECD) prepared under CEPA. The EIE enables the state agency proposing or funding a project to judge the appropriateness of proceeding with the action in light of its environmental impacts. For each state action covered by CEPA, the sponsoring agency must make a detailed written evaluation of its environmental impact before deciding to undertake or approve the action.

This EIE presents the environmental and engineering information necessary to satisfy the CEPA regulatory requirements. Technical information was collected and analyzed to support this EIE. Technical support documents were developed as necessary to support this project. These documents and the EIE are available upon request for public review at CTDOT and at the public libraries listed in Chapter 5. This EIE evaluates the social, economic, and natural environment consequences associated with a potential commuter rail station in East Bridgeport, Connecticut.

During the public comment period, the regulatory agencies, the public, and other interested parties are invited to provide comments on the technical analysis presented in the EIE. A public meeting will be conducted by CTDOT during the comment period to solicit comments from agencies and interested parties. All additional information and relevant comments will be evaluated and considered. At the conclusion of the EIE circulation period, CTDOT will develop a response to comments received on the EIE, and prepare a Record of Decision (ROD). The responses to comments and ROD will be made available to agencies and the public.

ES.2 Project Overview

The City of Bridgeport and CTDOT are evaluating a new commuter rail station along the New Haven Main Line (NHML) in East Bridgeport. The purpose of the Project is to enhance regional

access to and from East Bridgeport and support anticipated future growth. The proposed station would be located along Barnum Avenue between Seaview Avenue and Pembroke Street in East Bridgeport, on the site of the former Remington Arms factory. The scope of the project is to construct a new station that will include platforms, associated vertical circulation and access between platforms, parking, and station maintenance and control facilities that would be either incorporated into the cross-track access structures or housed in a stand-alone building north of the tracks. Currently, East Bridgeport suffers from a lack of convenient rail service, needed to sustain existing businesses and meet the area's future transportation demands. Due in large part to planning and financing efforts of the City of Bridgeport, significant development projects are underway or planned in East Bridgeport; the proposed station will support this growth.

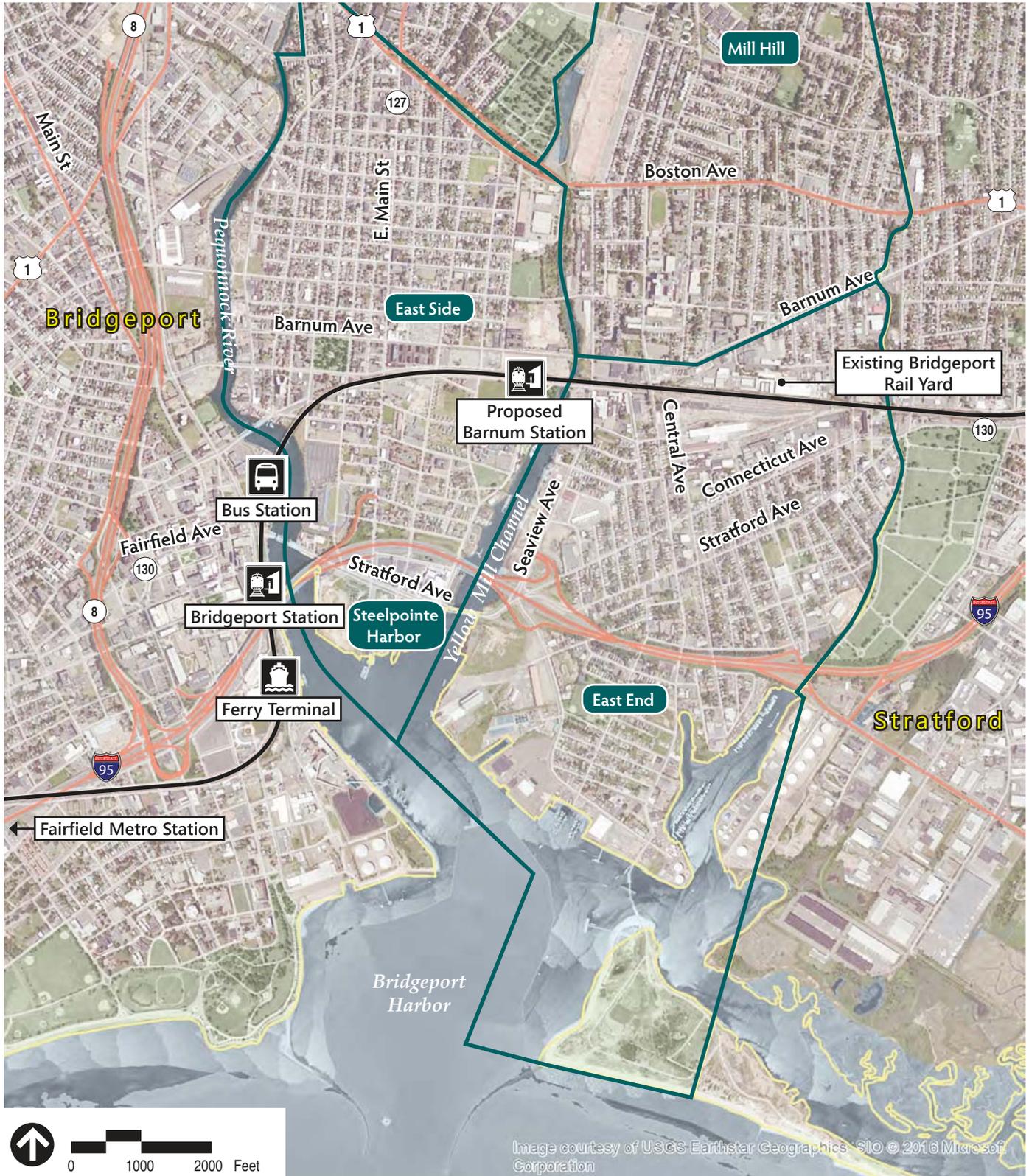
Figure ES-1 shows the proposed project location, and Figure ES-2 shows the existing Metro-North Railroad (MNR) commuter rail system.

ES.3 Purpose and Need

Chapter 2 of this EIE provides a review of the purpose of the Proposed Project and the need that it would meet. The purpose of the project is to construct a new commuter rail station to enhance regional access to and from East Bridgeport and to support anticipated future growth. Rail service in East Bridgeport would supplement the existing Bridgeport Station and complement planned transit-oriented development (TOD) in the area. The proposed project is anticipated to provide the following benefits:

- Enhance service flexibility by enabling express service and permitting two-track local and two-track express service on the mainline;
- Improve access to commuter rail for current and future residents of East Bridgeport;
- Enhance transit access to places of employment in East Bridgeport, including the Bridgeport Hospital and businesses in the Mill Hill, East Side, and East End neighborhoods;
- Support future TOD as envisioned in the *Bridgeport 2020 Master Plan of Conservation and Development* and the *BGreen 2020 Sustainability Plan*; and
- Meet state and regional transportation planning objectives.

A new commuter rail station is needed to support East Bridgeport employment opportunities and businesses, improve the capacity and efficiency of the Metro-North Railroad (MNR) and Shore Line East (SLE) service, and support anticipated growth in population and employment associated with planned TOD and growth initiatives. The need for a new commuter rail station is consistent with state, regional, and local planning objectives, including the State of Connecticut's *Let's Go CT!*, the Connecticut Metropolitan Council of Governments *Reconnect 1 Region*, and the city of Bridgeport's *BGreen 2020*. The station also realizes the city of Bridgeport's Barnum Station Feasibility Study, completed in 2013.



Source: ArcGIS Online Bing Aerial

- Municipal Boundary
- Neighborhood Boundary



Figure ES-1
Proposed Station Location

**Barnum Station
Bridgeport, Connecticut**



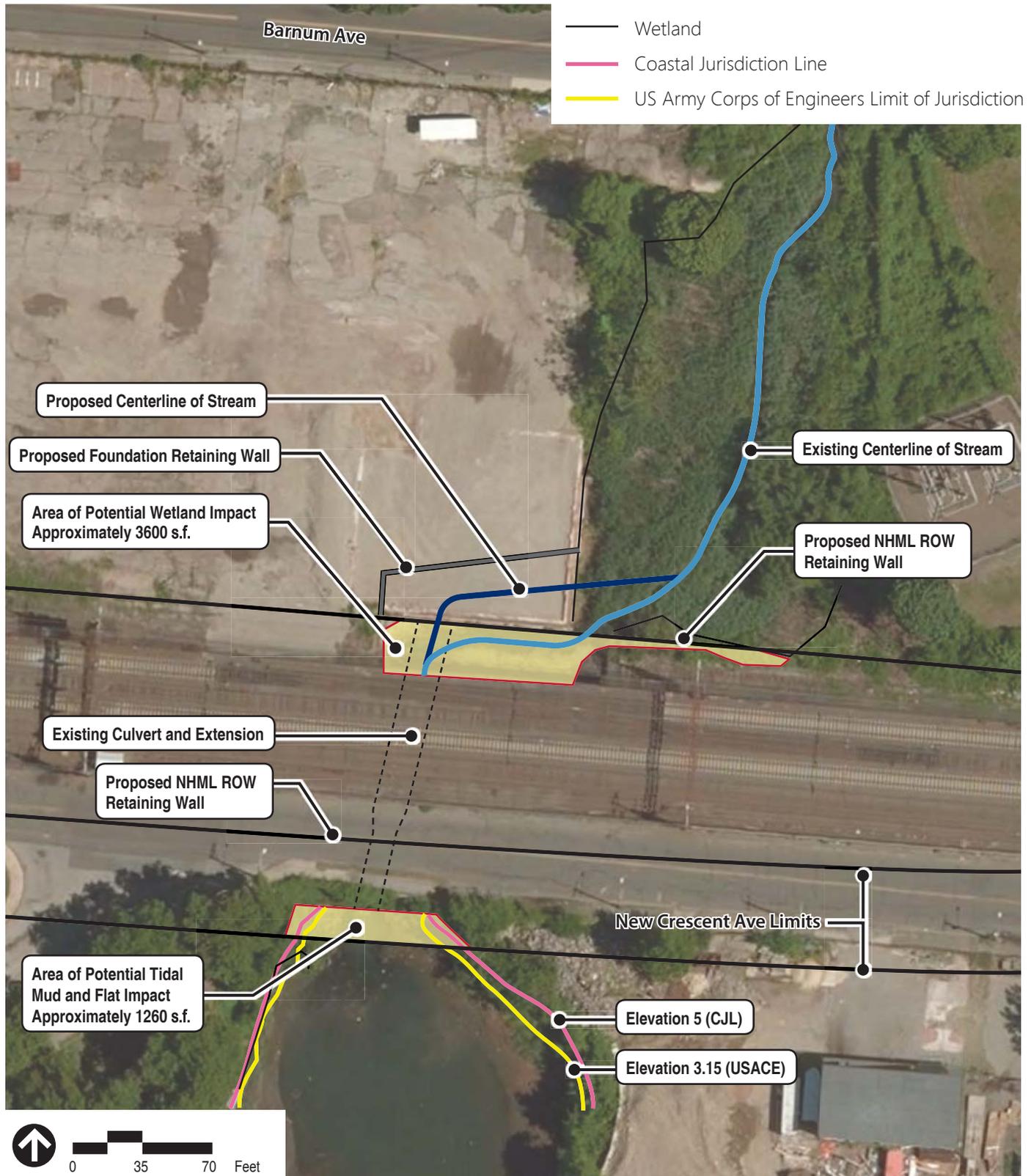
Source: MTA Metro-North Railroad



Figure ES-2
Metro-North Commuter Rail System

**Barnum Station
Bridgeport, Connecticut**

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Source: ArcGIS Online Bing Aerial



Figure ES-4
Proposed Project
Culvert Extension Impacts
**Barnum Station
Bridgeport, Connecticut**

ES.4 Project Description

Chapter 3 of this EIE provides a description of the Proposed Project. The northern portion of the proposed Barnum Station site is bordered by Barnum Avenue to the north, Hallett Street to the west and an unnamed stream to the east, beyond which lies Seaview Avenue. This area includes two separate parcels: a portion of the former Remington factory at 812 Barnum Avenue (7.26 acres currently owned by the city of Bridgeport) and the property located adjacent to the west at 965 East Washington Avenue (1.44 acres currently owned by Campus Office Park Associates). All of the former industrial buildings located on these parcels have been demolished. The southern portion of the proposed station site is located within the existing Crescent Avenue roadway, between Hallett Street and Waterview Avenue and extending from the railroad embankment to the southern curb line along Crescent Avenue. This area is approximately 1.0 acres in size. Along the NHML, the proposed station site is located between the west end of the East Bridgeport Rail Yard (EBRY) and the Pequonnock Bridge (PECK). Figure ES-3 shows a conceptual schematic of the proposed station configuration, and Figure ES-4 shows the section of the NHML and proposed station between Waterview Avenue and Seaview Avenue.

The proposed project consists of a dual island platform configuration, with platforms between NHML Tracks 1 and 3 and between Tracks 2 and 4. This configuration enables express rail service along the NHML by using Tracks 1 and 2 for express trains and Tracks 3 and 4 for local service. The proposed project will maintain full access to and from the west end of the EBRY. The platform lengths will support a 10-car trainset.

ES.5 Alternatives Considered

Chapter 3 of this EIE provides a review of the alternatives considered for this project. Two alternatives are evaluated in this EIE:

- No Action Alternative
- Proposed Project

Prior to the initiation of this project, the City of Bridgeport conducted an analysis of feasible sites for the proposed station. In identifying the site for the proposed station, CTDOT considered the following factors:

- Adjacency to the NHML right-of-way (ROW);
- Property availability/acquisition; and
- Meets the project purpose and need.

The City of Bridgeport determined that the proposed site at 812 Barnum Avenue was the only site feasible for the station due to its proximity to the NHML ROW, limited property acquisition, and ability to meet the purpose and need of the project.

The City of Bridgeport proposed the project and owns the former Remington Arms Facility site. As the sponsor, the City sought to identify a property along the NHML in East Bridgeport that was equally vacant and minimized property acquisition. The City of Bridgeport identified the site for the Proposed Project in the Barnum Station Feasibility Study, completed in 2013. This study analyzed a number of potential service and platform options through a series of screening criteria. This evaluation

considered track and platform geometric requirements and constraints, station configurations and concepts, NHML operational constraints, and the number of administrative, operational, and physical changes that would be required.

ES.6 Environmental Consequences and Mitigation

Chapter 4 of this EIE provides a detailed description of the environmental conditions and consequences of the Proposed Project and the No Action Alternative on transportation, air quality, noise and vibration, land use and zoning, socioeconomics, visual impacts and aesthetics, historic and archaeological resources, wetlands, water quality, coastal resources, hazardous materials, and safety and security. Chapter 4 also identifies measures to mitigate potential impacts.

CTDOT determined that certain environmental resources, or categories of potential environmental effect, are not present on the proposed project site or are not likely to be affected by constructing a new commuter rail station at the proposed site. The following environmental resources, or category of potential environmental effect, are not analyzed in the EIE because they are not present on site or would not be affected by construction:

- Coastal Barriers: The proposed project site is located at an inland non-tidal site and is not on a designated Coastal Barrier.
- Farmland Soils: There are no Prime, State, or Unique farmland soils present on the proposed project site.
- Relocations: Construction of the proposed project would require the relocation of one business north of the NHML ROW; it would not require the relocation of residents.
- Threatened and Endangered Species: Federal and state-listed protected species do not occur on or in the vicinity of the project site.¹
- Wild and Scenic Rivers: There are no federally designated Wild and Scenic Rivers in the vicinity of the Project.
- Wildlife: The proposed project site does not contain habitat for wildlife species. Constructing and operating a commuter rail station would not affect wildlife use of habitat for nesting, feeding, reproduction, overwintering, or migration.

Table ES-1 summarizes the potential environmental effects associated with the Proposed Project for each resource.

¹ In August 2016, an evaluation of the potential presence of red knots (*Calidris canuta rufa*) in the project area was completed. In a memorandum dated August 11, 2016, it was determined that it is unlikely that red knots use Yellow Mill Channel as a migratory stopover, and that the existing conditions supported a finding under Section 7 of the Endangered Species Act (ESA) of either "no effect" or "possible effect but no adverse effect" would result from the Proposed Project.

TABLE ES-1 PROPOSED PROJECT POTENTIAL ENVIRONMENTAL EFFECTS

Resource	Impact Summary	Potential Mitigation
Transportation	No intersections are expected to fail as a result of the Proposed Project when compared to the No Action conditions; no impacts to rail operations	Modify lane configurations; add additional signage; install one new traffic signal
Air Quality	No adverse effect	None required
Noise and Vibration	No noise or vibration impact	None required
Land Use and Zoning	One property acquisition and business relocation	None required
Socioeconomics and Environmental Justice	No disproportionate adverse effects	None required
Visual Impacts and Aesthetics	No adverse effect	None required
Historic and Archaeological Resources	Potential adverse impact to the historic NHML railroad ROW segment and contributing elements	Mitigation to be determined based on consultation with the Connecticut State Historic Preservation Office (CTSHPO) and historic resources stakeholders.
Wetlands and Floodplains	Approximately 3,600 square feet of wetland impact; approximately 7,190 square feet of floodplain (floodway, 1-percent annual chance, and 2-percent annual chance)	To be determined in coordination with Connecticut Department of Energy and Environmental Protection (CTDEEP) and U.S. Army Corps of Engineers (USACE)
Water Quality	Beneficial – would improve quality of runoff and reduce runoff rates	None required
Coastal Resources	Design to be consistent with coastal zone policies	None required
Hazardous Materials	Likely to encounter during construction	Pre-construction investigations would determine presence and/or extent of contamination; removal, transport, and disposal by licensed contractor
Safety and Security	Will be compliant with federal and state guidance; accessible by emergency vehicles	None required
Construction	Potential short-term impacts to traffic, rail operations, noise, air quality, water quality, hazardous materials and contaminated soils	Efficient Traffic Management Plan, noise, air quality, and water BMPs, Health and Safety Plan for hazardous materials.
Secondary and Cumulative	Potential to redevelop a previously-developed area; beneficial economic impacts	None required

ES.6.1 Transportation

The traffic analysis of the Proposed Project shows that the project would not cause significant changes in intersection levels of service (LOS) in the vicinity of the project when compared to the No Action Alternative; while several intersections LOS would degrade, this is largely attributable to background traffic growth that would occur regardless of whether the station is constructed. With limited mitigation consisting of one new traffic signal, lane restriping, and signage, the Proposed Project would have no effect on traffic conditions.

The Proposed Project would have no effect on bus transportation or other modes of public transportation. Greater Bridgeport Transit (GBT) has planned for growth in East Bridgeport and has

considered the construction of the station in future service planning. The area around the proposed station would continue to be served by GBT bus routes 1, 13, 15, and 23. The new station is anticipated to cause a small short-term drop in ridership at the existing Bridgeport Station at the 2021 year of opening; however, ridership at the Bridgeport Station is projected to recover and exceed current ridership by design year of 2040. The Proposed Project would enhance rail service and operational flexibility along the NHML by enabling two-track local express service and streamlining Amtrak and MNR operations.

ES.6.2 Air Quality

The results of the air quality analysis demonstrate that the highest carbon monoxide (CO) concentrations from the Proposed Project satisfy the State Implementation Plan (SIP) criteria. The CO concentrations for the Proposed Project under 2021 and 2040 conditions are below the National Ambient Air Quality Standards (NAAQS). For further information on the air quality analysis, see Chapter 4.

Federal regulations concerning the conformity of transportation projects developed, funded, or approved by the USDOT and by metropolitan planning organizations (MPOs) are contained in 40 CFR 93. The Proposed Project is properly programmed into the 2015 Statewide Transportation Improvement Program (STIP) and thus is accounted for in the State Implementation Plan (SIP). Since the project will not substantially affect diesel vehicle traffic and is properly programmed into the STIP, it is not a project of local air quality concern for PM under 40 CFR 93.123 (b) (1). The project will not cause or contribute to any new violation of any PM NAAQS in the area.

The construction of the Proposed Project will result in short-term, transient emissions of dust and emissions from construction equipment could affect air quality in the vicinity of either alternative during construction, but they are not expected to result in adverse air quality impacts.

ES.6.3 Noise and Vibration

The assessment of potential noise impacts shows that the existing noise levels in the project area range from 46 to 66 decibels (dBA) for Category 2 uses and 56 to 65 dBA for Category 3 uses (as defined in the FTA *Transit Noise and Vibration Impact Assessment Guidelines*, 2006). The Proposed Project would increase ambient future noise levels by one decibel or less as a result of changes in train and traffic patterns. Therefore, there would be no noise impact as a result of the Proposed Project.

The assessment of potential vibration impacts show that under the Proposed Project, future vibration levels would be below the absolute vibration criterion of 72 Vdb, so there would be no vibration impact and no need for mitigation.

During the construction period, the Proposed Project could result in temporary, short-term increases in noise and vibration from construction equipment.

ES.6.4 Land Use, Socioeconomics, and Environmental Justice

Due to the predominantly industrial nature of development in the immediate vicinity of the Proposed Project, no direct adverse impact is expected to community cohesion or access to any community resources or institutions. The Proposed Project is consistent with the existing surrounding land uses, and is consistent with city zoning. The availability of rail service in East Bridgeport would improve access to transportation options, support local businesses, and improve access to job opportunities in the region.

The Proposed Project would require acquisition of one property and would relocate the business currently operating on that parcel (a truck driving school). This business would likely be relocated elsewhere within East Bridgeport, and is not anticipated to impact local employment or economic conditions.

The Proposed Project is located adjacent to environmental justice populations. As the project is not expected to have an adverse effect on the surrounding community in terms of noise and vibration, land use, air quality, or otherwise, it would not have a disproportionate adverse effect on minority or low-income populations within the study area. The project would benefit local populations by enhancing access to the regional transportation system and supporting local businesses and employment. Outreach materials and public information for the Proposed Project would be made available in Spanish to accommodate foreign language populations.

ES.6.5 Visual Impacts and Aesthetics

There is no adverse visual impact associated with the Proposed Project. The proposed station would have a neutral or positive impact by redeveloping the currently vacant site and adding landscaping and lighting. If the station is constructed with pedestrian platform and cross-track access from under the NHML ROW, there would be no visual impacts to the site or surrounding area. If the station is constructed with a pedestrian overpass over the NHML ROW to provide pedestrian access to the platforms, this may have a visual impact. If the overpass access method is selected, it would be constructed in a manner visually consistent with other such pedestrian overpasses along the NHML in Connecticut (such as the overpass at Fairfield Station). The station may be visible from surrounding areas, but this visual impact is consistent with the industrial setting of the surrounding area.

ES.6.6 Historic and Archaeological Resources

The Proposed Project is anticipated to have an adverse effect on the historic linear district segment of the NHML within the Area of Potential Effect (APE) and contributing elements. Replacement and/or modification to the NHML historic retaining walls, bridges, and overhead catenary structures would constitute an adverse effect under Section 106. CTDOT and the City of Bridgeport will consult with the FTA, CTSHPO, and other stakeholders to develop appropriate mitigation measures to address the demolition and reconstruction of the retaining walls and bridges and replacement of the overhead catenary structures.

ES.6.7 Wetlands and Floodplains

The NHML ROW crosses a culvert that connects an unnamed freshwater stream to the Yellow Mill Channel through a culvert. The Proposed Project would impact approximately 3,600 square feet of vegetated wetland area. This impacted area is along the unnamed freshwater stream north of the NHML ROW immediately before entering a culvert that runs underneath the ROW. This narrow wetland area includes a man-made channel that runs between the NHML retaining wall and a foundation of a demolished building, and has little functional value. The majority of the impacted wetland area is not vegetated. As the design is finalized, CTDOT will determine what portion of the impacted wetland area is vegetated. This wetland impact would result from constructing the retaining walls to support the widened NHML ROW and the replaced and lengthened culvert connecting the unnamed stream to the Yellow Mill Channel.

The Proposed Project would impact approximately 1,260 square feet of tidal mud flat within Yellow Mill Channel, south of the NHML ROW and Crescent Avenue. The impact is a result of retaining walls

that would need to be constructed in order to shift Crescent Avenue to the south to accommodate the widened NHML ROW. As part of the widening, the culvert connecting the unnamed stream to the Yellow Mill Channel would be replaced and extended.

The Proposed Project would impact approximately 1,600 square feet of floodway, 1,590 square feet of floodplain in the 1-percent annual chance zone, and 4,000 square feet of floodplain in the 0.2- percent annual chance zone. These impacts would result from constructing a retaining wall parallel to the existing northern NHML ROW retaining wall to widen the ROW, and constructing a retaining wall south of Crescent Avenue to accommodate shifting Crescent Avenue to the south.

Wetland impacts of the Proposed Project would require permitting under the Connecticut Inland Wetlands and Watercourses Act and under Section 404 of the federal Clean Water Act. CTDOT will adopt appropriate compensatory mitigation measures for wetland and floodplain impacts.

ES.6.8 Water Quality

The Proposed Project would convert formerly developed, currently vacant land into the station parking lot and facilities. Construction would decrease the impervious surface and stormwater runoff, because the amount of landscaped area would increase.

Stormwater originating from the project site would be captured, controlled, and treated prior to discharge. Effects of the Proposed Action would be beneficial because it would reduce the rate of discharge, and because the storm drainage system would be designed to improve stormwater quality in conformance with appropriate manuals and guidance documents.

The Proposed Project could result in temporary, short term discharge of silts and sediment to surface waters during the construction process. Indirect and secondary impacts potentially include impacts to water quality in the Yellow Mill Channel as a result of increased contaminants or suspended solids in stormwater runoff. Appropriate best management practices (BMPs) including sediment controls and treatment technologies would be implemented in the design and construction of the station to avoid and minimize any potential impacts. Actual impacts will be determined during final design when the final footprint of the station and stormwater management features are designed. A Stormwater Pollution Prevention Plan (SWPPP) would be developed in accordance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit required for the project.

ES.6.9 Coastal Resources

The site is located within the Coastal Area. The proposed station is consistent with the policies and procedures of the Coastal Management Act and will not result in adverse impacts to characteristics and functions of resources, coastal flooding, coastal water circulation patterns, drainage patterns, patterns of shoreline erosion and accretion, visual quality, water quality, or to wildlife, finfish, or shellfish habitat.

ES.6.10 Hazardous Materials

The Proposed Project would not result in the release of hazardous materials; however, it is likely that CTDOT would encounter hazardous materials during construction due to the former industrial uses of the site. Subsurface investigations would be conducted prior to ground disturbance or demolition of the NHML ROW retaining walls and bridges. As there is no building demolition proposed, there is no potential for exposure to asbestos-containing materials, lead based paint, Polychlorinated Biphenyls (PCBs), or mercury-containing equipment present in structures. A Phase II Environmental Site Assessment (ESA) would include collecting and analyzing soil and groundwater samples in areas of

concern for analysis of constituents of concern (such as oil or other hazardous materials). Any contaminated media would be compared to the CTDEEP Remediation Standard Regulations (RSRs) for regulatory compliance. Impacted soils generated as a result of construction activities will be identified, excavated, and transported off site by a licensed hauler to a licensed disposal facility. Impacted groundwater generated from construction activities will be evaluated for treatment or disposal options in accordance with the standing Memorandum of Understanding (MOU) between the city of Bridgeport and Dupont.

ES.6.11 Energy

The Proposed Project would not result in impacts to energy utilities in the vicinity of the project site. CTDOT would work with energy utility distributors United Illuminating Company and Southern Connecticut Gas prior to construction to identify and coordinate any utility relocations that may be required.

ES.6.12 Safety and Security

The Proposed Project would be constructed in a manner consistent with federal and state safety and security requirements. Based on the site location and distances from emergency services, the site would be adequately served by public emergency vehicles, police, fire, and hospitals. Chapter 4 provides further discussion of the site distances from various emergency services. During construction, emergency services would be considered developing the Traffic Management Plan (TMP) and Health and Safety Plan (HASP). The Proposed Project would improve the safety and security of the currently vacant site, enhancing pedestrian and cyclist safety through well-defined spaces and improved lighting.

ES.6.13 Cumulative and Secondary Impacts

Secondary impacts are defined as the impact on the environment of actions that occur as a result of the proposed action, but at a different location or different time. The Proposed Project would benefit existing residents and businesses in the area, and is needed to support already planned future development in the area. Given the city of Bridgeport's focus on encouraging investment and development in East Bridgeport, development in this area is likely to occur, and the Proposed Project would support this future growth.

Cumulative impacts are defined as the combination of the Proposed Project's impacts with impacts from other past, current, and reasonably foreseeable projects. The analysis provided in Chapter 4 shows that the Proposed Project would not result in a serious deterioration of environmental, social, or economic conditions. It would provide benefits to the region by increasing access to rail and supporting current and future development.

ES.6.14 Summary

With mitigation measures in place, no significant adverse impacts are expected to result from the Proposed Project. The Proposed Project is expected to have an adverse impact on the historic MNR railroad because it requires demolishing and reconstructing the historic retaining walls, bridges and catenary structures in order to widen the railroad ROW; however, CTDOT will work with FTA, CTSHPO, and historic resources stakeholders to develop appropriate measures to mitigate this impact.

ES.7 Public Involvement

On May 24, 2016, the City of Bridgeport held an informational meeting to discuss the Barnum Station TOD Structural Evaluation and Adaptive Reuse Study and the Barnum Station Project. This meeting provided general information about the two projects and explained the differences between them. An additional informational meeting was held on October 13, 2016 to provide further information on these projects. A website was created that provides links to information on the Proposed Project and the Barnum Station TOD Study: <http://www.barnumstation.com/>.

CTDOT posted a public scoping notice for this EIE in the Connecticut Council on Environmental Quality (CEQ) Environmental Monitor on August 2, 2016. Following the release of the EIE for public review, CTDOT will hold a public meeting in Bridgeport during the public comment period to seek feedback regarding the Proposed Project. This public meeting is currently scheduled for January 25, 2017, and will be publicly advertised in English and Spanish through websites, newsprint, and email. A public informational meeting, where residents can ask questions of CTDOT officials, will be held during the development of the final design plans.

The City and CTDOT will develop and implement an outreach program during the construction period to keep the public informed about construction status and schedule, and to provide a mechanism for CTDOT to receive and respond to construction questions from the public. The outreach program will include coordination with the Saints Cyril and Methodius Slovakia Roman Catholic Church, located adjacent to the project site.

A notice of availability for this EIE was published in the Connecticut CEQ Environmental Monitor on January 3, 2017. The EIE has been posted to the project website listed above for public review during the public comment period. The public comment review period is 45 days, and closes on February 17, 2017. The document is also physically available for public inspection at locations identified in Chapter 5, *Distribution*.

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1 Introduction

1.1 Overview

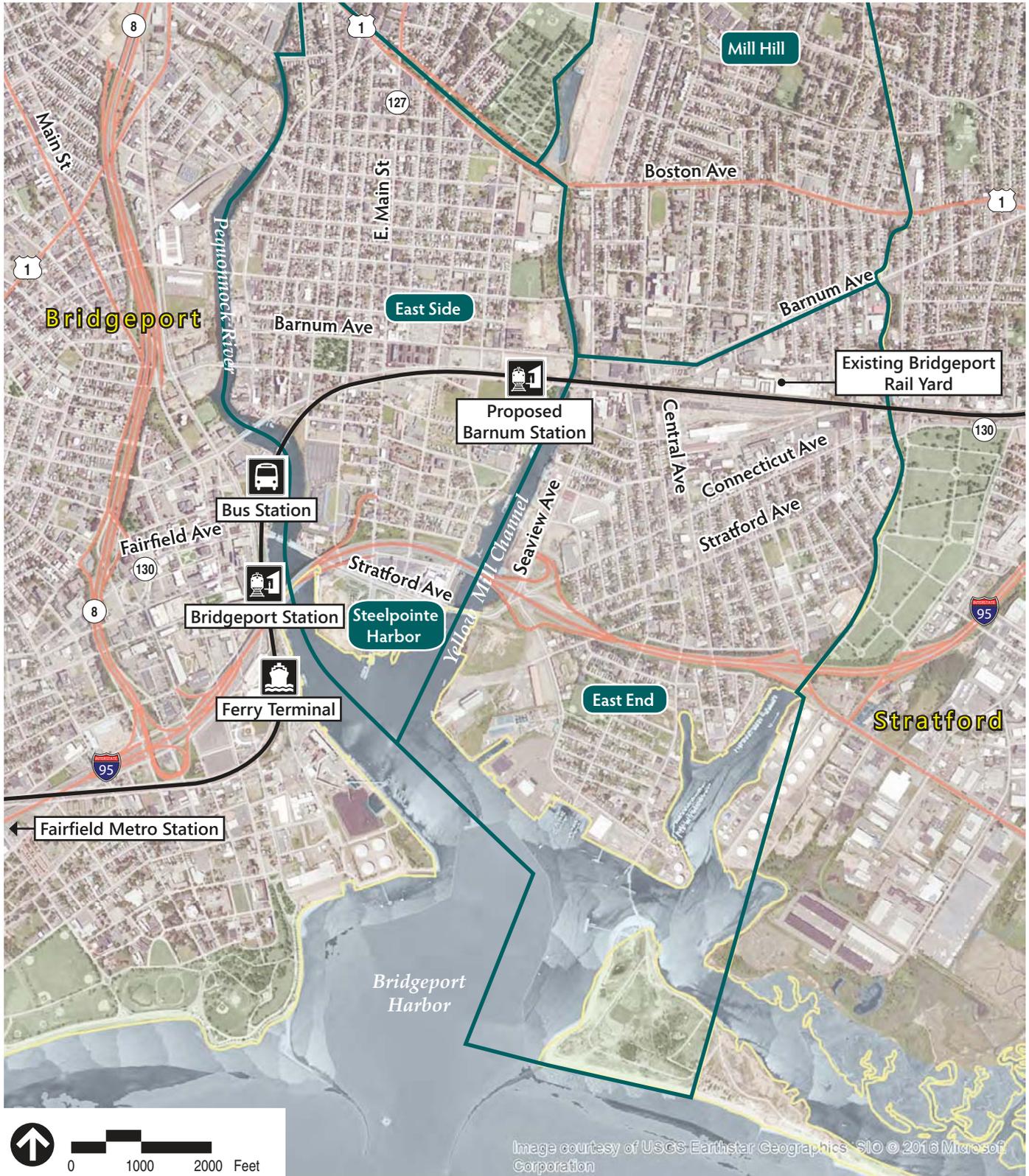
The Connecticut Department of Transportation (CTDOT) has recognized the need to develop a new commuter rail station along the New Haven Main Line (NHML) in Bridgeport. In Connecticut the NHML is owned by CTDOT and is operated and maintained for CTDOT by Metro-North Railroad (MNR). The Proposed Action is to construct a new commuter rail station consisting of platforms, cross-track access, and a surface parking lot. The action is needed to provide additional access to the NHML commuter rail service in East Bridgeport, support the opportunity for NHML express service, and support future development in the area. The commuter rail station was identified in the *Barnum Station Feasibility Study*, completed in 2013 by the city of Bridgeport and the Greater Bridgeport Regional Council (now the Connecticut Metropolitan Council of Governments [MetroCOG]). The city of Bridgeport and the community of East Bridgeport support the construction of a commuter rail station.

CTDOT has prepared this Environmental Impact Evaluation (EIE) in accordance with the Connecticut Environmental Policy Act (CEPA) and its implementing regulations at Sections 22a-1a-1 through 12, inclusive of the regulations of Connecticut State Agencies. The CEPA regulations require that an EIE be prepared for state actions that may have a significant impact on the environment. CTDOT is required to undertake an EIE for any project that involves the construction of a new rail facility per the Proposed Project's Environmental Classification Document (ECD) prepared under CEPA. The EIE enables the state agency proposing or funding a project to judge the appropriateness of proceeding with the action in light of its environmental impacts. For each state action covered by CEPA, the sponsoring agency must make a detailed written evaluation of its environmental impact before deciding to undertake or approve the action. This EIE presents the environmental and engineering information necessary to satisfy the CEPA regulatory requirements for the proposed station.

A Categorical Exclusion (CE) has also been prepared for the Proposed Project in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Federal Transit Administration's implementing regulations. The EIE and CE examine the potential environmental effects of the proposed station. The City of Bridgeport is the project proponent, the CTDOT is the lead agency for the EIE, and the Federal Transit Administration (FTA) is the lead agency for the CE.

1.2 Project Location

Located along Barnum Avenue in East Bridgeport, the proposed station would be constructed on the site of the former Remington Arms Facility. Figure 1-1 shows the location of the proposed station. Shown in Figure 1-2, the station site is bounded by Hallett Street to the west, Barnum Avenue to the north, an unnamed stream to the east, and Crescent Avenue to the south. The project site extends along the rail ROW beyond Pembroke Street on the west and Seaview Avenue on the east to accommodate the track work and bridge reconstruction that would be required within the ROW. The station site is located approximately one mile north of the Interstate I-95 interchange Exit 29.



Source: ArcGIS Online Bing Aerial

- Municipal Boundary
- Neighborhood Boundary



Figure 1-1
Proposed Station Location

**Barnum Station
Bridgeport, Connecticut**

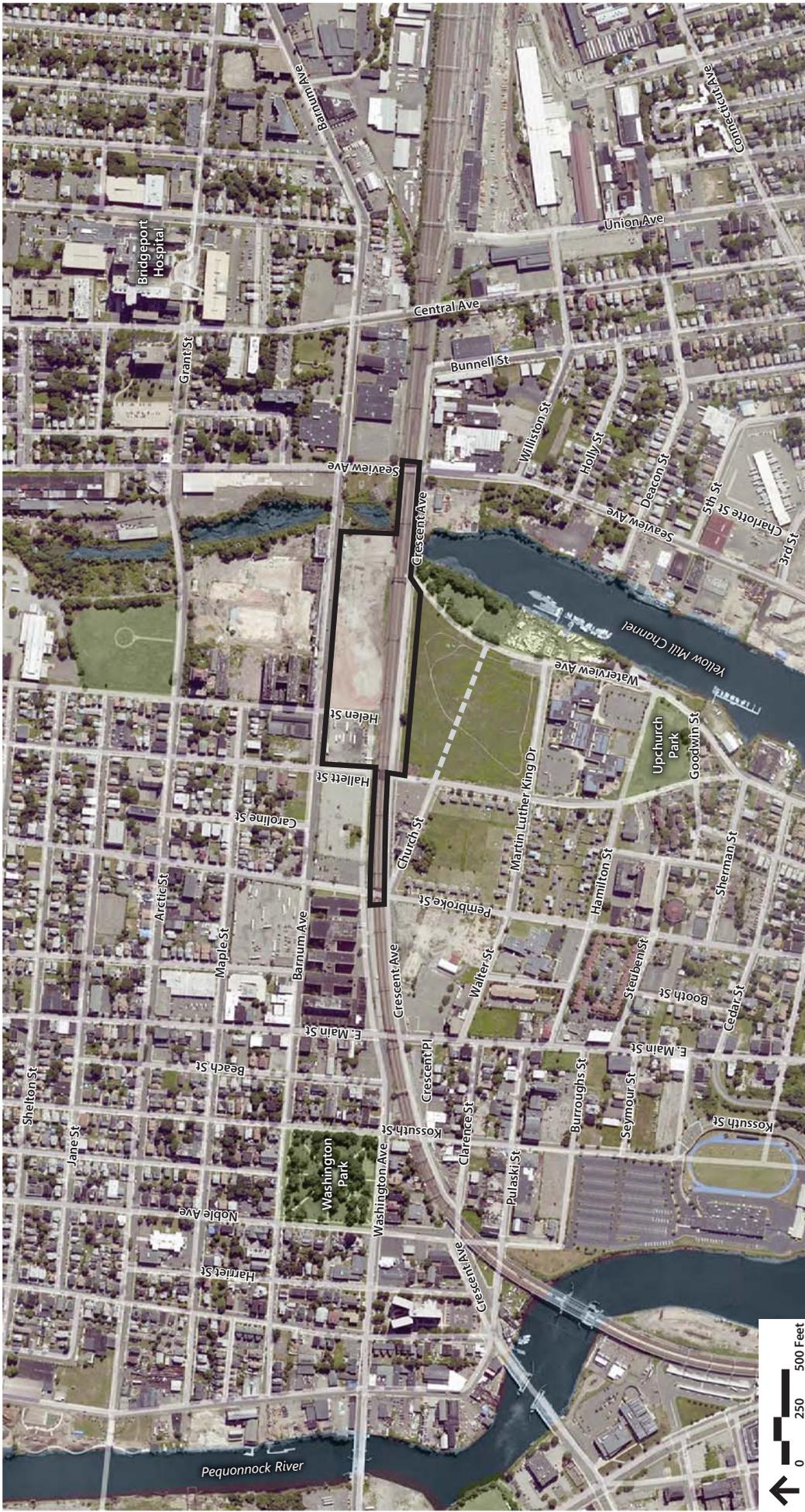


Figure 1-2
Project Site

**Barnum Station
Bridgeport, Connecticut**

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The project site is comprised of former industrial properties located in a predominantly urban setting. The existing NHML right-of-way (ROW) bisects the station site and is elevated relative to nearby properties. The portion of the NHML ROW needed to accommodate the station platforms, cross-track access, and station egress areas is generally located between the Pembroke Street bridge and the Yellow Mill Channel culvert. In order to accommodate the platforms, the NHML ROW would be widened, requiring construction within the railroad ROW running from the Seaview Avenue bridge to the Pembroke Street bridge, and within the Crescent Avenue ROW from Hallett Street to Seaview Avenue (Figure 1-2).

For the purposes of this EIE, the Barnum Station site consists of a large area north of the railroad ROW, and a small strip of property south of the railroad ROW.

- The station area north of the railroad consists of two separate parcels: a portion of the former Remington factory at 812 Barnum Avenue (7.26 acres currently owned by the city of Bridgeport) and the property located adjacent to the west at 965 East Washington Avenue (1.44 acres currently owned by Campus Office Park Associates). All of the former industrial buildings located on these parcels have been demolished. The parking lot located on the former Remington factory site was installed in the mid-20th century and is currently in deteriorated condition. The 965 East Washington Avenue site is currently improved with a comparatively newer asphalt parking lot and construction trailer.
- The station area south of the railroad is currently located within the Crescent Avenue roadway, situated between Hallett Street and Waterview Avenue and extending from the railroad embankment to the southern curb line along Crescent Avenue. This area is approximately 1.0 acres in size.

Along the NHML, the proposed station site is located between the west end of the East Bridgeport Rail Yard (EBRY) and the long track curve that starts near Hallett Street. Further west, the NHML crosses the Pequonnock River drawbridge and sweeps into an existing commuter rail station in downtown Bridgeport. The existing Bridgeport Station rail station and adjacent Bridgeport Intermodal Center on Water Street are approximately one mile from the proposed Barnum Station site. The Bridgeport Station includes an interior waiting area and convenience store, and the Intermodal Center includes an interior waiting area for bus riders, ticketing and information offices, bathrooms, and a coffee shop.

The NHML tracks are also used to support Amtrak Northeast Corridor Regional and Acela passenger services as well as SLE passenger trains operating between New London and Stamford, CT. CSX Transportation (CSXT) provides freight rail service to area businesses and warehouses located along the NHML.

1.3 Consistency with Planning Studies

The City of Bridgeport and State of Connecticut have considered the possibility of constructing a second commuter rail station in the city for several years. The following sections briefly describe the previous studies, including the Barnum Feasibility Study (2013), Let's GO CT! (2015), Reconnect 1 Region (2015), and BGreen 2020 (2015), that these entities and their partners prepared in association with the proposed project. These studies are discussed further in Section 2.5, *State and Regional Objectives*.

1.3.1 Conservation and Development Policies: The Plan for Connecticut (2013-2018)

The *Conservation and Development Policies: The Plan for Connecticut*, was adopted in May 2013. The plan is structured around six growth management principles that are intended to guide development within the state. Two of these management principles apply to the Proposed Project:

- Growth Management Principle 1 – Redevelop and Revitalize Regional Centers and Areas with Existing or Currently Planned Physical Infrastructure. This principle is a directive to prioritize development in areas that have historically been centers of activity through redevelopment, adaptive reuse, and brownfield development. The Proposed Project is proposed on a vacant and underutilized former industrial property in the vicinity of several major redevelopment projects that include residential, commercial, and mixed uses.
- Growth Management Principle 3 – Concentrate Development around Transportation Nodes and Along Major Transportation Corridors to Support the Viability of Transportation Options. This principle recognizes the critical role that transportation hubs have in providing residents with access to jobs, education, recreation, and daily activities. The Proposed Project would serve as a transportation hub for the residents and businesses of East Bridgeport. The city is currently conducting a planning study for transit-oriented development adjacent to the proposed station.

Connecticut General Statutes (CGS) Section 16a-31 requires agencies to be consistent with the Connecticut Conservation and Development Plan whenever they undertake an action to acquire, develop, or improve real property with an expense greater than \$200,000. The Proposed Project would be considered a “growth-related project” as defined in CGS 16a-35c(a)(2) as “the acquisition of public transportation equipment or facilities,” and is therefore subject to application of the Locational Guide Map (LGM). The LGM is intended to help agencies assess the consistency of their actions with the Conservation and Development Plan, and applies only to “growth-related projects.” According to the LGM, the Proposed Project site is located within three Priority Funding Areas:

- Urban Area – Designation as an Urban Area or Urban Cluster in the 2010 Census
- Water – Existing or planned water service from an adopted Public Drinking Water Supply Plan
- Sewer – Existing or planned sewer service from an adopted Wastewater Facility Plan

The Proposed Project site is partially located within a Conservation Area due to the proximity to the unnamed stream and associated 1 percent annual chance (100-year) Flood Zone.

CTDOT determined that the Proposed Project is a “growth-related project”, that it is located within three Priority Funding Areas according to the LGM, and that it is consistent with the municipal plan of conservation and development, *Bridgeport 2020: A Vision for the Future*. Therefore the Proposed Project is consistent with the *Connecticut Conservation and Development Plan* and may proceed without further consideration of the Locational Guide Map in accordance with CGS Chapter 297a.

1.3.2 Barnum Feasibility Study (2013)

The City of Bridgeport, in conjunction with the Greater Bridgeport Regional Council (GBRC) (now operating as MetroCOG), became a partner in the New York-Connecticut Sustainable Communities Consortium with a goal of developing livable communities with mixed-income housing and employment at key transit nodes. In 2013, the City and GBRC finalized a Feasibility Study to determine whether constructing and operating a second train station in the city is physically and operationally possible and compatible with the existing MNR, CTDOT Shoreline East and Amtrak service, as well as to

assess the redevelopment opportunities on adjacent parcels.

Results of the analysis indicated that it is feasible to construct and operate a new commuter rail station on the site of the former Remington factory. Further, the Feasibility Study showed that such a station would support future redevelopment and revitalization in East Bridgeport.

1.3.3 Let's GO CT! (2015)

Let's GO CT! is an initiative of Connecticut Governor Dannel P. Malloy that outlines a series of transportation investments across the state with the purpose of improving safety, reliability, and responsiveness. Accompanying this effort was a 5-year ramp-up plan that detailed the existing condition of the transportation system in the state and initial steps to implement the plan. The Proposed Project is included as a specific action under the initiative.

1.3.4 Reconnect 1 Region (2015)

Reconnect 1 Region is a comprehensive plan for development and policy intended to guide land use, housing, transportation, infrastructure, economic development, and sustainability. MetroCOG, in coordination with member cities, developed this comprehensive plan that adopts a series of regional goals for integrating land use and transportation decisions and serves as the long-term planning framework for the Greater Bridgeport Region. The Proposed Project would contribute to the region's progress in meeting several of these goals.

1.3.5 BGreen 2020 (2010)

BGreen 2020, which the City of Bridgeport developed in coordination with the Bridgeport Regional Business Council in 2010, outlines a ten-year strategic sustainability plan for the city. The plan emphasizes public transit investment as a means to improve the quality of life, social equity, and economic competitiveness of the city. The plan includes construction of a station in East Bridgeport.

1.4 Purpose of this EIE

This EIE considers the impacts and benefits of the Proposed Project and the No Action Alternative. It has been prepared in accordance with CEPA and its implementing regulations at Sections 22a-1a-1 through 12, inclusive of the Regulations of Connecticut State Agencies. CTDOT is the sponsoring agency for this EIE. For each state action covered by CEPA, the sponsoring agency must make a detailed written evaluation of its environmental impact before deciding to undertake or approve the action. Before preparing an EIE, the sponsoring agency must post a public scoping notice in order to gather relevant information and comment from other state agencies and the public. CTDOT posted a public scoping notice for the proposed project on August 2, 2016. The sponsoring agency must consider any comments received and evaluate any substantive issues raised in response to the public scoping notice in the EIE. The EIE must include:

- A description of the proposed action;
- A statement of its purpose and need;
- A description of the environment of the area which would be affected by the proposed action as it currently exists;
- A description and analysis of the reasonable alternatives of the proposed action;

- A discussion of the potential environmental impact of the proposed action; and
- Mitigation measures to reduce or eliminate the impact.

The objective of this EIE is to fully evaluate the environmental, economic, and social issues associated with the proposed project. Following the public review and comment on this EIE, CTDOT will receive and respond to comments and prepare a Record of Decision (ROD).

NEPA regulations establish a framework for agencies to determine the level of environmental review required: an Environmental Impact Statement, an Environmental Assessment, or a Categorical Exclusion. The FTA is the sponsoring federal agency, and has determined that the proposed project may be evaluated as a CE¹ based on several preliminary environmental studies completed on the potential environmental effects of the proposed project. A CE has also been prepared for the proposed project in accordance with NEPA regulations. Specifically, it has been prepared pursuant to the rules and regulations of the NEPA 40 CFR Parts, 15000-1508, inclusive of Section 106 of the National Historic Preservation Act and applicable rules and regulations, and the Federal Highway Administration (FHWA) and FTA regulations, *Environmental Impact and Related Procedures*, 23 CFR Part 771.117. The public outreach required under Section 106 of the National Historic Preservation Act is being conducted as part of this process.

1.5 Coordination and Consultation

This section discusses the state and federal permits that are anticipated for the Proposed Project, in addition to complying with NEPA and CEPA regulations. The following sections summarize the scoping process, agency coordination with regulatory and other governmental agencies, and public outreach.

1.5.1 CEPA Scoping

CTDOT has invited the input of other state and federal agencies through interagency meetings and correspondence. Public input was sought through a public scoping notice posted in the State of Connecticut's CEQ Environmental Monitor on August 2, 2016. CTDOT received three comment letters on the scoping notice for the proposed project; the Connecticut Department of Public Health (CTDPH) provided a comment letter dated August 11, 2016, the Connecticut Office of Policy and Management (OPM) provided a comment letter dated September 2, 2016, and the Connecticut Department of Energy and Environmental Protection (CTDEEP) provided a comment letter dated September 2, 2016. CTDOT considered these comments during development of this EIE.

1.5.2 Interagency Coordination

CTDOT coordinated with federal and state agencies to solicit information on environmental conditions, potential impacts, and agency input. These agencies include:

- US Army Corps of Engineers (USACE)
- US Environmental Protection Agency, Region I (USEPA)
- US Fish and Wildlife Services (USFWS)
- US Coast Guard

¹ 401 CFR 1508.4 CEQ criteria on Categorical Exclusions, and 23 CFR 771.118 FTA NEPA guidance, paragraph (d)

- National Marine Fisheries Service (NMFS)
- Connecticut Department of Energy and Environmental Protection (CTDEEP)
- Office of the Long Island Sound Program (OLISP)
- Connecticut Office of Policy and Management
- Connecticut State Historic Preservation Office (CTSHPO)
- Connecticut Department of Public Works
- Connecticut Department of Economic and Community Development
- Connecticut Council of Environmental Quality
- Connecticut Department of Public Health
- Connecticut Metropolitan Council of Governments (MetroCOG)
- City of Bridgeport, Connecticut, Mayor's Office

1.5.3 Coordination with Communities and Organizations

CTDOT has coordinated with local communities and organizations throughout the study to obtain information concerning existing conditions as well as transportation and economic needs.

Coordination includes the following entities:

- Metropolitan Transportation Authority Metro-North Railroad (MNR);
- Greater Bridgeport Transit (GBT); and
- City of Bridgeport, Connecticut, Mayor's Office.

CTDOT has coordinated closely with the city of Bridgeport planning and engineering staff, holding planning and schematic design review meetings with city staff throughout the development of the project.

1.5.4 Public Meetings and Outreach

On May 24, 2016, the City of Bridgeport held an informational meeting to discuss the Barnum Station TOD Structural Evaluation and Adaptive Reuse Study and the Barnum Station Project. This meeting provided general information about the two projects and explained the differences between them.

CTDOT posted a public scoping notice in the Connecticut Council on Environmental Quality (CEQ) Environmental Monitor on August 2, 2016.

An additional informational meeting was held on October 13, 2016 to provide further information on these projects. A website was created that provides links to information on each project: <http://www.barnumstation.com/>.

A notice of availability for this EIE was published in the Connecticut CEQ Environmental Monitor on January 3, 2017. The EIE has been posted to the project website listed above for public review during the public comment period. The public comment review period is 45 days, and closes on February 17, 2017. The document is also physically available for public inspection at locations identified in Chapter 5, *Distribution*.

CTDOT will hold a public meeting in Bridgeport during the public comment period to seek feedback regarding the preparation of the document. This public meeting is currently scheduled for January 25, 2017, and will be publicly advertised in English and Spanish through websites, newsprint, and email. A public informational meeting, where residents can ask questions of CTDOT officials, will be held during the development of the final design plans. The City and CTDOT will develop and implement an outreach program during the construction period to keep the public informed about construction status and schedule, and to provide a mechanism for CTDOT to receive and respond to construction questions from the public. This outreach program will include coordination with the Saints Cyril and Methodius Slovakia Roman Catholic Church.

1.6 Permits and Approvals Required

Several state and federal permits and approvals will be required for the Barnum Station Project. Since this is a state-sponsored project, all local jurisdictions are superseded by the relevant state authorities. As the permit applicant, CTDOT must obtain the permits and approvals listed below prior to construction. Table 1-1 lists the anticipated state and federal permits required for the Proposed Action along with the status of permits and other approvals.

TABLE 1-1 ANTICIPATED PERMITS AND APPROVALS

Issuing Agency	Approval or Permit	Status
U.S. Army Corps of Engineers (USACE)	404 Permit/Section 10 Permit	To be obtained prior to construction
Connecticut Department of Energy and Environmental Protection (CTDEEP), Office of Long Island Sound Programs (OLISP)	Structures, Dredging, and Fill, and Tidal Wetlands Permit (Coastal Consistency Review to be completed as part of the Permit)	To be obtained prior to construction
Connecticut Department of Energy and Environmental Protection (CTDEEP)	General National Pollutant Discharge Elimination System (NPDES) Permit for Stormwater Discharges from Construction Activities	To be obtained prior to construction
Inland Wetlands and Watercourses Agency of the City of Bridgeport	Inland Wetlands and Watercourses Act Permit	To be obtained upon completion of final design plans
Connecticut Department of Transportation (CTDOT), Office of the State Traffic Administration (OSTA)	Major Traffic Generator application	To be submitted upon completion of final design plans
Connecticut State Historic Preservation Office (CTSHPO)	Memorandum of Agreement	In process

2 Purpose and Need

This chapter establishes the purpose of, and need for, a new commuter rail station on the NHML in East Bridgeport, between Bridgeport and Stratford, Connecticut. The chapter includes a summary of prior studies and the key transportation issues that support the Build Alternatives.

2.1 Project Purpose

The purpose of the Project is to construct a new commuter rail station to enhance regional access to and from East Bridgeport and support anticipated future growth. Rail service in East Bridgeport would supplement the existing Bridgeport Station's critical role by serving neighborhoods that lack convenient access to the existing station. A station in East Bridgeport would also complement planned transit-oriented development (TOD) by enabling new residents and workers to commute by rail and avoid vehicle use. One of the purposes of the project (which is more "opportunity-driven" than "deficiency-driven") is to allow more flexibility in commuter and intercity rail services on the NHML between New Haven and Stamford (and potentially into Grand Central Terminal). The project is expected to provide the following benefits:

- Enhance service flexibility by enabling express service and permitting two-track local and two-track express service on the mainline;
- Improve access to commuter rail for current and future residents of East Bridgeport;
- Enhance transit access to places of employment in East Bridgeport, including the Bridgeport Hospital and businesses in the Mill Hill, East Side, and East End neighborhoods;
- Support future TOD as envisioned in the *Bridgeport 2020 Master Plan of Conservation and Development* and the *BGreen 2020 Sustainability Plan*; and
- Meet state and regional transportation planning objectives.

2.2 Existing Railway Operations and Infrastructure

Bridgeport is the largest city in the state of Connecticut with approximately 146,680¹ residents, and is supported by one downtown rail station serving both commuter and intercity rail. In contrast, the neighboring town of Fairfield has less than half the number of residents as Bridgeport² but has three rail stations along the NHML. The City of Norwalk is just over half the size of Bridgeport³ but has four rail stations, and various other municipalities in Connecticut⁴ provide their residents with access to multiple rail stations to ensure their mobility and provide transportation options. The existing

¹ American Community Survey, 2010-2014 5-Year Population Estimate. U.S. Census Bureau.

² Town of Fairfield 2014 population of 61,347. American Community Survey, 2010-2014 5-Year Population Estimate. U.S. Census Bureau.

³ City of Norwalk 2014 population of 88,145. American Community Survey, 2010-2014 5-Year Population Estimate. U.S. Census Bureau.

⁴ Town of Greenwich, Town of Westport, City of Milford, City of New Haven, and Town of Wilton

Bridgeport Station is served by the MNR and SLE commuter rail trains as well as Amtrak's *Northeast Regional* and *Vermont* intercity routes. The MNR service runs from New Haven (north of Bridgeport), to Grand Central Terminal (GCT) in New York City, NY. SLE service runs from New London to New Haven. Amtrak's *Northeast Regional* runs from Boston, Massachusetts to Richmond-Norfolk/Newport News, Virginia, and the *Vermont* runs from St. Albans, Vermont to Washington D.C.

Bridgeport Station is centrally located in the downtown district of Bridgeport, but it does not provide convenient service to the employment and growth area of East Bridgeport. East Bridgeport encompasses the eastern portion of the city, and is separated from the downtown district and Bridgeport Station by the Pequonnock River. East Bridgeport includes the neighborhoods of Mill Hill, East Side, and East End. To access the intercity rail network, residents located in a 3.5-mile stretch of East Bridgeport must travel west to the Bridgeport Station or further east to the Stratford Station. Figure 2-1 shows the existing Bridgeport Station's location relative to the neighborhoods of East Bridgeport.

Bridgeport Station is part of the Northeast Corridor (NEC), a 457-mile long rail corridor that extends from Boston, MA to Washington DC, connecting major cities in the northeast region of the United States. The NEC supports over 260 million passenger trips annually through a combination of service provided by Amtrak and eight commuter rail agencies, including MNR and CTDOT SLE.⁵ Amtrak anticipates overall NEC ridership to grow in the future as a result of population and employment growth throughout the corridor. Within the NEC's service area, Amtrak expects population growth of approximately 12 percent, with matching employment growth of approximately 11 percent by 2040.⁶ In the same timeframe, total annual intercity trips on all NEC services are projected to roughly double, raising total annual ridership to approximately 520 million.⁷ Amtrak provides service at the Bridgeport station with 14 *Northeast Regional* trains per day and two *Vermont* trains per day. Bridgeport Station ranks 106 in annual Amtrak boardings of the more than 500 stations served by Amtrak nationally, with over 80,000 passenger "on offs" in 2015.⁸ Bridgeport Station has a high volume of Amtrak daily boardings, particularly during peak hours⁹ and weekends, and Amtrak expects the NEC ridership numbers to grow in the future.

MNR currently operates 26 weekday commuter trains (combined inbound and outbound) on the NHML stopping at Bridgeport Station during morning peak hours, with approximately eight to ten cars per trainset.¹⁰ An additional 56 weekday trains (combined inbound and outbound) stop at Bridgeport Station during off-peak hours, and 19 weekday trains (combined inbound and outbound) stop at Bridgeport station during afternoon peak hours.¹¹ According to ticket sales and data collected by MNR, Bridgeport Station is the fourth busiest station on the NHML, averaging 3,400 daily weekday boardings.¹² The Station also averages 3,120 total weekend boardings. Of the 48 stations served by the MNR New Haven Line (CT and NY), Bridgeport Station has the fifth highest number of total weekday MNR boardings after Stamford Station (CT), Greenwich Station (CT), Larchmont Station (NY), and New Rochelle Station (NY).

⁵ *NEC Future Tier 1 Draft EIS*. Amtrak, 2015.

⁶ *NEC Future Tier 1 Draft EIS*. Amtrak, 2015.

⁷ Amtrak, North East Corridor Facts and Data. <https://nec.amtrak.com/content/growing-demand-rail-services-northeast>. Accessed February 17, 2016.

⁸ Amtrak, North East Corridor Facts and Data. <https://nec.amtrak.com/facts-and-data>. Accessed February 17, 2016.

⁹ Defined as: "weekday trains that arrive in GCT between 5 AM and 10 AM and that depart GCT between 4 PM and 8 PM". Metropolitan Transportation Authority.

¹⁰ Metropolitan Transportation Authority, New Haven Main Line schedule. April 2016.

¹¹ Metropolitan Transportation Authority, New Haven Main Line schedule. April 2016.

¹² 2015 New Haven Main Line Inbound Station Boardings (2015), MNR. Received from CTDOT February 16, 2016.

Between New Haven and Grand Central stations, the NHML typically provides four separate tracks (except for a four-mile segment from Woodmont [MP 65] to Devon [MP 61] with three tracks) served by stations with outside platforms (except at the New Haven and Stamford stations which utilize island platforms). This layout means that every train stopping at a station has to use the outside tracks, often crossing over from the inside to outside tracks to access the platform. This requires lower train speeds, and effectively means that one train occupies two tracks during the cross over movement. The result is sub-optimal commuting times and lower system capacity. With this configuration, it is difficult to run express trains. The current MNR commuter service schedule uses an informal zone express system to limit the number of required crossovers; in this informal system, some trains stop at specific blocks (sequential groups) of stations, and other trains stop at other blocks of stations. These trains use the outside tracks for stops then either cross over to an inside track or continue in express mode along the outside track. CTDOT also extends a limited number of SLE commuter trains (New London – New Haven) further west to Bridgeport and Stamford (four trains in each direction daily).

Amtrak has stops for intercity service at New Haven, Bridgeport and Stamford along the NHML in Connecticut. The current downtown Bridgeport Station has only outside platforms so the Amtrak trains either have to operate along the outside tracks or cross over from the inside to outside tracks as they approach Bridgeport.

2.3 East Bridgeport Employment

The City of Bridgeport faces significant challenges in ensuring its residents have access to employment opportunities. Bridgeport's job market fell by 27 percent between 1990 and 2005, despite a two-percent job market growth in the greater Bridgeport-Stamford-Norwalk region during the same period. Bridgeport has a 12.7-percent unemployment rate compared to the 8.5-percent statewide average¹³. The impact of high unemployment is reflected in the estimates of household income. According to the American Community Survey (ACS) 5-year estimates, Bridgeport's median household income is only 50 percent of the median household income of Fairfield County. It is likely that income is much lower in the study area, estimated at \$23,956¹⁴. Median household income in the state is \$67,740 (ACS 2010). Table 2-1 presents unemployment statistics and income data for East Bridgeport and the greater region, and Table 2-2 identifies the major employers in the vicinity of the proposed station.

As a result of the challenging local job market, Bridgeport residents must turn to regional employment opportunities beyond the city limits. To compound this challenge, over 20 percent of households in Bridgeport do not have access to a vehicle for transportation¹⁵, significantly higher than the 9 percent of households statewide. Vehicle access in the study area is even lower than that of the city, with some census tracts in East Bridgeport reaching 30 percent of households without vehicle access.¹⁶

East Bridgeport serves as a primary employment center for the city, with over a dozen large employers (defined as employers with over 30 full-time employees) in the vicinity of the proposed station site.¹⁷

¹³ The City of Bridgeport. *BGreen2020 A Sustainable Plan for Bridgeport, Connecticut*. 2010.

¹⁴ A weighted mean of household median income (weighted by the population of each census tract) was used to calculate median household income for the study area.

¹⁵ American Community Survey (ACS) 5-year estimate 2010-2014, Table DP04. U.S. Census Bureau.

¹⁶ American Community Survey (ACS) 5-year estimate 2010-2014, Table DP04. U.S. Census Bureau.

¹⁷ *Solicitation PEB716169 RFP Barnum Station TOD*. Barnum Station TOD RFP, City of Bridgeport. 2015.

The Mill Hill and East Side neighborhoods are recognized for their medical services industry and are home to Bridgeport Hospital and various other health and doctor's offices. The hospital and other health offices and institutions in the neighborhoods are critical to employment in East Bridgeport, with the health and education sector representing the largest employment sector for both Mill Hill and East Side residents.¹⁸ Employees of businesses in these neighborhoods do not have convenient commuter rail access from the existing Bridgeport Station. Commuting by rail to these neighborhoods requires that employees disembark and walk distances ranging from 0.5 to 2 miles or transfer to a local bus route before arriving at their destination.

TABLE 2-1 UNEMPLOYMENT AND INCOME

Area	# Unemployed	Unemployment %	Median Household Income
Study Area	1,715	7.92%	\$23,956
Bridgeport	9,018	8.22%	\$41,047
Fairfield County	36,207	5.14%	\$81,268
Connecticut	145,356	5.15%	\$67,740

Source: Connecticut Department of Labor Office of Research, 2012, 2011, & 2010, Connecticut Labor Force Data by Place of Residence.

Notes: Estimated Population – People (over 16) & Households.

The Study Area consists of a ½ mile radius around the proposed project site.

TABLE 2-2 TOP EMPLOYERS IN THE VICINITY OF THE PROPOSED PROJECT

Employer	Employees	Sector
Bridgeport Hospital	2,600	Health Care
Prime Resources ¹	310 FT/150 PT	Specialty Items
Moore Tool Company	280	Precision Tools
Lacey Manufacturing	258 FT/46 PT	Medical Products
Harding High School	123	Educational
Bridgeport Health Care Center ¹	49	Health Care
Rotair Industries	46	Helicopter Parts
Valley Container	45	Packaging Material
Luis Marin Munoz Elementary School	40	Elementary School
Optimus Health Care, Inc.	35	Mental Health

Source: Barnum Station Feasibility Study, 2013.

1 Business that is outside, but adjacent to the study area. The table lists employers within a ½ mile radius around the project site.

2.3.1 Businesses and Employers

Bridgeport Hospital is a regional hospital that serves over 18,000 annual inpatients and 277,000 annual outpatients, and employs 2,600 employees from all over the region. The hospital, which has operated from the same site for over 131 years, is part of the Yale-New Haven health system affiliated with the Yale School of Medicine and employs over 200 medical residents and fellows¹⁹. Bridgeport Hospital is recognized as a leader in education and health in the community and regionally.

Bridgeport Hospital is currently only accessible by passenger vehicle and by bus. It is served by the GBT bus routes 13, 15, and 23, or by personal vehicles. It is not convenient for patients and employees to reach the Hospital by train as it is approximately 1.9 miles by foot from Bridgeport Station, requiring a taxi, bus ride, or other means as a last-mile solution. This distance also exceeds the 0.25-mile to 0.5-mile walking distance standard (and approaches the 2-mile cycling distance) typically used in TOD and neighborhood planning.

¹⁸ *Bridgeport Master Plan of Conservation and Development*. Bridgeport 2020, City of Bridgeport. 2008. Pages 140 and 146.

¹⁹ Bridgeport Hospital. www.bridgeporthospital.org/about. Accessed January 27, 2016.

There is also a ridership demand from hospital employees shuttling between Bridgeport Hospital and Yale-New Haven Hospital. Shuttle service is provided between the New Haven Station in New Haven, Connecticut and the Yale-New Haven Hospital, offering rail accessibility to hospital employees and patients. Bridgeport Hospital does not currently have such a service. Without a commuter rail station in East Bridgeport, employees of Bridgeport Hospital and other East Bridgeport businesses are not able to capitalize on the existing commuter rail network due to the distances from the existing Bridgeport Station.

Bridgeport Hospital is working with the City of Bridgeport to review potential future hospital expansion opportunities on the current site of Harding High School immediately adjacent to the hospital.²⁰ The City plans to relocate Harding High School, and in late 2015 broke ground for construction of the new school facility.²¹ The City worked with General Electric to locate the new school facility to a nearby parcel previously owned by General Electric²² and donated to the city. The new school facility will continue to serve East Bridgeport and would be well served by a commuter rail station. After the relocation of the high school, Bridgeport Hospital may pursue expansion opportunities on the former site. Expanding the hospital would provide a needed boost to regional and local employment, but would further increase the transportation demands in the area.

In addition to the medical services industry, East Bridgeport has a number of educational institutions that serve as occupational and social fixtures in the community. There are seven elementary schools in the vicinity of the project in East Bridgeport, and one high school. There are also two public charter schools run by Achievement First, a 501(c)(3) non-profit organization focused on bringing educational opportunities to disadvantaged areas in Connecticut, New York, and Rhode Island. These educational institutions constitute the second highest employment sector in East Bridgeport; four of the 11 schools are within 0.5-miles of the proposed project site, and all 11 are within one mile of the site. Educators and administrators at this cluster of institutions in East Bridgeport cannot easily take advantage of the existing rail network due to the location of Bridgeport Station.

A new station in East Bridgeport would enhance transportation access to a substantially underemployed community and maintain the critical existing employment centers in East Bridgeport. East Bridgeport has a high concentration of health and educational institutions that draw people to and from the city and which employ a large portion of city residents. These employment centers are especially important to the community as it has struggled to keep pace with the employment rates of the larger county. A station in East Bridgeport is needed to protect and grow the existing East Bridgeport businesses, and open additional employment opportunities to residents through enhanced transportation access.

2.4 Future Growth

East Bridgeport is a priority growth area identified in both the Bridgeport *2020 Master Plan of Conservation and Development* and the *BGreen 2020 Sustainability Plan*. These plans focus specifically on enhancing multi-modal transportation infrastructure, and emphasize mixed-use and TOD. Several

²⁰ Discussions with Bridgeport Hospital, 2016.

²¹ *Groundbreaking for new Harding High campus*. CTpost, August 28, 2015. <http://www.ctpost.com/news/article/Groundbreaking-for-new-Harding-High-campus-6472100.php>. Accessed February 12, 2016.

²² *New high school to replace 90-year-old Harding High School*. Bridgeport News, March 6 2015. <http://www.thebridgeportnews.com/11321/new-high-school-to-replace-90-year-old-harding-high-school/>. Accessed March 15, 2016.

major development projects are underway in the vicinity of East Bridgeport which will produce additional transportation demands within the area. Adequate access to public transportation will be critical to ensuring these new development projects advance the City's TOD goal and do not increase reliance on personal vehicles. Figure 2-1 shows the surrounding developments and projects underway in the vicinity of the proposed project.

Steelpointe Harbor is an ongoing 52-acre mixed-use development south of the proposed station, along the Yellow Mill Channel. The development abuts the channel, and consists of a network of walkable streets, open space, waterfront walkways, and residential, retail, and commercial development. When completed, the development will provide 800,000 square feet of retail space, 200,000 square feet of commercial/office space, 300,000 square feet of hotel/meeting space, a marina with supporting infrastructure, and up to 1,500 new residential units.²³ In late 2014, the Steelpointe Harbor developer was also selected in a public bidding process for development of Seaview Plaza, a site adjacent to Steelpointe Harbor. The developments emphasize connecting and complimenting pedestrian amenities, neighborhood building scale and block sizes, and a stimulating streetscape.

The former 38-acre Father Panik Village site continues to provide development potential in the area directly south of the proposed project location. Since its demolition in 1993²⁴, the site has been redeveloped with single family housing on the west side, minor improvements to Upchurch Park to the south, and ongoing construction of the Crescent Crossing Housing Development in the center. The Crescent Crossing Housing Development is a multi-phase development initiative in the East Side neighborhood. The project broke ground in 2015, and will add over 170 additional housing units to East Bridgeport directly south of the proposed station location.²⁵

DuPont is developing plans for a business park located in both East Bridgeport and in Stratford. The 422-acre Lake Success Eco Business Park straddles Bridgeport and Stratford and occupies the formerly contaminated Remington Woods site (344 acres in Bridgeport). In anticipation of the business park, Bridgeport has started design for the Seaview Avenue Corridor project. The City plans to redesign, realign, and extend Seaview Avenue, beginning as far south as Barnum Avenue. The entire project will include pedestrian and bicycle improvements along the roadway.

As discussed previously, the City of Bridgeport has a parallel project underway to relocate the existing Harding High School; the new high school will front the realigned Seaview Avenue. Both the realignment and the construction of the new Harding High School are in design phases and are anticipated to be completed in 2018.²⁶

²³ Steelpointe Harbor. <http://www.bldsteelpointe.com/about-us/overview/>. Accessed April 05, 2016.

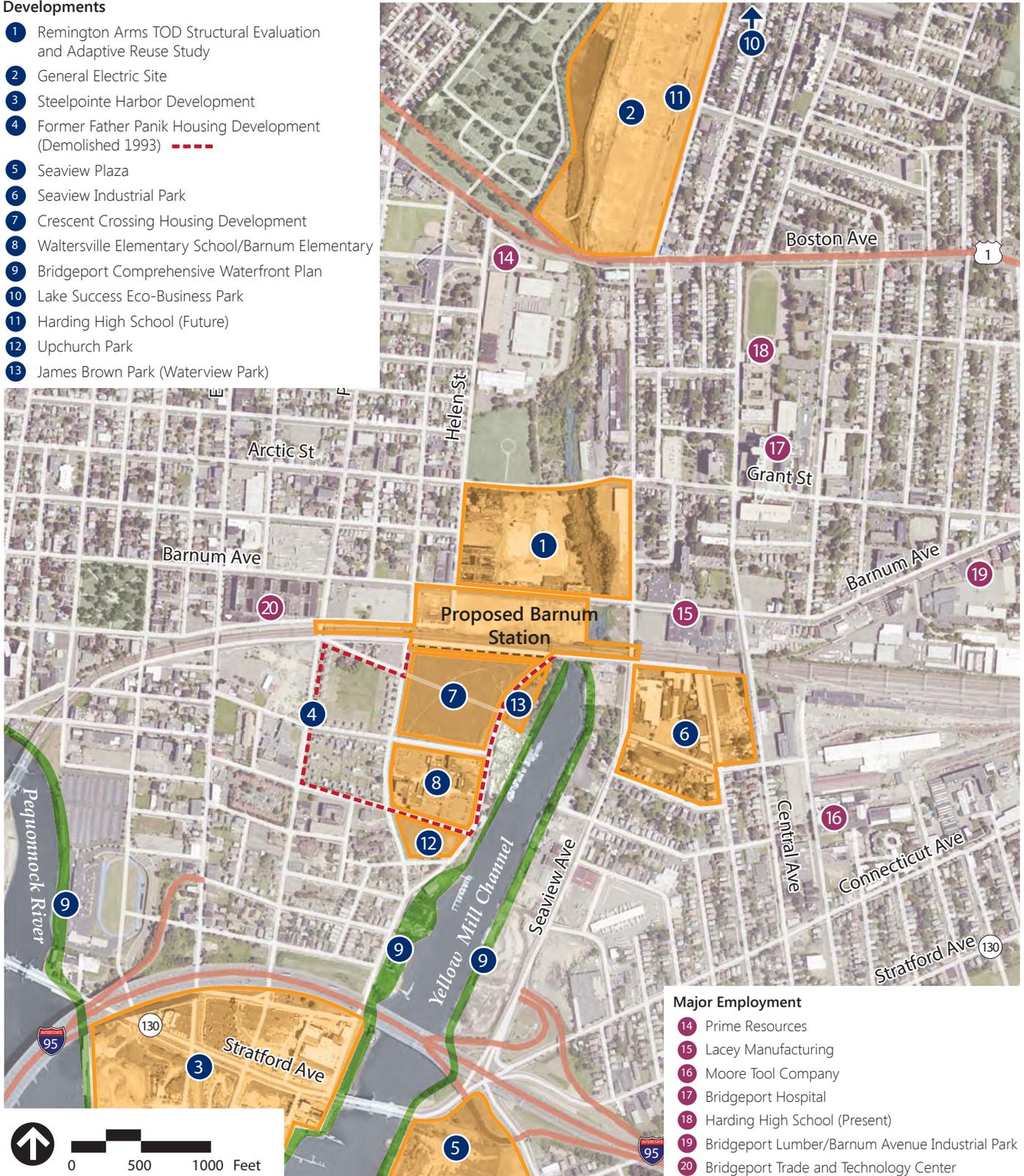
²⁴ Rierden, Andi. "The Last Farewell to Father Panik Village." *New York Times* [New York City] 17 October 1993.

²⁵ *Massive housing project in new mayor's hands*. Lockhart, Brian. CTpost, October 28, 2015. <http://www.ctpost.com/news/article/Massive-housing-project-in-new-mayor-s-hands-6593824.php>. Accessed April 05/2016.

²⁶ *Preliminary plans unveiled for Remington Woods site*. Ocasio, Keila Torres. CTpost, April 20, 2015. <http://www.ctpost.com/news/article/Preliminary-plans-unveiled-for-Remington-Woods-6212557.php>. Accessed February 12, 2016.

Developments

- 1 Remington Arms TOD Structural Evaluation and Adaptive Reuse Study
- 2 General Electric Site
- 3 Steelpointe Harbor Development
- 4 Former Father Panik Housing Development (Demolished 1993) - - - -
- 5 Seaview Plaza
- 6 Seaview Industrial Park
- 7 Crescent Crossing Housing Development
- 8 Waltersville Elementary School/Barnum Elementary
- 9 Bridgeport Comprehensive Waterfront Plan
- 10 Lake Success Eco-Business Park
- 11 Harding High School (Future)
- 12 Upchurch Park
- 13 James Brown Park (Waterview Park)



Source: ArcGIS Online Bing Aerial



Figure 2-1

Surrounding Proposed and Existing Development and Major Employers

**Barnum Station
Bridgeport, Connecticut**

In 2015, the City of Bridgeport initiated a project to develop a TOD plan, structural analysis, and adaptive reuse strategy adjacent to the proposed Barnum Station. Currently underway, the project has three parts; it will produce a TOD plan for the 0.5-mile radius around the proposed station, conduct a structural building analysis for the former Remington Arms Ammunition facility located at 889 Barnum Avenue, and produce an adaptive reuse strategy for the same site. The site is named Tower Place, and is located directly across Barnum Avenue from the proposed station.

The City is pursuing TOD and mixed-use development as a means to reduce private vehicle use and associated emissions. Of all regional trips in the greater Bridgeport region, 96.6 percent involve the use of private vehicles, with the majority of these in the drive-alone category. Only 3.4 percent of all trips are made by a form of public transportation (bus or train). Based on CTDOT's travel demand model, total vehicle trips in the region are expected to grow by about 12.7 percent from 2010 to 2040.²⁷ The heavy use of passenger vehicles produces high vehicle-miles traveled (VMT) and associated vehicle emissions for the region. Fairfield County, including Bridgeport and neighboring communities, is a "marginal non-attainment area" for ozone emissions²⁸. Providing additional transportation options is a core feature of TOD, facilitating a shift away from private vehicles and driving alone and reducing associated emissions.

2.5 State and Regional Objectives

As discussed in Chapter 1, the Proposed Project is consistent with transportation planning objectives established at the state and regional levels. The following sections note specific objectives within each of these initiatives that are consistent with the Proposed Project.

2.5.1 State-Level Objectives

Let's Go CT! is an initiative of Connecticut Governor Dannel P. Malloy that outlines a series of transportation investments across the state with the purpose of improving safety, reliability, and responsiveness. This effort is accompanied by a 5-year ramp-up plan that details the existing condition of the transportation system in the state, and initial steps to implement the plan.

The proposed Barnum Station is a specific action under Let's GO CT!, which emphasizes the expansion of high-frequency and high-capacity rail service to and from New York City, the addition and modernization of stations, and upgrades to tracks to support local and express services. The 5-year ramp-up plan identifies the proposed station as an initial step in achieving the plan's overall goals, as it would enhance overall service flexibility along the NHML. The proposed station would enhance service flexibility by allowing two-track local and two-track express service on the mainline. The track work associated with the proposed station would improve service flexibility to and from New York City, a primary goal identified in Let's GO CT!

2.5.2 Regional Objectives

The Proposed Project meets goals established in various regional planning documents, and is identified as a development objective in documents prepared by MetroCOG and the City of Bridgeport.

Released in 2015, *Reconnect 1 Region* is a comprehensive plan for development and policy intended to guide land use, housing, transportation, infrastructure, economic development, and sustainability. The

²⁷ LRTP 2015-2040, Greater Bridgeport Regional Council (GBRC), 2015.

²⁸ (8-hour Ozone 2008 Standard) United States Environmental Protection Agency. *The Green Book Nonattainment Areas for Criteria Pollutants*. October, 2012.

plan was developed by MetroCOG in coordination with member cities, and identifies specific regional goals that the proposed Barnum Station project would help achieve. The plan highlights TOD strategies and zoning as an important mechanism and identifies the proposed Barnum Station as an ideal location for implementing such strategies. *Reconnect 1 Region* identifies Barnum Station as Goal 6.2E, a transformative project that compliments the ongoing and anticipated growth in East Bridgeport.²⁹ The plan notes that the project would increase the region's overall transit use, and support a transit-oriented pattern of future development.

BGreen 2020, developed in 2010 by the City of Bridgeport in coordination with the Bridgeport Regional Business Council, outlines a ten-year strategic sustainability plan for the City of Bridgeport. The Plan established goals and identified opportunities that will help improve the quality of life, social equity, and economic competitiveness of the city, at the same time also reducing carbon emissions and increasing the community's resilience to the effects of climate change. Recognizing that the transportation sector contributes approximately one-third of the city's total greenhouse gas emissions, *BGreen 2020* adopts a "Transit First" policy to prioritize bus operations expansion, enhanced bus corridors, and construct a new transit station where needed. The Plan identifies the construction of a MNR station in the East Side and East End as a strategy to sustain development in the area and compliment the Seaview Avenue realignment project.

GBT is in the process of developing the GBT Master Plan to serve as a blueprint for GBT operations and services over the subsequent 25 years. It is intended to enhance service in high bus ridership areas and in response to community needs, identify needed improvements to infrastructure and operations, and anticipate future ridership demands. The bus operations and service concepts in the Master Plan consider Barnum Station in the analysis of future transportation needs and demands.

2.5.3 Barnum Station Feasibility Study (2013)

The City of Bridgeport completed a feasibility study for a commuter rail station in East Bridgeport. The City worked with MetroCOG to evaluate the value of constructing and operating a second commuter rail station in Bridgeport compatible with existing MNR and Amtrak services. The Feasibility Study provides a detailed assessment of East Bridgeport's history, demographics, environmental conditions, land use mix, businesses, transportation patterns, pedestrian and bicycle facilities, and development potential; it clearly demonstrates the feasibility and benefits of a new station in East Bridgeport.³⁰

The study identifies specific development areas in the vicinity of East Bridgeport that a commuter rail station would support, including downtown Bridgeport, Seaview Avenue corridor, Steelpointe Harbor, and the Lake Success Eco-Business Park. Though the station would primarily serve East Bridgeport, the study also demonstrates how a second station in Bridgeport offers enhanced mobility and transportation access along the entire rail corridor in the Greater Bridgeport region.

2.6 Project Need

The Project is needed to support East Bridgeport employment opportunities and businesses, improve the capacity and efficiency of the MNR and SLE service, and support anticipated growth in population and employment associated with planned TOD and growth initiatives.

²⁹ *Reconnect 1 Region*. MetroCOG. 2015.

³⁰ *Barnum Station Feasibility Study*. City of Bridgeport, Greater Bridgeport Regional Council. 2013.

East Bridgeport is an employment center and a focus area for growth and development for the City of Bridgeport, but the area lacks regional public transportation options. Without convenient access to the intercity rail network, employment among East Bridgeport residents is likely to continue to decline or remain stagnant, employees of existing businesses in East Bridgeport must commute by passenger vehicle or bus and increase regional VMT, and the potential for future development in the East Bridgeport area will be constrained by the limited transportation options. The relatively high percentage of East Bridgeport residents without access to a vehicle will remain disconnected from regional employment opportunities and suffer from a general lack of transportation alternatives.

With the current track and platform configuration, trains must routinely switch tracks to serve stations. These crossovers require lower train speeds and dual-track occupancy through the duration of the cross over move, reducing overall line capacity and speed. A new station in East Bridgeport with two island platforms would provide more opportunity for express service, enhance line capacity, and reduce commuter trip times. The increased system capacity could potentially reduce delays, improve the efficiency of overall system operations, and allow a possible increase in MNR and SLE service.

Walkable, mixed-use, TOD will not be possible in the East Bridgeport area without convenient access to the intercity rail network. East Bridgeport does not have the rail access needed to achieve the dense, pedestrian-oriented land use characteristics that residents of the area desire and that the City aims to achieve.

A new station is needed in East Bridgeport to support the anticipated growth in population and economic activity. As a focus area for growth and development, East Bridgeport will have increasingly demanding transportation requirements; new residents and workers in the area must currently commute by car or bus, contributing to regional VMT and localized air pollution. The City is seeking to pursue development projects that would reduce reliance on vehicles, but currently the only alternatives to private vehicles are buses, cycling, or walking. Providing convenient commuter rail access would add a robust transportation alternative, and it would advance the City's stated objectives of enhancing multi-modal infrastructure and supporting TOD.

3 Proposed Project and Alternatives Considered

This EIE describes the Proposed Project, consisting of a new commuter rail station in East Bridgeport at the site of the former Remington Arms Ammunition factory along Barnum Avenue, and compares it with the No Action Alternative. This chapter discusses the site selection process and alternatives that were evaluated and dismissed.

3.1 Proposed Project

The Proposed Project is a new commuter rail station along the NHML in East Bridgeport. The station would include two passenger platforms, platform access, and surface parking lots. A conceptual layout of the Proposed Project is shown in Figure 3-1. Figure 3-2 shows a section of the Proposed Project at the culvert located between Waterview Avenue and Hallett Street.

The Proposed Project would include the elements listed below:

- Two new center-island station platforms, each 900 feet in length to accommodate up to a 10-car train. One platform would serve Tracks 1 and 3 and one would serve Tracks 2 and 4 to enable two-track express and two-track local service through the station.
- A surface parking lot with approximately 550 parking spaces planned for the year of opening (2021). The surface lot would provide vehicular access via one driveway to Hallett Street and two driveways to Barnum Avenue. Parking supply could increase to 1,000 stalls in the future.
- A vehicular drop-off/pick-up area.
- Cross track pedestrian access to the platforms. Cross track access would be provided either by a pedestrian overpass or a pedestrian concourse. This EIE does not identify a preferred access option; this will be determined during final design of the station based primarily on soil/geology subsurface investigations and other design considerations including constructability.
 - The pedestrian overpass option over the railroad tracks would allow access to both platforms and both sides of the station site through elevators and stairs above the tracks.
 - The pedestrian concourse option would allow pedestrians to access platforms and both sides of the station from an at-grade concourse area beneath the elevated NHML railroad. Platform access would be provided by elevators and stairs.
- Stormwater originating from the site would be collected, controlled, and treated prior to discharge.
- Sidewalks, landscaping, and bicycle and pedestrian amenities would be placed where appropriate to allow safe and efficient pedestrian access.

The proposed project would require improvements to the track structure to support the station and platform layout. Tracks 1 and 2 would be maintained on their existing track alignment. Tracks 3 and 4 would be shifted toward the outside of the ROW to accommodate the platforms. There is one crossover between Tracks 1 and 3 that would need to be relocated to allow for full continued access to the EBRY.

The platforms would be center island platforms, with the two inside tracks (1 and 2) would providing express service for Amtrak, MNR and SLE trains, and the outside tracks serving local trains. This would create the opportunity for new express service stopping at New Haven, Barnum, and Stamford. The island platforms would allow easy cross-platform transfers between local and express trains at these three key stations. By eliminating the need for cross-overs, train speeds would be able to increase (or trains could maintain speed), reducing commuter trip times even on local trains. This also means that system capacity could potentially be enhanced by reducing the number of cross over movements.

Shifting the track and constructing the platforms would require widening the existing railroad embankment and reconstructing the existing bridges over Seaview Avenue, Hallett Street, and Pembroke Street, as well as replacing and extending the culvert leading to Yellow Mill Channel. The widened embankment would also require closing Crescent Avenue between Pembroke Street and Waterview Avenue (south of the existing ROW). The former East Washington Avenue Extension (north of the ROW) would be used to accommodate the station and ROW widening on the north side. Railroad signal system modifications would be needed to accommodate the new station and the relocated crossover. Underground and overhead utilities within the railroad and street ROW would need to be relocated as needed.

Vehicular access to Barnum Station would be through two driveways onto Barnum Avenue and one onto Hallett Street. There would be two new surface parking lots designed to meet CTDOT Design Standards. The two lots would be separated by a two-lane circular vehicular drive with drop-off/pick-up areas (taxis on one side), and pedestrian walkways connecting from Barnum Avenue to a station plaza at the north base of the pedestrian crossing headhouse. The main station parking lot entrance on Barnum Avenue at the intersection with Helen Street would provide access to parking and a passenger drop-off/pick-up area.

The station would provide cross-track pedestrian access from the north-side of the widened ROW (at a pedestrian plaza) to the south-side pedestrian route located approximately at the former Crescent Avenue roadway. The cross track access (concourse or bridge option) will be weather-protected and have the potential for locking gates or doors to provide security when the station is closed. Secondary emergency egress stairs will be constructed at the ends of the platforms in order to conform with CT Building Code & NFPA 130 emergency egress requirements.

Barnum Station would accommodate pedestrian movements generated by several different types of users, including drivers walking from their parking space, passengers who are dropped off, and pedestrians walking to the station from surrounding areas. Internal site circulation has been designed to separate pedestrian and vehicular traffic. Sidewalks would be installed and would offer the pedestrian safe passage from the parking areas and circulation roads. The station area would be connected to reconstructed sidewalks on Barnum Avenue, Hallett Street, and the pedestrian platform access connection area south of the ROW. Lighting would be provided by full-cut off LED fixtures mounted on poles and spaced to provide the minimum required illuminance. Traffic and pedestrian signage would assist with vehicular and pedestrian movements.

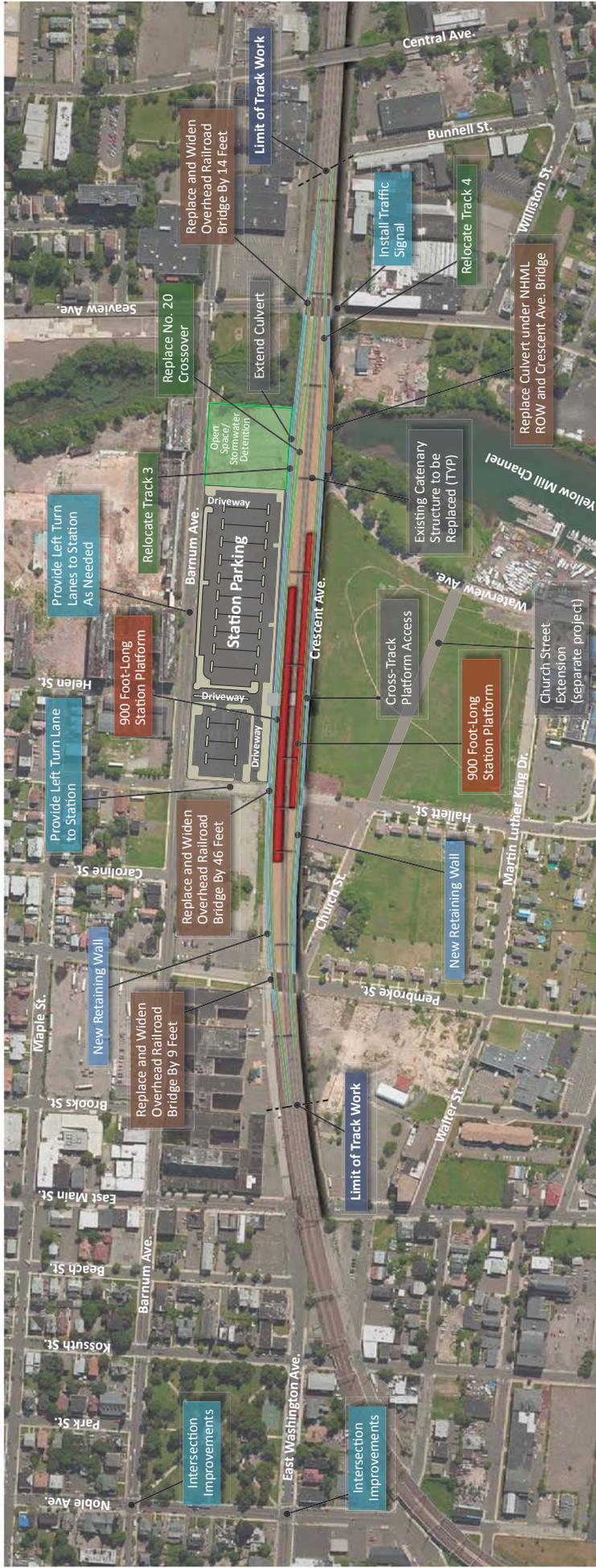
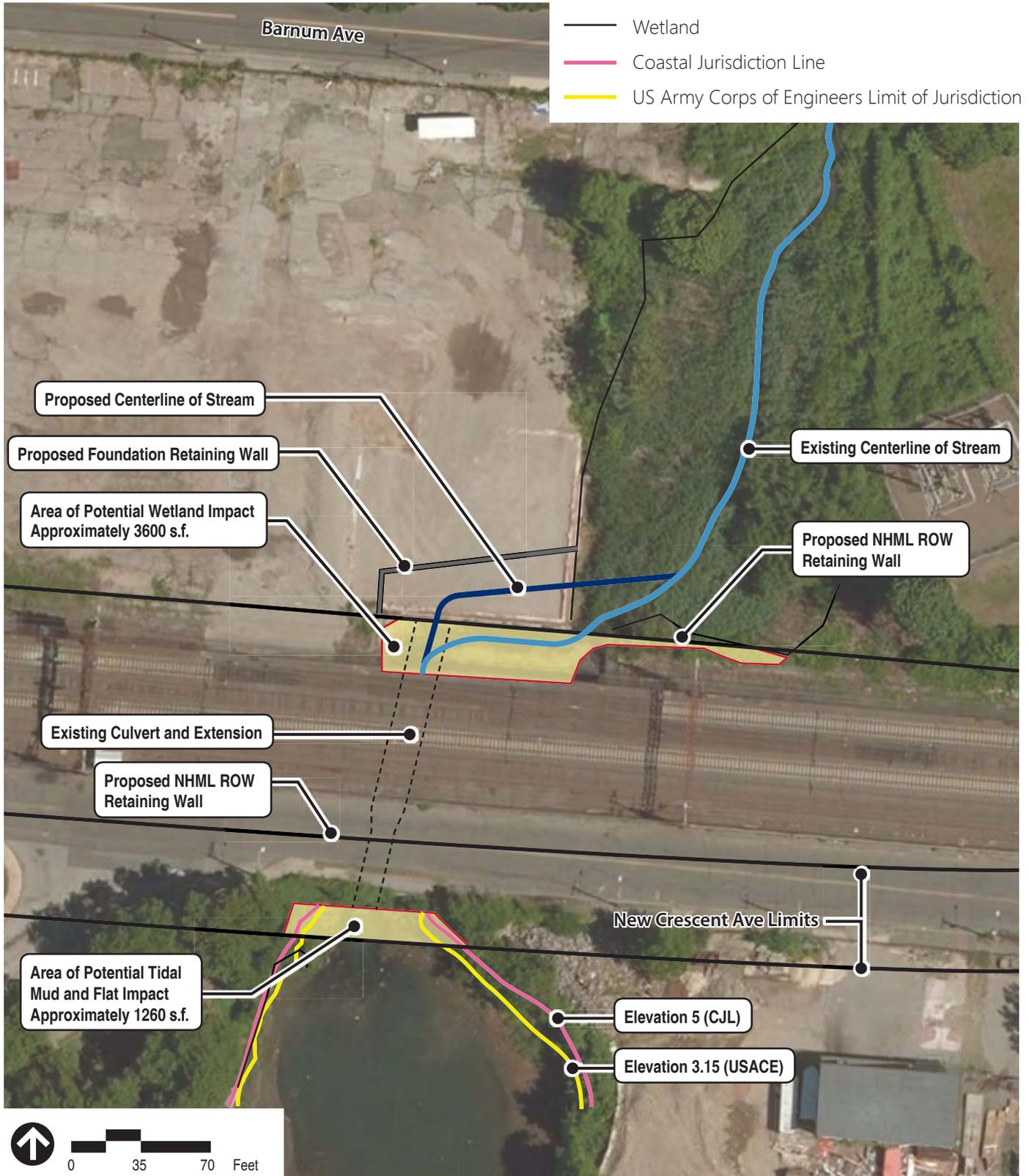


Figure 3-1
Proposed Project Schematic

**Barnum Station
Bridgeport, Connecticut**

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Source: ArcGIS Online Bing Aerial



Figure 3-2
Proposed Project
Culvert Extension Impacts
**Barnum Station
Bridgeport, Connecticut**

Reconstructed sidewalks would comply with the appropriate standards of the Americans with Disabilities Act (ADA). An ADA compliant route from the street would be established for access to the station from both sides of the tracks. Additional sidewalks would be placed where appropriate to allow safe and efficient pedestrian movements. Station design will encourage bicycle transportation by providing secure bicycle racks or storage within five-hundred feet of the cross-track access structure and providing connections to bicycle lanes and/or multi-use pedestrian trails located in the vicinity of the site.

GBT provides fixed-route and demand responsive public bus service through the project area. The GBT fixed route system is radial in that most routes begin, end, or pass-through downtown Bridgeport. The downtown terminal (located just north of the MNR rail station in Bridgeport) acts as a pulse point for the system to facilitate transfers between routes and better coordinate operations. Designated bus stops are located at most principal intersections within the Barnum Station area, and it is anticipated that regional bus service would drop-off and pick-up passengers at stops located along Barnum Avenue rather than the station's vehicular loop drive or parking areas.

3.2 Project Costs and Benefits

In developing the Proposed Project, CTDOT considered the project purpose and need, project costs, and project benefits. CTDOT estimates that the project will cost between \$275 and \$300 million based on the conceptual engineering plans and program. Annual operating costs are estimated at approximately \$750,000¹. Financial benefits of the Proposed Project would result from the improved attractiveness of the MNR service, additional passengers, reduced vehicle miles traveled and accompanying air quality emissions, reduced roadway repair burden, reduced risks of automobile accidents, improved local property values, and improved local economic activity.

3.3 No Action Alternative

The No Action Alternative assumes that CTDOT would not build a commuter rail station in East Bridgeport. It also assumes that existing site and related conditions would continue uninterrupted. Consequently, the needs of the community and region that the proposed project would address, as described in Chapter 2, *Purpose and Need*, would remain. These needs include local employment opportunities and business support, improvements to the capacity and efficiency of MNR, SLE, and Amtrak service, and accommodations for anticipated growth in population and employment associated with planned TOD and growth initiatives. East Bridgeport residents would continue to travel to the Bridgeport Station or Stratford Station to access the commuter and regional rail systems.

The No Action Alternative assumes that several development projects currently planned and underway would proceed. The City of Bridgeport identified a wide range of planning, design, and construction projects, generally within approximately 0.5 mile to 1 mile of the Barnum Station site that may impact the design, construction, and/or operation of the proposed passenger rail station. These projects are all at differing degrees of planning; some have begun construction, some have allocated funding, and some are early concepts. Each of the development initiatives, however, may have an

¹ CTDOT. TIGER VII Grant Application, Barnum Station Project. June 5, 2015. Section V.

effect on passenger ridership and station capacity needs at Barnum Station. The No Action Alternative assumes that these projects have been completed:

- Crescent Crossing Housing Development
- General Electric Site (with Harding High School)
- SteelPointe Harbor
- Seaview Industrial Park
- Seaview Plaza
- Seaview Avenue Corridor Improvements (north of Barnum Avenue)

3.4 Site Selection

In identifying the site for the proposed station, CTDOT considered the following factors:

- Adjacency to the NHML ROW;
- Property availability/acquisition; and
- Meets the project purpose and need.

The City of Bridgeport proposed the project and owns the former Remington Arms Facility site. As the sponsor agency, CTDOT sought to identify a property along the NHML in East Bridgeport that was equally vacant and minimized property acquisition. CTDOT also sought to identify properties that met the purpose and need of the project. The proposed station site along Barnum Avenue was the only property identified that was adjacent to the NHML ROW, required limited property acquisition (largely owned by the City of Bridgeport), minimized relocations, and met the purpose and need of the project.

3.5 Dismissed Options

In developing the proposed station, 12 station layout options were developed but dismissed. Three rail operations/design parameters were used by CTDOT in developing the schematic track/platform layouts for Barnum Station:

- Maintaining full access to/from the EBRY. The existing track layout has a series of No. 20 crossovers (CP-257) that allow a train to exit the west end of the yard and cross from the south side of the ROW (Track 4) to the north side (Track 3). The existing maximum authorized speed through these crossovers is 45 mph. This move is important to maintain as the EBRY is a storage location for MNR revenue trains and these trains generally enter service in the mornings at the downtown Bridgeport Station. There are only outside platforms at Bridgeport Station so the trains must be able to access Track 3 to serve the station.
- The most desirable location for the Barnum Station platform(s) is on a tangent section of track. Platforms on curves can introduce issues related to the gap between the platform and the edge/side of the train. It is also desirable to avoid the spiral transition section of track (the section approaching a curve as the track alignment transitions from a flat tangent to a super-elevated curve).

- CTDOT has conveyed interest in developing express rail service along the New Haven Line. Given the generally available 4-track ROW, the service concept envisions utilizing the two inside tracks (1 and 2) for express trains and the two outside tracks (3 and 4) for local service. For this concept to be operationally efficient, island platforms between Tracks 1 and 3 and between Tracks 2 and 4 are desirable. An island platform layout allows trains operating on the center tracks (Tracks 1 and 2) to stop at the station without needing to cross over to the outside tracks for platform access.

Using these rail operations/design parameters, CTDOT developed twelve design options:

- Option 1: Side Platforms with Existing No. 20 Crossovers Maintained
- Option 2: Side Platforms with No. 15 Crossovers
- Option 3: Dual Island Platforms on Tangent Track
- Option 4: Alternate Version of Dual Island Platforms on Tangent
- Option 5: Dual Island Platforms with North Platform on Curve
- Option 6: Alternate Version of Dual Island Platforms with North Platform on Curve (Standard No. 20)
- Option 7: Alternate Version of Dual Island Platforms with North Platform on Curve (Tangential No. 20)
- Option 8: Dual Island Platforms with North Platform/Tracks 1 and 3 on Curve (Increased Platform Stagger)
- Option 9: Single Center Island and Two Side Platforms on Tangent
- Option 10: Single Center Island and Two Side Platforms on Tangent
- Option 11: Single Center Island and Side Platforms on Curve (Standard No. 20 Crossover)
- Option 12: Single Center Island and Side Platforms on Curve (Tangential No. 20 Crossover)

3.5.1 Review of Dismissed Options

Each of the design options were evaluated based on the track work required, the catenary structures impacted, the bridge modifications required, the railroad operations impacts, and the capability to allow express service along the NHML. The following sections describe each design option and the reason it was dismissed from consideration.

3.5.1.1 Option 1: Side Platforms with Existing No. 20 Crossovers Maintained

This concept provides two 1,080-foot x 12-foot side platforms adjacent to Tracks 3 and 4 on the existing track alignment. It maintains access to/from the west end of EBRY with the existing No. 20 crossovers. The Track 4 platform is entirely on tangent track, while approximately 215 feet of the Track 3 platform (north side) is on curved track. The platforms are staggered, with the Track 3 platform offset approximately 220 feet west of the Track 4 platform (860 feet of platform overlap). This option was dismissed because it did not support the desired express/local service concept.

3.5.1.2 Option 2: Side Platforms with No. 15 Crossovers

This concept provides two 1,080-foot x 12-foot side platforms adjacent to Tracks 3 and 4 on the existing track alignment. It would replace the existing No. 20 crossovers with shorter No. 15 crossovers to allow the platforms to be centrally located relative to the available parcels. Both platforms as a result would be entirely on tangent track and the platforms are not staggered. This option was dismissed because it did not support the desired express/local service concept and the No. 15 crossovers reduced the maximum authorized speed through the interlocking from 45 to 30 MPH.

3.5.1.3 Option 3: Dual Island Platforms on Tangent Track

This concept provides two 1,080-foot x 24-foot island platforms respectively between Tracks 1 and 3 and Tracks 2 and 4 to provide access to all tracks. It would maintain Tracks 1 and 2 on their existing track alignment and shift Tracks 3 and 4 towards the outside of the ROW. It would also maintain the existing No. 20 crossovers between Tracks 4 and 2 and between Tracks 2 and 1. This concept would install a new No. 15 crossover between Tracks 1 and 3 at least 65 feet west of the western limit of the platforms to preserve connectivity from EBRY to Track 3. Both platforms are entirely on tangent track; however, track spirals start close to the ends of the platforms. The platforms are staggered, with the east end of the Track 2/4 platform offset approximately 140 feet west of the Track 1/3 platform (940 feet platform overlap). This option was dismissed because the No. 15 crossovers reduced the maximum authorized speed through the interlocking from 45 to 30 MPH.

3.5.1.4 Option 4: Alternate Version of Dual Island Platforms on Tangent

This concept is the same as Option 3, except that it would install a new No. 20 crossover between Tracks 1 and 3 rather than a No. 15. In order to ensure that the platform is entirely within tangent track and all crossovers are more than 65 feet from the ends of the platforms, this concept narrows the width of the platform along the north side between Tracks 1 and 3 at both ends. This option was dismissed because it required the island platform between Tracks 1 and 3 to be an irregular shape and narrow on the east end.

3.5.1.5 Option 5: Dual Island Platforms with North Platform on Curve

This concept also provides two 1,080-foot x 24-foot island platforms respectively between Tracks 1 and 3 and Tracks 2 and 4 to provide access to all tracks. It maintains Tracks 1 and 2 on their existing track alignment and shifts Tracks 3 and 4 toward the outside of the ROW. It replaces the existing No. 20 crossovers with No. 15 crossovers to ensure all track moves occur east of the station limits. Approximately 500 feet of the north platform along Track 3 only is on curved track. The Track 3 platform tapers down to 18.5 feet at the west end. The tracks are tangent along the remainder of the platform edges. The platforms are staggered, with the Track 1/3 platform offset approximately 190 feet west of the Track 2/4 platform (990 feet of platform overlap). This option was dismissed because the No. 15 crossovers reduced the maximum authorized speed through the interlocking from 45 to 30 MPH and because the of the north platform extending into the curve.

3.5.1.6 Option 6: Alternate Version of Dual Island Platforms with North Platform on Curve (Standard No. 20 Crossover)

This concept is the same as Option 5, except that it installs a new No. 20 standard crossover between Tracks 2 and 1 rather than a No. 15. Crossover. This would allow a maximum speed of 45 mph through the crossover between Tracks 2 and 1, thereby limiting the potential impact to express trains operating on these tracks. The south platform (Tracks 2 and 4) is entirely on tangent track. Approximately 550 feet of the north platform is on curved track along Track 3 only. The Track 3 platform tapers down to 20.67 feet at west end and 21.0 feet at the east end. The tracks are tangent along the remainder of the platform edges. The platforms are staggered, with the Track 1/3 platform offset approximately 270 feet west of the Track 2/4 platform (810 feet of platform overlap). This option was dismissed because it required an increased platform stagger with a longer portion of the Track 3 platform within the curve limits, and the northern platform required tapering on both ends.

3.5.1.7 Option 7: Alternate Version of Dual Island Platforms with North Platform on Curve (Tangential No. 20 Crossover)

This concept is the same as Option 6, except that it installs a new No. 20 tangential crossover between Tracks 2 and 1 rather than a standard No. 20. This would allow a maximum speed of 60 mph through the crossover between Tracks 2 and 1, further limiting the potential impact to express trains operating on these tracks. Approximately 665 feet of the north platform along Track 3 only is on curved track. The Track 3 platform tapers down to 13.33 feet at the west end and 21 feet at the east end. The tracks are tangent along the remainder of the platform edges. The platforms are staggered, with the Track 1/3 platform offset approximately 330 feet west of the Track 2/4 platform (750 feet of platform overlap). This option was dismissed because it required an increased platform stagger and the northern platform required tapering on both ends. While this option was technically feasible, the reduction in the maximum authorized main line speed at Hallett Street nullified the possible speed benefit of using a tangential crossover instead of a standard crossover as in Option 6.

3.5.1.8 Option 8: Dual Island Platforms with North Platform/Tracks 1 and 3 on Curve (Increased Platform Stagger)

This concept provides two 1,080-foot x 24-foot island platforms respectively between Tracks 1 and 3 and Tracks 2 and 4 to provide access to all tracks. It maintains Tracks 1 and 2 on their existing track alignment and shifts Tracks 3 and 4 toward the outside of the ROW. It replaces the existing No. 20 crossovers with No. 15 crossovers to ensure all track moves occur east of the station limits. The Track 2/4 platform is entirely on tangent track. Approximately 825 feet of the Track 1/3 platform is on curved track and tapers down to 18.5 feet at the west end. The platforms are staggered, with the Track 1/3 platform offset approximately 835 feet west of the Track 2/4 platform (245 feet of overlap). This option was dismissed because of the increased platform stagger and the No. 15 crossovers reduced the maximum authorized speed through the interlocking from 45 to 30 MPH.

3.5.1.9 Option 9: Single Center Island and Two Side Platforms on Tangent

This concept provides a single 1,080-foot x 24-foot center island platform between Tracks 1 and 2 as well as two 1,080-foot x 12-foot side platforms adjacent to Tracks 3 and 4 to provide access to all tracks. It realigns all of the tracks. All platforms are entirely on tangent track and the platforms are not staggered. As a result, EBRY is only accessible from Track 4 and the crossovers (shown as new No. 15s) are further east beyond Central Avenue. This option was dismissed because it did not allow full

connectivity to EBRY and the No. 15 crossovers reduced the maximum authorized speed through the interlocking from 45 to 30 MPH.

3.5.1.10 Option 10: Single Center Island and Two Side Platforms on Tangent

This concept also provides a 1,080-foot x 24-foot center island platform between Tracks 1 and 2 as well as two 1,080-foot x 12-foot side platforms adjacent to Tracks 3 and 4 to provide access to all tracks. It realigns all of the tracks and installs new No. 15 crossovers east of station limits. The platforms are not staggered. The south platform (Track 4) is entirely on tangent track. At the center island platform, approximately 145 feet of Track 1 and 190 feet of Track 2 are on curved track, while approximately 140 feet of the north platform (Track 3) is also on a curve. The island platform tapers down to 22.42 feet at the east end and 23.5 feet at the west end. This option was dismissed because it did not allow full connectivity to EBRY and the No. 15 crossovers reduced the maximum authorized speed through the interlocking from 45 to 30 MPH.

3.5.1.11 Option 11: Single Center Island and Side Platforms on Curve (Standard No. 20 Crossover)

This concept is essentially the same as Option 10, except that it installs a new No. 20 standard crossover between Tracks 2 and 1 rather than a No. 15. This would allow a maximum speed of 45 mph through the crossover between Tracks 2 and 1, thereby limiting the potential impact to express trains operating on these tracks. The south platform (Track 4) is entirely on tangent track. At the center island platform, approximately 145 feet of Track 1 and 190 feet of Track 2 are on curved track, while approximately 210 feet of the north platform (Track 3) is also on a curve. The island platform tapers down to 23.5 feet at the west end and 22.42 feet at the east end. The Track 3 platform tapers down to 12 feet at west end. The tracks are tangent along the remainder of the platform edges. The platforms are staggered, with the Track 3 platform offset approximately 70 feet west of the Track 4 platform (1,010 feet of platform overlap). This option was dismissed because it required an increased platform stagger with a longer portion of the platform along Tracks 1, 2, and 3 within the curve limits.

3.5.1.12 Option 12: Single Center Island and Side Platforms on Curve (Tangential No. 20 Crossover)

This concept is essentially the same as Option 6, except that it installs a new No. 20 tangential crossover between Tracks 2 and 1 rather than a standard No. 20. This would allow a maximum speed of 60 mph through the crossover between Tracks 2 and 1, further limiting the potential impact to express trains operating on these tracks. The south platform (Track 4) is entirely on tangent track. Approximately 146 feet to 192 feet of the center-island platform is on curved track, while approximately 241 feet of the north platform (Track 3) is also on a curve. The island platform tapers down to 23.5 feet at the west end and 22.42 feet at the east end. The Track 3 platform tapers down to 12 feet at west end. The tracks are tangent along the remainder of the platform edges. The platforms are staggered, with the Track 3 platform offset approximately 102 feet west of the Track 4 platform (978 feet of platform overlap). This option was dismissed for the same reasons as Option 11.

3.5.2 Selection of Preferred Option

The Preferred Option was developed as a modification of Option 4, with slight adjustments to the platform placement and dimensions. CTDOT and project stakeholders reviewed the preliminary station options and identified the following elements of the preferred layout:

- The proposed station will have a dual island platform configuration, with platforms between Tracks 1 and 3 and between Tracks 2 and 4. This configuration supports the envisioned

development of express rail service along the New Haven Line by using Tracks 1 and 2 for express trains and Tracks 3 and 4 for local service.

- The proposed station will maintain full access to and from the west end of EBRY. Similar to the existing interlocking at CP-257, the proposed track configuration will use a series of No. 20 crossovers to allow a train to exit the west end of EBRY and cross from the south side of the ROW (Track 4) to the north side (Track 3) at a maximum authorized speed of 45 mph.
- The length of the platforms will maintain as much of the platform as possible outside the limits of a track curve. The proposed platforms are 900 feet, which are long enough to accommodate a 10-car trainset.
- The potential impacts to Crescent Avenue from an expanded NHML ROW were considered acceptable because the City of Bridgeport is currently working on separate projects that will extend Church Street from Hallett Street to Waterview Avenue, providing an alternative route. This would allow Crescent Avenue to be discontinued if necessary between Pembroke Street and Waterview Avenue.

4 Affected Environment, Environmental Consequences, and Mitigation

4.1 Introduction

This chapter describes the affected environment, environmental consequences, and potential mitigation for the Proposed Project evaluated in this EIE.

4.1.1 Existing Track Infrastructure

The Barnum Station site is on the NHML in East Bridgeport between the existing commuter rail stations in Stratford (Mile Post 59.1) and downtown Bridgeport (Mile Post 55.5). This site is located between the Seaview Avenue (UG 56.77) and Pembroke Street (UG 56.35) railroad bridges immediately west of the existing EBRY facility. On a typical weekday, approximately 175 passenger trains operate over this segment.

From north to south there are four electrified mainline tracks: Track Numbers 3, 1, 2 and 4. There is an additional tail track on the south side of the ROW (Track 6) that extends from the EBRY facility, west over the Seaview Avenue Bridge before dead-ending approximately 250 feet beyond the bridge. The mainline tracks are electrified at 12.5 kV, 60 Hz AC delivered through an overhead catenary system. The track structure includes continuously welded rail and either concrete ties (Track 2), wooden ties (Tracks 1 and 4), or a mixture of both (Track 3).

The segment of track between the existing downtown Bridgeport Station and the EBRY has numerous constraints. The four-track mainline is on an elevated (10- to 20-foot high) embankment through the city of Bridgeport until the tracks reach the west end of EBRY. Universal crossovers west of the station allow eastbound trains to move from the center to the outside tracks to access Bridgeport Station's side platforms. Upon exiting Bridgeport Station and crossing over the Stratford Avenue Bridge, the guideway enters a relatively sharp curve, straightening as the tracks cross over the PECK drawbridge. Just north of PECK Bridge, the track enters a second curve near Noble Avenue and gradually flattens near Hallett Street. The tracks remain straight through the project site.

Within the project site, a non-universal interlocking allows eastbound trains to cross from the north side of the ROW (Track 3) to the south side (Track 4) in order to access the EBRY. There are no crossovers that allow an eastbound train to cross from south to north (Track 4 to Track 3) between downtown Bridgeport Station and EBRY. The nearest universal interlockings that allow this are further west past the downtown Bridgeport Station, or further east in Milford. Entering the project site from the east, the MAS is 75 mph until the non-universal interlocking, and 60 mph until Hallett Street, at which point it lowers further to 45 mph to cross the PECK drawbridge.

4.1.2 Station Area Context

The following areas define the Barnum Station site:

- Approximately 8.7 acres of land north of the NHML ROW, bound by Barnum Avenue to the north, Hallett Street to the west, and the unnamed stream to the east, which includes two separate parcels:
 - 812 Barnum Avenue is the southern portion of the former Remington Arms factory. The City of Bridgeport owns this site. All of its former industrial buildings were demolished. The parking lot, which is currently in deteriorated condition, was constructed in the mid-20th century.
 - 965 East Washington Avenue is immediately west of the former Remington site. Campus Office Park Associates owns this site. Improvements to the property include a comparatively newer asphalt parking lot and construction trailer. This site is currently used by a truck driving training program. The City will need to acquire this parcel to construct the station.
- Approximately 1.0 acre of Crescent Avenue south of the NHML, between Hallett Street and Waterview Avenue.

The area north of the Proposed Project site is also part of the former Remington Arms factory; this property is not within the Proposed Project site and would not be developed as part of the proposed station. The City of Bridgeport also owns this northern portion of the former Remington Arms factory across Barnum Avenue, between Helen Street, Arctic Street, and the unnamed stream. This approximately 11.0-acre parcel housed the former Remington Shot Tower and other Munitions Factory buildings that are currently abandoned and in a severely deteriorated condition. A commercial property is at the northwest corner of Barnum Avenue and Helen Street, directly across from 965 Washington Avenue, occupied by Colorblends Wholesale Flower Bulbs.

Campus Office Park Associates owns the 867 East Washington Avenue parcel west of the Barnum Station site, across Hallett Street. Campus Office Park Associates improved this parcel with asphalt pavement, though it is currently vacant. The existing Campus Office Park complex is further west, across Pembroke Street, and houses several commercial businesses, a warehouse, and office space.

A wetlands and stream are on the eastern portion of the 812 Barnum Avenue property. United Illuminating (UI) owns the property beyond the east bank of the stream at 1677 Seaview Avenue. This property houses cable terminators that transition UI underground electric ducts that run beneath the Pequonock River and Yellow Mill Channel to aerial transmission lines supported on towers that continue further north.

Crescent Avenue currently parallels the railroad embankment to the south of the NHML ROW from Pembroke Street to Seaview Avenue. The Housing Authority of the City of Bridgeport owns a 29.08-acre parcel south of Crescent Avenue between Hallett Street and Waterview Avenue. The southern portion of this parcel is under development as Phase 1a and 1b of the Crescent Commons Housing Development.

According to the City of Bridgeport Assessor's Department, UI also owns a small tract of land at the southeast corner of Crescent Avenue and Hallett Street (552 Crescent Avenue). The land is vacant but previously contained a UI transformer substation. The Housing Authority also owns two small parcels across Hallett Street, beyond which lies the Saints Cyril and Methodius Slovakia Roman Catholic Church at the corner of Crescent Avenue and Church Street.

4.2 Resources Eliminated from Further Consideration

Preliminary research, review of existing information, and coordination with state and federal resource agencies shows that certain environmental resources, or categories of potential environmental effect, are not present on the Proposed Project site or are not likely to be affected by construction of a new commuter rail station at the proposed site. CTDOT prepared a *Baseline Conditions Technical Memorandum* in 2016 that documents existing conditions that supports these conclusions.

The following environmental resources, or category of potential environmental effect, are not analyzed in the EIE because they are not present on site or would not be affected by construction:

- Coastal Barriers: The Proposed Project site is not on a designated Coastal Barrier.
- Farmland Soils: There are no Prime, State, or Unique farmland soils present on the Proposed Project site.
- Relocations: Construction of the Proposed Project would require the relocation of one business; it would not require the relocation of residents.
- Threatened and Endangered Species: Federal and state-listed protected species do not occur on or in the vicinity of the project site.
- Wild and Scenic Rivers: There are no federally designated Wild and Scenic Rivers in the vicinity of the Project.
- Wildlife: The Proposed Project site does not contain habitat for wildlife species. Constructing and operating a commuter rail station would not affect wildlife use of habitat for nesting, feeding, reproduction, overwintering, or migration.

4.3 Transportation

This section describes the transportation study area, existing rail, bus, and automobile transportation conditions within this area, the methodology used to establish existing and future transportation conditions, the traffic impacts of the No Action Alternative and Proposed Project, and the potential mitigation measures. The development of this analysis was coordinated with CTDOT staff and the City of Bridgeport, with additional consultation with MNR concerning rail operations. The *Traffic Impact and Access Study (TIAS) Technical Memorandum* is included in this EIE as Appendix A, and contains additional information and detailed analysis of the projected transportation impacts.

4.3.1 Methodology

The study area for the traffic impact analysis is relatively broad in order to identify and analyze the full effect of traffic impacts as a result of the Proposed Project. The study area captures 30 intersections in the vicinity of the proposed station (Figure 4-1). These intersections were selected based on conversations with the City of Bridgeport and a review of the surrounding road network and proposed site access and circulation.

The traffic analysis reviews existing traffic operations (2016) and estimated traffic operations for the year of opening (2021) for both the No Action Alternative and Proposed Project. The analysis also reviews estimated future traffic operations (2040) for use in analyzing potential air quality impacts,

discussed in Section 4.4. Traffic conditions are described in terms of Level of Service (LOS), with levels ranging from LOS A to LOS F. Most jurisdictions identify a threshold (typically LOS D or E) above which roadways must operate or be considered failing or deficient. For the Barnum Station project, LOS D is the threshold; any intersections operating at a LOS E or LOS F were considered deficient.

LOS for signalized intersections are defined in terms of average stopped delay per vehicle. Delay is a complex measure and is dependent on a number of variables including the quality of signal progression, cycle length, green ratio, and the volume/capacity ratio for the approach. For signalized intersections, levels of service can be calculated and expressed for each movement or approach and for the total intersection as a weighted average of all movements.

Traffic operating conditions were analyzed during the weekday morning and evening peak hours, when traffic flow is at its highest. Peak hour turning movement counts, vehicle classifications, and bicycle and pedestrian counts were recorded at each of the intersections within the study area for a one-day period in November 2015 (with additional counts collected in April and May 2016). These observations were collected on weekdays between 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, the morning and evening peak periods, respectively.

The analysis includes several design assumptions for the circulation and access at the proposed station. The proposed station would be served by approximately 550 parking spaces at year of opening, with access provided by three driveways; one access way from Hallett Street, and two access ways from Barnum Avenue. A "kiss-and-ride" and taxi drop-off area would be accessed by a driveway from Barnum Avenue. This analysis assumed that, by 2040, a parking garage would be constructed on the southeast corner of Barnum Avenue and Hallett Street with access provided by one driveway each to Hallett Street and Barnum Avenue. That parking garage, however, is not part of the Proposed Project.

The capacity analyses were conducted using Synchro software (Version 8), based on evaluation criteria contained in the 2000 National Research Council Highway Capacity Manual (HCM). The analysis is based on four performance measures: Seconds of Delay, Volume-to-Capacity, Level of Service, and Demand. These are used together in order to compare performance; for example, some intersections may have a high Volume-to-Capacity ratio which might indicate an area of concern, but show low delay or high LOS which would indicate that the intersection performs well despite the high volume.



Figure 4-1
Study Area Intersections

**Bannum Station
Bridgeport, Connecticut**

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The daily ridership at the proposed station, by mode of access, was forecast using the FTA Simplified Trips on Project Software (STOPS) model. The daily vehicle traffic generated by the proposed station was determined based on the number of riders expected to access the station by passenger vehicle. The portion of daily vehicle traffic expected to occur during the weekday morning and weekday evening peak hours was then estimated based on review of the current Bridgeport train station schedule and the 2015 MNR boardings data.

Rail operations were analyzed in coordination with MNR and CTDOT to understand the Existing Conditions, No Action and Build scenarios. The existing conditions model was used as a baseline against which to compare the No Action and Build scenarios. Both scenarios include the following identified and planned infrastructure improvement projects:

- Stamford Station Track 7;
- WALK Bridge CP-243; and
- NHML Signal Replacement Project.

The No Action scenario assumes operations of the existing MNR, SLE, and Amtrak Service with these planned infrastructure projects. The Build scenario includes all improvements from the No Action scenario with the addition of Barnum Station. Additional Hartford Line and SLE service was extended past New Haven when possible, creating zone express service to major stations, stopping at Barnum Station, and terminating at Stamford. Headway gaps and service opportunities to Barnum Station were supplemented with MNR trains when applicable for the Build scenario.

4.3.2 Existing Conditions

4.3.2.1 Public Transportation

GBT provides fixed-route and demand responsive public bus service in the Greater Bridgeport planning region, serving Bridgeport, Fairfield, Stratford, and Trumbull, with additional local and express services extending into Monroe, Shelton, and Derby. Inter-district services (the Coastal Link) extend into East Bridgeport, Westport, Milford, and accommodate transfers with other transit systems including Connecticut Transit, Norwalk Transit District, Milford Transit District, Housatonic Area Regional Transit, and Valley Transit District.

The local bus system consists of 19 routes with various route extensions and branches to extend coverage. GBT provides eight bus routes in the vicinity of the Proposed Project, typically providing 30-minute headways and service between 5:00 AM and 11:30 PM. These routes are shown in Table 4-1.

TABLE 4-1 SUMMARY OF LOCAL BUS ROUTES IN THE PROPOSED PROJECT VICINITY

Bus Route	From	To	Number of Stops		Down-town Bus Station	Route through Study Area	Frequency (minutes)		
			Inbound	Outbound			Week-day	Sat	Sun
1	University of Bridgeport	Dock Shopping Center	5	5	Yes	Barnum Avenue	30	30	30
CL	Norwalk Wheels Hub	CT Post Mall	8	6	Yes	Stratford Ave-CT Ave	20	30	120
9	Seaside Park	Hawley Lane Mall, Trumbull Corp. Park	2	7	Yes	East Main Street	30	60	60
10	Fairfield Woods @ Stillson Rd.	Beardsley Ave @ Stratford Ave.	4	5	Yes	Stratford Avenue-CT Ave	30	60	60
13	Bus Terminal	Success Park	5	5	Yes	Central Avenue	30	60	60
15	Bus Terminal	Derby Rail Station	6	6	Yes	Grant St-Arctic St	60	60	60
17	Bus Terminal	Success Park	6	6	Yes	US Rte 1-North Ave	30	30	NA
23	Bus Terminal	Derby Rail Station	7	7	Yes	Grant St- Arctic St	60	NA	NA

Source: Greater Bridgeport Transit, 2015.

Designated bus stops are located at most principal intersections within the vicinity of the Proposed Project. Based on ridership data, about 10,100 passengers use one of the GBT bus routes that pass through the study area each day, with about 1,600 riders getting on or off within the study area.

4.3.2.2 Traffic Operations

The traffic conditions at 30 intersections in the vicinity of the Proposed Project site were evaluated through intersection geometry, traffic volumes, and vehicle crash history. This section describes the existing traffic conditions. Assessing crash history, traffic volumes, and existing level of service at the study intersections allows CTDOT to identify trends or hot spots that could worsen from potentially increased traffic. Data were obtained from the three most recent years available (2012-2014) from the CTDOT Bureau of Planning and Research and CTDOT evaluated each of the intersections' crash history; these detailed tables are available in the TIAS Report (Appendix A)

Figure 4-2 presents the results of the existing conditions LOS analysis. Because the LOS analysis evaluated a high number of signalized and unsignalized intersections, the detailed results of the LOS analysis for the study area are provided in Appendix A. The capacity analysis results indicate that all signalized intersections in the study area currently operate at an overall LOS D or better during the peak traffic periods under existing conditions. All unsignalized intersections in the study area also operate at LOS D or better during the peak traffic periods.



Figure 4-2 Existing Intersections Level of Service

Barnum Station Bridgeport, Connecticut

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4.3.2.3 Rail Operations

The project area is served by commuter and intercity regional rail services. MNR, a subsidiary of the New York Metropolitan Transportation Authority, operates commuter trains through Bridgeport on the electrified NHML. The NHML runs east-west along the southwestern shoreline of the state between New Haven and New York City. Commuter rail service is oriented towards travel to and from New York City, with peak service consisting of trains headed inbound toward Grand Central Terminal in the mornings and outbound from New York City in the evening. In addition to main line service, three branch lines connect to the NHML.

The NHML is part of Amtrak's NEC, the busiest passenger rail corridor in the United States, connecting eight states and the District of Columbia. Amtrak operates the Acela high-speed trains along the corridor, as well as the Northeast Regional and Vermonter rail service.

Amtrak also operates SLE on behalf of CTDOT. SLE trains operate east of New Haven, and pass through or make stops at Bridgeport on the way to Stamford, CT.

There are 20 stations along the NHML within Connecticut, and five in the Greater Bridgeport Region: Stratford, Bridgeport, Fairfield (Town Center), Southport and the Fairfield Metro Center station, which opened in December 2011. Stations are relatively close together with an average of only about 2.5 miles separating the stations. High level platforms are provided at all stations and indoor waiting areas are available at Bridgeport, Fairfield and Fairfield Metro Center stations.

Weekday data on passenger boardings for Bridgeport Station and the adjacent stations are available for MNR and are presented in Table 4-2. Over the past several years, ridership on the NHML has continued to increase. Total annual ridership is currently about 39.6 million passengers. Typical weekday boardings from the region's rail stations total 8,246 persons per day. The busiest stations are Fairfield (Town Center) and Bridgeport, with 2,048 and 3,012 passenger boardings per day, respectively. Commuter passengers, typically riding in the peak hours, comprise a large percentage of overall commuter rail ridership.

TABLE 4-2 WEEKDAY PASSENGER BOARDINGS FOR BRIDGEPORT STATION AND ADJACENT STATIONS – METRO NORTH RAILROAD (2015)

Station	Total Boardings	Peak ¹	Off Peak
Stratford	1,399	80.6%	19.4%
Bridgeport	3,436	63.3%	36.7%
Fairfield Metro Center	1,692	76.0%	24.0%
Fairfield (Town Center)	2,137	74.5%	25.5%
Southport	392	73.0%	27.0%
TOTAL	8,246	71.6%	28.4%

Source: Metro North Railroad, 2015

¹ The Peak Period considers all weekday trains that arrive in Grand Central Terminal (GCT) or Harlem-125th Street Station between 5:00 AM and 10:00 AM, that depart from GCT between 5:30 AM and 9:00 AM, or that depart GCT between 4:00 PM and 8:00 PM. (MTA, 2016).

Over half of all daily passengers boarding from a station in the region travel to Grand Central Terminal in Manhattan. Despite this, intrastate travel has become increasingly important. Better and more frequent service has been instituted to meet intrastate trip purposes, especially those oriented to Stamford where there is a heavy reverse commute ridership in addition to ridership into Manhattan.

4.3.3 Impact Assessment

4.3.3.1 Public Transportation

No Action Alternative

Under the No Action Alternative, bus transportation would remain a core transportation mode for residents and employees traveling to and from the project area and buses would continue to have a key role in meeting the area's transportation needs. GBT Routes 1 (to be combined with Coastal Link (CL) service), 13, 15, and 23 would continue to provide access to East Bridgeport. GBT would seek to enhance service frequency and the number of routes through East Bridgeport to accommodate future growth as necessary.

Proposed Project

The Proposed Project is not anticipated to have an effect on public transportation in the vicinity of the site. The station would increase the demand for bus service to and from the project area from passengers arriving to or departing from the station. GBT projections for bus ridership based on current transportation data and trends estimate that approximately 9.3 percent of station users would arrive by bus.

GBT, MetroCOG, and the City of Bridgeport are currently finalizing the Regional Long Range Transit Plan and Alternative Modes Analysis of the east/west corridor through the city of Bridgeport. This plan identifies the proposed station as a key consideration in future service improvements, driving the realignment of the CL to Barnum Avenue. The realigned CL service would absorb the existing GBT Route 1 service to provide shorter headways to and from the proposed station. The proposed service changes in the Regional Long Range Transit Plan are designed to take full advantage of the proposed station.

TABLE 4-3 WEEKDAY LINKED TRIP IMPACTS BY OPERATOR

Category	2014		2021		2040	
	No Action	Barnum Station Build	No Action	Barnum Station Build	No Action	Barnum Station Build
MNR Linked Trips	73,957	74,743	77,738	78,518	94,919	95,822
Bus-Only Linked Trips	62,547	62,351	63,543	63,348	65,986	65,833
All Transit Linked Trips	136,505	137,094	141,281	141,866	160,905	161,655
Incremental Linked MNR Trips	0	786	0	780	0	903
Incremental Linked Transit Trips	0	589	0	585	0	750

1 Parking at Barnum constrained to 550 cars to represent opening-year conditions.

2 Parking at Barnum constrained to 550 cars to represent opening-year conditions.

3 Parking at Barnum not constrained.

Table 4-3 shows the Proposed Project's projected impact on Linked Trips by operator. The difference in Bus-Only Linked Trips between the No Action and the Proposed Project conditions for both 2021 and 2040 are negligible. The GBT bus service planned in the Regional Long Range Transit Plan would be sufficient to support future bus ridership demand in the station vicinity.

4.3.3.2 Traffic Operations

This section discusses the analysis of future traffic conditions and includes a review of expected trip generation from the proposed station based on the projected daily ridership. Impacts for the No Action Alternative and the Proposed Project are assessed based on the study area intersections' projected LOS for the 2021 Year of Opening and the 2040 design year. Appendix A provides the results of the intersection capacity analysis for each intersection. The site-generated traffic volume projections for the proposed station for the 2021 Year of Opening and 2040 design year are summarized in Table 4-4.

TABLE 4-4 PROPOSED STATION TRIP GENERATION SUMMARY

	2021 Site-Generated Traffic			2040 Site Generated Traffic		
	Park and Ride	Drop-off/ Pickup	Total	Park and Ride	Drop-off/ Pickup	Total
Weekday Daily						
Enter	540	83	623	1,100	124	1,224
Exit	540	83	623	1,100	124	1,224
Total	1,080	166	1,246	2,200	248	2,448
Weekday AM Peak Hour						
Enter	130	26	156	264	39	303
Exit	0	26	26	0	39	39
Total	130	52	182	264	78	342
Weekday PM Peak Hour						
Enter	0	23	23	0	35	35
Exit	117	23	140	238	35	273
Total	117	46	163	238	70	308

Source: VHB, Traffic Impact Analysis Report, 2016.

The origin/destination of vehicle trips generated by the proposed station shown in Table 4-4 was projected using the STOPS model; the model allows for separate origin/destination projections for park and ride and pickup/drop-off trips. The STOPS model assumes that pickup/drop-off trips originate within three miles of the proposed station, but park and ride trips may be attracted from further distances. Using this information, these trips were plotted onto the surrounding roadway network to develop future site-generated traffic volumes at each of the study area intersections.

No Action Alternative

Under the No Action Alternative, future traffic conditions would worsen as a result of background traffic growth. The background growth is a function of the expected land development, economic activity, and changes in demographics in the area. According to the analysis, four signalized intersections and one unsignalized intersection in the study area are projected to operate at an overall LOS E or F under future conditions.

- East Washington Avenue at Knowlton Street: The intersection will continue to operate at LOS D during peak periods under both the No Action and Proposed Project conditions in 2021. Analysis shows degradation of intersection LOS to LOS E during the weekday evening peak traffic period

under both the No Action and Proposed Project conditions due to anticipated background traffic growth in 2040.

- Seaview Avenue at Route 130 (Connecticut Avenue/Stratford Avenue): The intersection LOS would degrade to LOS E during the weekday evening peak traffic period under both the No Action and Proposed Project condition by 2021 due to anticipated background traffic growth. The intersection is expected to continue to operate at an overall LOS E during the weekday evening peak traffic period under the No Action condition by 2040.
- Seaview Avenue at I-95 Northbound Ramps: The intersection LOS would degrade to LOS F during the weekday evening peak traffic period under both the No Action and Proposed Project conditions by 2021 due to anticipated background traffic growth, with individual turning movements expected to operate at LOS F under the same conditions. This level of service is expected to continue to 2040 under both the No Action and the Proposed Project conditions.
- Route 127 (East Main Street) at Cedar Street: The intersection LOS would degrade to LOS E during the weekday evening peak traffic period under both the No Action and Proposed Project conditions by 2021 due to anticipated background traffic growth. Analysis shows degradation of intersection LOS to LOS F during the weekday evening peak period under both the No Action and the Proposed Project conditions due to anticipated background traffic growth in 2040.
- Seaview Avenue at Crescent Avenue: The intersection's northbound and southbound Seaview Avenue approach LOS would degrade to LOS F during the peak traffic periods under both the No Action and Proposed Project conditions by 2021 and through 2040 due to anticipated background traffic growth.

Proposed Project

With the Proposed Project, one intersection is projected to operate at a LOS one grade lower than that of the No Action condition (Seaview Avenue at Route 130), and additional traffic generated by the proposed station is projected to increase average delays.

- East Washington Avenue at Knowlton Street: The intersection would operate at the same LOS as under the No Action conditions for both 2021 and 2040. Traffic generated by the proposed station would increase average delays by approximately 3 seconds during the weekday morning peak and evening peak periods by 2021, by approximately 11 seconds during the weekday morning peak period by 2040, and by approximately 8 seconds during the weekday evening peak period by 2040.
- Seaview Avenue at Route 130 (Connecticut Avenue/Stratford Avenue): The intersection would operate at the same LOS as under the No Action conditions for 2021. With the additional traffic generated by the proposed station, this intersection is projected to operate at LOS F during the weekday evening peak traffic period by 2040, compared to LOS E under No Action conditions for the same period. The traffic would increase average delays by approximately 9 seconds during the weekday evening peak period by 2021, and by approximately 20 seconds during the same period by 2040.
- Seaview Avenue at I-95 Northbound Ramps: The intersection would operate at the same LOS as under the No Action conditions for both 2021 and 2040. Traffic generated by the proposed station would increase average delays by approximately 11 seconds during the weekday evening peak period by 2021, and by approximately 23 seconds during the same period by 2040.

- Route 127 (East Main Street) at Cedar Street: The intersection would operate at the same LOS as under the No Action conditions for both 2021 and 2040. Traffic generated by the proposed station would not increase average delays.
- Seaview Avenue at Crescent Avenue: The intersection would operate at the same LOS for the northbound and southbound approaches as under the No Action conditions for both 2021 and 2040. Though this intersection operates at the same LOS under both the No Action and Proposed Project conditions, the average delay would be substantially worse under the Proposed Project conditions. With installation of a new traffic control signal at this unsignalized intersection, the intersection is projected to operate at LOS A during peak periods by 2021 and 2040; the installation of a new traffic signal is included under Section 4.3.4, Mitigation Measures.

4.3.3.3 Rail Operations

No Action Alternative

Under the No Action Alternative, rail operations would remain unchanged along the NHML corridor and a new commuter rail station would not be constructed in East Bridgeport. The No Action Alternative recognized all funded future signal and infrastructure improvement projects scheduled to be operational prior to 2021. These included the NHML signal improvement project, new universal interlocking CP-243 between Westport and East Norwalk stations, and the addition of a new stub-ended platform track at Stamford Station (Track 7).

Proposed Project

The operational impact of the Proposed Project was evaluated using Berkeley Simulation's Rail Traffic Controller® (RTC). The rail operations evaluation for the Proposed Project included the same assumed infrastructure projects as the No Action Alternative with the addition of the proposed station.

To test the full impacts of the Proposed Project, a future expansion of existing services was assumed for the full-build model. This future service plan assumed the introduction of "zone express" SLE service as well as the future addition of a new Hartford/Springfield service. The Springfield/Hartford Service included proposed trips originating from Springfield and Hartford terminating at New Haven. This proposed service was extended to include stops at Barnum Station, terminating at Stamford Station. The zone express SLE service extended a portion of the current Shoreline service from the existing terminus at New Haven Station west to Stamford Station, making a single stop at Barnum Station in between. These new express trains were used to fill operating windows between existing MNR service, and utilized the full potential of the proposed center island platforms, maintaining express traffic on the inside tracks. Additionally, two variations of Amtrak service were also tested. The first variation maintained all current Amtrak service as it operates today, while the second scenario stopped all Amtrak regional service currently serving Bridgeport station at the new Barnum Station instead.

This analysis concluded that the introduction of Barnum Station would have little to no impact on existing NHML operations. Any trains making new station stops at Barnum Station would incur three to four minutes of additional travel time. When dispatched under perturbed conditions the simulation model showed resiliency in its ability to recover from randomized delays, further proving the addition of Barnum Station would not impact NHML operations. Based on this analysis and the anticipated future operating plans for Amtrak, SLE and MNR, the addition of Barnum Station along the NHML in Bridgeport would not cause new operational conflicts nor require modifications to planned schedules.

4.3.3.4 Ridership

A ridership analysis was conducted to estimate future ridership for stations along the NHML for the No Action and Build scenarios. This analysis considered a wide variety of input sources including population and employment, origin-to-destination travel patterns, transit levels-of-service, the Connecticut Statewide Travel Model forecasts, the New York Metropolitan Transportation Council forecasts, U.S. Census data, highway travel times and costs, transit schedule data for MNR, GBT, CT Transit, and New York City Subway, and overall system ridership statistics. Table 4-5 presents estimates of station boardings for each alternative.

No Action Alternative

As shown in Table 4-5, ridership is projected to steadily increase through 2021 and 2040 at modeled stations under the No Action Alternative.

Proposed Project

By the planned Year of Opening (2021), the proposed station would attract nearly 1,600 daily boardings. By 2040, weekday boardings would grow to nearly 2,400 daily boardings.

The projected weekday boardings by station show that there is a need for the proposed station. In the year of opening (2021), the proposed station is anticipated to draw a small portion of riders from the existing Bridgeport Station and other stations along the line. However, by 2040, the projections indicate that these stations will have recovered and surpassed their existing weekly boardings, and the proposed Barnum Station would continue to grow in weekday boardings. This short-term decrease in weekly boardings at the Bridgeport Station and other stations is expected due to riders naturally shifting their travel patterns to use the closest station to their origin or destination.

TABLE 4-5 COMPARISON OF COUNTED AND MODELED 2014, 2021, AND 2040 WEEKDAY BOARDINGS BY STATION

Station	Counted (2016)	Base 2014	2021 No Build	2021 Build	2040 No Build	2040 Build
New Haven State St.	69	406	403	367	436	392
New Haven	3,389	2,991	3,108	3,041	3,933	3,989
West Haven	537	542	553	542	644	646
Milford	2,181	2,165	2,253	2,047	2,741	2,555
Stratford	1,396	1,181	1,197	1,097	1,414	1,185
Barnum	-	-	-	1,595	-	2,354
Bridgeport	3,715	3,960	4,064	3,517	4,924	4,358
Fairfield Metro	1,585	1,617	1,649	1,435	1,937	1,503
Fairfield	2,162	1,790	1,888	1,759	2,362	2,308
Southport	383	736	778	693	982	928
Green's Farms	763	955	983	970	1,115	1,139
Westport	2,478	2,234	2,311	2,183	2,729	2,650
East Norwalk	777	927	960	952	1,126	1,155
South Norwalk	3,044	2,886	2,993	2,949	3,522	3,600
Rowayton	562	298	310	296	363	361
Darien	1,679	978	1,027	988	1,240	1,250
Noroton Heights	1,460	1,617	1,711	1,607	2,071	2,060
Stamford	13,391	12,225	12,877	12,293	15,922	15,983
Old Greenwich	1,022	621	635	633	713	727
Riverside	803	629	647	628	714	712
Cos Cob	900	749	785	766	914	938
Greenwich	4,429	4,061	4,235	4,219	5,046	5,239
Total	46,725	43,568	45,367	44,577	54,848	56,032

Source: VHB, Barnum Ridership Report, 2016.

4.3.4 Mitigation Measures

Based on the results of the future conditions LOS analysis at the study area intersections, CTDOT has developed recommendations to address potential traffic impacts resulting from the proposed station. Improvements are recommended at five locations, summarized below:

- Provide left-turn lanes on Hallett Street and Barnum Avenue at the proposed station driveways;
- Install wayfinding signs to direct Barnum Station visitors to turn onto Noble Avenue from East Washington Avenue;
- Restripe the existing pavement surface on Barnum Avenue to provide left-turn lanes onto Noble Avenue;
- Restripe the existing pavement surface on East Washington Avenue to provide left-turn lanes onto Noble Avenue; and
- Install a new traffic control signal at the intersection of Seaview Avenue at Crescent Avenue.

4.4 Air Quality

The FTA, in cooperation with the FHWA, has established procedures for the Transportation Conformity requirements of the Clean Air Act, as amended in 1990. The Transportation Conformity provisions of the Clean Air Act are intended to integrate transportation and air quality planning in areas that are designated by the USEPA as not meeting the National Ambient Air Quality Standards (NAAQS). Transit projects are an important part of improving air quality. The air quality study includes a local and regional air quality analysis that demonstrates compliance with the Transportation Conformity. The local/hotspot (microscale) analysis evaluated carbon monoxide (CO) quantitatively and considered the potential for impacts of particulate matter (PM). The regional or mesoscale analysis evaluated the ozone precursors volatile organic compounds (VOC) and oxides of nitrogen (NO_x) as well as the greenhouse gas carbon dioxide CO₂. All analyses were conducted in accordance with the SIP and Motor Vehicle Emissions Budget (MVEB). This section provides an analysis of the potential effects of the Proposed Project on air quality, including an analysis of the potential implications of the project with respect to mobile source air toxics (MSATs).

A regional modal shift from vehicle commuters to rail commuters is likely to occur as a result of the new commuter rail station. Since the station will only service commuter rail, vehicle trips to and from Barnum Station will primarily be made by light-duty passenger vehicles. A negligible amount of heavy-duty diesel vehicle trips is associated with the implementation of the Project.

4.4.1 Overview

FTA, FHWA, and the USEPA, have established procedures for Transportation Conformity requirements of the Clean Air Act Amendments. Guidance from both the USEPA and CTDEEP define the air quality modeling and review criteria for analyses prepared pursuant to the 1990 Clean Air Act Amendments (CAAA). The CAAA require that a Proposed Project not:

- Cause any new violation of the NAAQS;
- Increase the frequency or severity of any existing violations; or
- Delay attainment of any NAAQS.

These criteria are specifically addressed in the microscale analysis. The CAAA resulted in states being divided into attainment and non-attainment areas with classifications based upon the severity of their air quality problem. A non-attainment area is an area that has had measured pollutant levels that exceed the NAAQS and that has not been designated to attainment. The CAAA established emission reduction requirements that vary by an area's classification.

4.4.2 Existing Conditions

4.4.2.1 Air Quality Standards

The USEPA has set the NAAQS for criteria pollutants to protect public health. The predominant source of pollution anticipated from the proposed station is emissions from project-related motor vehicle traffic. CO and PM are directly emitted by motor vehicles. CO and PM concentrations can be estimated by computer modeling, which can then be compared to the NAAQS. The following section describes the attainment status of each of the pollutants of concern within the study area.

Carbon Monoxide

The Proposed Project site is located in the city of Bridgeport within Fairfield County. The area designation for the city of Bridgeport is within the New Jersey-New York-Connecticut Interstate Air Quality Control Region as defined in 40 CFR 81.13.¹ This area is considered a Moderate Maintenance area for CO. Maintenance areas are required to periodically evaluate their impact on CO concentrations and the NAAQS.

Particulate Matter

PM is made up of small solid particles and liquid droplets. PM₁₀ refers to particulate matter with a nominal aerodynamic diameter of 10 micrometers or less, and PM_{2.5} refers to particulate matter with an aerodynamic diameter of 2.5 micrometers or less. The area designation for the city of Bridgeport is within the New Jersey-New York-Connecticut Air Quality Control Region which is in attainment for PM₁₀ and is designated an Attainment area for PM_{2.5} under the 2012 standard, but a Maintenance Area under the 2006 standard. Maintenance areas are required to periodically evaluate their impact on PM concentrations and the NAAQS.

Ozone

Fairfield County has been determined to be a moderate non-attainment area for the 8-hour ozone standard of 2008 as of June 2016. On June 15, 2005, the USEPA revoked the 1-hour ozone standard for most areas in the country. This action means that the 1-hour ozone non-attainment area classified as "Serious," is no longer applicable for the county. Only the 8-hour ozone NAAQS applies. A new final rule for the Ozone NAAQS was published in the Federal Register on October 26, 2015, and effective as of December 28, 2015. The previous (2008) Ozone standards additionally remain in effect in some areas. Revocation of the previous (2008) Ozone standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards. The ozone precursors (Nitrogen Oxides [NO_x] and Volatile Organic Compounds [VOC]) are analyzed. Emissions of VOC and NO_x react in the presence of heat and sunlight to form ozone in the atmosphere. Accordingly, ozone is regulated as a regional pollutant and is not assessed on a project-specific basis.

Volatile Organic Compounds

VOC are a general class of compounds containing hydrogen and carbon and are a precursor to the formation of the pollutant ozone. While concentrations of VOC in the atmosphere are not generally measured, ground-level ozone is measured and used to assess potential health effects.

Oxides of Nitrogen

When combustion temperatures are extremely high, as in automobile engines, atmospheric nitrogen gas may combine with oxygen gas to form various oxides of nitrogen. Of these, nitric oxide (NO) and nitrogen dioxide (NO₂) are the most significant air pollutants. This group of pollutants is generally referred to as nitrogen oxides or NO_x. Nitric oxide is relatively harmless to humans but quickly converts to NO₂. Nitrogen dioxide has been found to be a lung irritant and can lead to respiratory illnesses. Nitrogen oxides, along with VOC, are also precursors to ozone formation.

¹ Each state is responsible for ensuring air quality conformity within the entire geographic area by submitting an implementation plan that identifies national primary and secondary ambient air quality standards. Air quality control regions were established in 1970.

Carbon Dioxide

Greenhouse gases (GHG) are essential to maintaining the temperature of the Earth—without them the planet would be so cold as to be uninhabitable. While there are other GHGs, CO₂ is the predominant contributor to global warming, and emissions can be calculated for CO₂ with readily accessible data. CO₂ is used as a proxy to assess the regional greenhouse gas impacts of the project.

4.4.3 Impact Assessment, Microscale Analysis

The microscale analysis analyzed concentrations of CO and the potential for impact of PM at a localized level and compared them to the NAAQS. Microscale analyses are conducted for worst-case scenarios, in order to show that all study area intersections will pass the NAAQS by demonstrating the acceptability of a few representative intersections.

4.4.3.1 Methodology

The microscale air quality analysis evaluated air quality impacts of the following conditions:

- 2015 Existing Condition
- 2040 No Action Condition (Horizon Year; without Barnum Station)
- 2040 Build Condition (Horizon Year; with Barnum Station)

The 2040 No Action conditions projected the 2015 existing traffic condition to the future years without the planned station. The analysis then compared these values to the Proposed Project (2040). Because the microscale analysis is intended to analyze the worst-case air quality scenario, it does not analyze the Year of Opening 2021 and only considers the 2040 design year scenario when the traffic volumes are the largest and delay/queuing is at its worst.

Intersection Selection

The intersections that were modeled in the microscale analysis were selected based on level of service and intersection volumes as outlined in the USEPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (the "EPA Guidance")². The USEPA Guidance requires that intersections be ranked by descending intersection volumes and improving level of service based on the design-year Build condition without mitigation measures. Intersections that have the worst level of services and highest intersection volumes are chosen for analysis. These intersections provided the worst-case scenario pollutant concentrations.

As a result of the screening assessment of the traffic data from the Proposed Project, four intersections were chosen for the analysis based on LOS and volume during the morning (AM) and/or evening (PM) peak hour. The intersections represent the worst LOS in the study area and/or the largest volume in the study area due to the Proposed Project. It is expected that if these worst-case scenario intersections pass, then all intersections in the study area will exhibit CO concentrations below the NAAQS. The Horizon Year Build Condition intersection volumes and LOS are presented in Table 4-6. Based on the rankings, the following intersections were evaluated:

- Seaview Avenue at I-95 Southbound Ramps - AM peak (Highest Overall Volume)

² *Guideline for Modeling Carbon Monoxide from Roadway Intersection*, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-454/R-92-005, November 1992.

- Seaview Avenue at Connecticut/Stratford Avenue (Route 130) - AM peak (Highest Overall Volume) & PM peak (Worst LOS & Highest Overall Volume)
- Seaview Avenue at I-95 Northbound Ramps - PM peak (Worst LOS)
- East Main Street (Route 127) at Cedar Street - PM peak (Worst LOS)

TABLE 4-6 2040 BUILD CONDITION OVERALL INTERSECTION VOLUMES AND LOS

Intersection	Morning Peak Period		Evening Peak Period	
	Volume	LOS	Volume	LOS
Main Street at Catherine Street and East Washington Avenue	2450	D	2320	C
East Washington Avenue at Housatonic Avenue	2238	B	2548	C
East Washington Avenue at Knowlton Street	1476	D	1817	E
East Washington Avenue at Noble Avenue	720	B	978	C
East Main Street (Route 127) at East Washington Avenue	993	B	1430	A
East Main Street (Route 127) at Crescent Avenue	951	B	1365	A
Barnum Avenue at Noble Avenue	673	B	871	C
Barnum Avenue at Kossuth Street	744	B	884	B
Barnum Avenue at East Main Street (Route 127)	1441	B	1939	D
Barnum Avenue at Seaview Avenue*	2154	C	2280	C
Barnum Avenue at Central Avenue	1723	B	1945	C
Barnum Avenue at Mill Hill Avenue	1317	D	1431	B
Barnum Avenue at Elizabeth Street, Pixlee Place, and Grant Street	965	B	1222	B
Barnum Avenue At Bishop Avenue	1202	B	1345	B
Boston Avenue (Route 1) at Seaview Avenue	2546	C	2798	C
Boston Avenue (Route 1) at Bond Street	2545	-	2787	-
Boston Avenue (Route 1) at Central Avenue	1856	B	2327	C
Boston Avenue (Route 1) at Pallisade Avenue	1827	B	2178	B
Seaview Avenue at I-95 SB Ramps	2656	C	3207	C
Seaview Avenue at Connecticut/Stratford Avenue (Route 130)	3043	C	4626	F
Seaview Avenue at I-95 NB Ramps	1885	D	2888	F
East Main Street (Route 127) at Cedar Street	1139	C	2062	F

Note: **Bold** indicates study intersection and top three overall volume or worst level of service.

1 Chosen for information purposes.

The intersection of Barnum Avenue at Seaview Avenue - PM peak (Largest Volume Increase) was added to the analysis due to the greatest observed increase in volume generated by the Proposed Project. The intersection analysis is provided for informational purposes to evaluate the changes in CO concentrations from the No Action condition to the Build condition.

Given the same LOS, the PM peak hour was chosen for the analysis because it has higher overall volume than the AM peak hour, even though the project-generated volume is slightly higher during the AM peak hour. Thus the PM peak hour condition presents the greatest potential for impact.

Emissions Modeling

The emission factors used in the microscale analysis were obtained from the USEPA's MOVES2014a (MOVES) emissions model. MOVES input files, which include fuel data, inspection and maintenance files (I/M), age distribution data and meteorology information, were obtained from CTDOT. MOVES was modeled using input files consistent with the current State Implementation Plan, which reflects Connecticut specific emission control programs and registration distribution. The MOVES modelling methodology was consistent with Federal Regulations and USEPA Project- Level CO Analysis Guidance³ on analysis of hotspot scenarios—producing emission factors for a typical January weekday from the 8 AM to 9 AM hour or a “worst case scenario”. Links were developed in a manner consistent with the planned links of the CAL3QHC model. Specific roadway grades were considered for links that had substantial increasing grade. Finally, emission rates were calculated using the built-in CAL3QHC post-processing script of the MOVES module.

Dispersion Modeling

The CO microscale analysis used the USEPA CAL3QHC Version 2.0 model and was based on the procedures outlined in the USEPA Guidance. The analysis evaluated the intersections representing the worst operating intersections based on LOS. The analysis analyzed the year 2015 as the base year, and the No Action and Build conditions in the design year 2040. The analysis included existing and future proposed roadway geometry, traffic signal timings, and peak hour traffic volumes. This analysis evaluated 1-hour and 8-hour CO concentrations at sensitive receptor locations.

Background Values

The DEEP maintains a network of air quality monitors to measure background concentrations of the criteria pollutants. Background concentrations are ambient pollution levels from all stationary, mobile, and area sources. The values presented in this report are from the *2015 Annual Air Monitoring Network Plan* submitted June 22, 2015⁴, the most recent monitoring network plan. The concentrations represent design values, determined using monitored data measured from 2012 to 2014. The design values were chosen based on the overall background values for the city of Bridgeport. CO design background concentrations are 1.4 ppm for the 8-hour averaging time and 2.4 ppm for the 1-hour averaging time.

Receptors

Receptors were placed along travel links in a manner that is consistent with the USEPA Guidance. Receptors were located in areas with the possibility of impact to the public at distances of at least 3 meters from the edge of the roadway and in 25-meter spacing per the USEPA Guidance⁵. Receptors were modeled at 1.8 meters off the ground and at all intersections chosen for analysis. Figure 4-3 shows the locations of the air quality study area intersections and receptors.

³ “Using MOVES2014 in Project-Level Carbon Monoxide Analyses” *U.S. Environmental Protection Agency*, EPA-420-B-15-028, March 2015.

⁴ “Connecticut 2015 Annual Air Monitoring Network Plan” *Connecticut Department of Energy and Environmental Protection*. Bureau of Air Management. June 22, 2015.

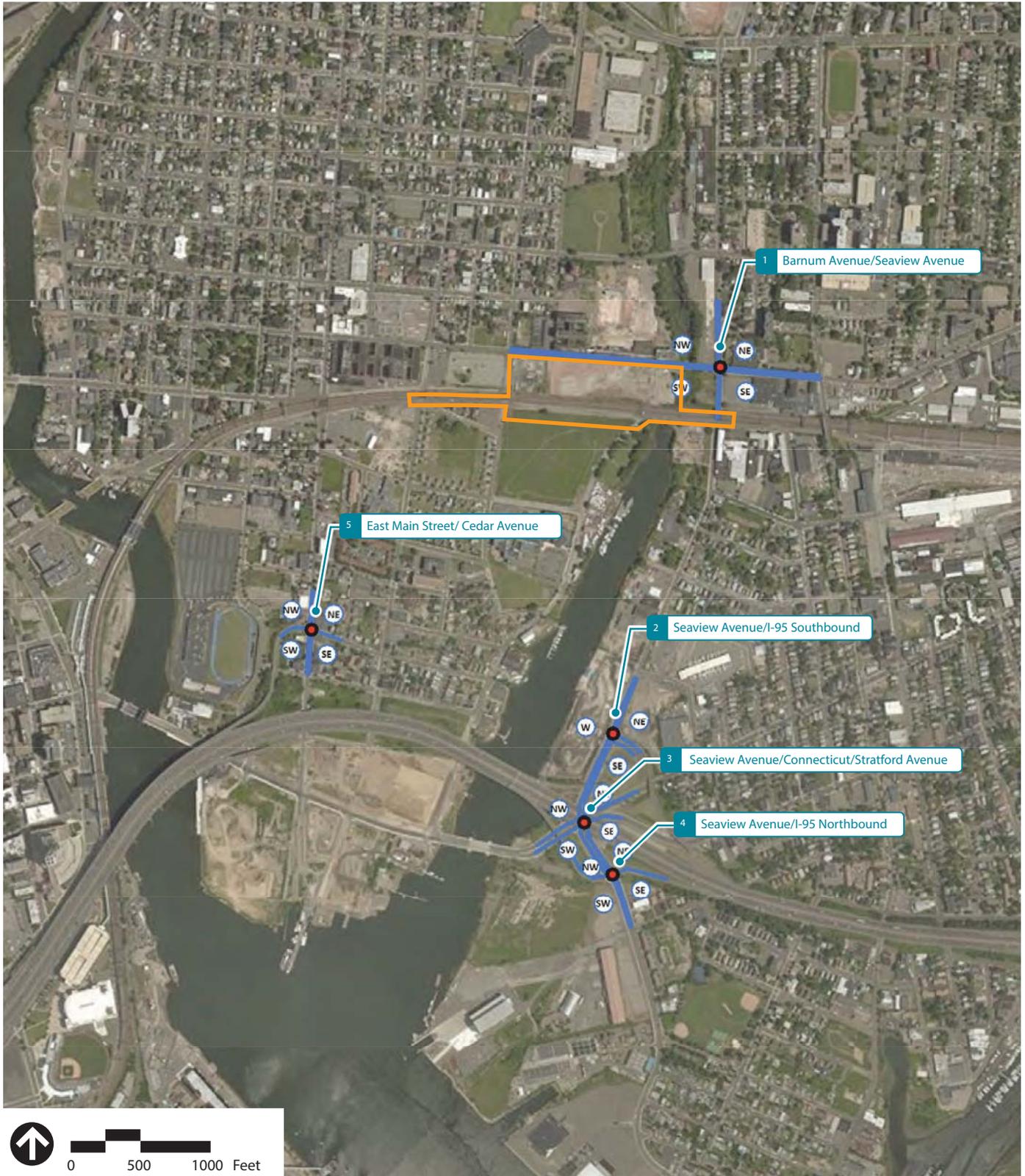
⁵ *Guidance for Modeling Carbon Monoxide from Roadway Intersections*, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA 454/R-92-005. November 1992.

4.4.3.2 Microscale Analysis Results

The CO concentrations were calculated directly using the USEPA CAL3QHC computer model. The highest 1-hour and 8-hour CO concentrations for each intersection are presented in Table 4-7 and Table 4-8, respectively. The 1-hour CO concentrations include a background concentration of 2.4 ppm. The 8-Hour CO concentrations were derived by applying a persistence factor of 0.70 to the project-generated 1-Hour CO concentrations and include an 8-Hour background concentration of 1.4 ppm.

The microscale analysis determined that the 1-hour CO concentrations for the 2015 Existing Condition ranged from a minimum of 2.6 parts per million (ppm) at the intersections of Barnum Avenue at Seaview Avenue to a maximum of 3.2 ppm at the intersection of Seaview Avenue at I-95 NB Ramps. The corresponding maximum 8-hour CO concentrations ranged from a minimum of 1.5 ppm to a maximum of 2.0 ppm. All the 1-hour and 8-hour concentrations are below the CO NAAQS of 35 and 9 ppm, respectively. These values are consistent with the area's designation as a CO Maintenance area.

The CO concentrations for each intersection under the No Action and Build conditions show that there are minimal to no increases for 1-hour and 8-hour CO concentrations between the 2040 No Action and Build conditions due to the minor traffic volume increase and minimal intersection delays experienced at the study intersections. The 1-hour CO concentrations ranged between 2.4 and 2.6 ppm, and the 8-hour CO concentrations ranged between 1.4 and 1.5 ppm for 2040 No Action and Build conditions. The results of the microscale analysis demonstrate that the 2040 No Action and Build CO concentrations (both 1-Hour and 8-Hour values) are well below the NAAQS.



Source: ArcGIS Online Bing Aerial

- Project Site
- Receptor Locations
- Intersection Locations



Figure 4-3
Air Quality Receptors and Intersections

**Barnum Station
Bridgeport, Connecticut**

TABLE 4-7 PREDICTED MAXIMUM 1-HOUR CO CONCENTRATIONS (PARTS PER MILLION)¹

Number as indicated in Figure 4-3	Intersections	Receptor Sector	2015	2040	2040	Project Increment ²
			Existing	No Action	Build	
1	Barnum Avenue at Seaview Avenue (PM peak)	Northeast	2.7	2.4	2.4	0.0
		Northwest	2.6	2.4	2.4	0.0
		Southeast	2.6	2.4	2.4	0.0
		Southwest	2.6	2.4	2.4	0.0
2	Seaview Avenue at I-95 Southbound Ramps (PM peak)	Northeast	2.8	2.4	2.4	0.0
		Southeast	2.9	2.5	2.5	0.0
		West	3.0	2.4	2.4	0.0
3	Seaview Avenue at Connecticut/Stratford Avenue (Route 130) (AM peak)	Northeast	2.7	2.4	2.4	0.0
		Northwest	2.8	2.4	2.4	0.0
		Southeast	2.9	2.4	2.4	0.0
		Southwest	2.7	2.4	2.4	0.0
3	Seaview Avenue at Connecticut/Stratford Avenue (Route 130) (PM peak)	Northeast	2.9	2.6	2.6	0.0
		Northwest	3.0	2.5	2.5	0.0
		Southeast	3.1	2.5	2.5	0.0
		Southwest	3.0	2.6	2.6	0.0
4	Seaview Avenue at I-95 Northbound Ramps (PM peak)	Northeast	3.2	2.5	2.5	0.0
		Northwest	3.0	2.5	2.6	0.1
		Southeast	2.8	2.5	2.5	0.0
		Southwest	3.2	2.5	2.5	0.0
5	East Main Street (Route 127) at Cedar Street (PM peak)	Northeast	2.7	2.4	2.4	0.0
		Northwest	2.7	2.5	2.5	0.0
		Southeast	2.7	2.4	2.4	0.0
		Southwest	2.7	2.5	2.5	0.0

Source: VHB, Inc.

1 The concentrations are expressed in parts per million (ppm) and include a 1-hour background concentration of 2.4 ppm. The 1-hour NAAQS for CO is 35 ppm. The emissions presented represent the highest emissions experienced at each receptor sector of each analyzed intersection.

2 Represents the difference between the worst-case scenario No Action condition and the Build condition.

TABLE 4-8 PREDICTED MAXIMUM 8-HOUR CO CONCENTRATIONS (PARTS PER MILLION)¹

Intersections	Receptor Sector	2015	2040	2040	Project Increment ²
		Existing	No Action	Build	
Barnum Avenue at Seaview Avenue (PM peak)	Northeast	1.6	1.4	1.4	0.0
	Northwest	1.5	1.4	1.4	0.0
	Southeast	1.5	1.4	1.4	0.0
	Southwest	1.5	1.4	1.4	0.0
Seaview Avenue at I-95 Southbound Ramps (PM peak)	Northeast	1.7	1.4	1.4	0.0
	Southeast	1.8	1.5	1.5	0.0
	West	1.8	1.4	1.4	0.0
Seaview Avenue at Connecticut/Stratford Avenue (Route 130) (AM peak)	Northeast	1.6	1.4	1.4	0.0
	Northwest	1.7	1.4	1.4	0.0
	Southeast	1.8	1.4	1.4	0.0
	Southwest	1.6	1.4	1.4	0.0
Seaview Avenue at Connecticut/Stratford Avenue (Route 130) (PM peak)	Northeast	1.8	1.5	1.5	0.0
	Northwest	1.8	1.5	1.5	0.0
	Southeast	1.9	1.5	1.5	0.0
	Southwest	1.8	1.5	1.5	0.0
Seaview Avenue at I-95 Northbound Ramps (PM peak)	Northeast	2.0	1.5	1.5	0.0
	Northwest	1.8	1.5	1.5	0.0
	Southeast	1.7	1.5	1.5	0.0
	Southwest	2.0	1.5	1.5	0.0
East Main Street (Route 127) at Cedar Street (PM peak)	Northeast	1.6	1.4	1.4	0.0
	Northwest	1.6	1.5	1.5	0.0
	Southeast	1.6	1.4	1.4	0.0
	Southwest	1.6	1.5	1.5	0.0

Source: VHB, Inc.

- 1 The concentrations are expressed in parts per million (ppm). The 8-Hour CO concentrations were derived by applying a persistence factor of 0.70 to the project-generated 1-Hour CO concentrations and include an 8-Hour background concentration of 1.4 ppm. The 8 hour NAAQS for CO is 9 ppm. The emissions presented represent the highest emissions experienced at each receptor sector of each analyzed intersection.
- 2 Represents the difference between the worst-case scenario No Action condition and the Build condition.

4.4.3.3 Particulate Matter

This project is not of local air quality concern and therefore does not require a quantitative PM hotspot analysis. 40 CFR 93.123 (b) (1) defines the types of projects that must quantitatively address PM hotspot concentrations for transportation conformity, which include:

- New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;
- Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- Projects in or affecting locations, areas, or categories of sites which are identified in the PM₁₀ or PM_{2.5} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The project is properly programmed into the 2015 Statewide Transportation Improvement Program (STIP) as project number 0015-0373⁶ and has been through the process of regional conformity to show that the emissions estimates for the project are below the MVEBs. The documentation of the project's STIP conformity for PM is provided in the "PM_{2.5} Air Quality Conformity Determination"⁷. Since the project will not substantially affect diesel vehicle traffic and is properly programmed into the STIP it is clearly not a project of local air quality concern for PM under 40 CFR 93.123 (b) (1). The project will not cause or contribute to any new violation of any PM NAAQS in the area.

4.4.3.4 Microscale Analysis Conclusion

The microscale assessment demonstrated that the Project would not result in adverse localized air quality impacts. The microscale analysis evaluated site-specific impacts from the vehicles traveling through congested intersections in the study area. This analysis results show that all existing and future carbon monoxide concentrations are below the NAAQS. The microscale study demonstrates that the Project conforms to the CAAA and the SIP because:

- No violation of the NAAQS would be expected to be created.
- No increase in the frequency or severity of any existing violations (none of which are related to this station) would be anticipated to occur.
- No delay in attainment of any NAAQS would be expected to result due to the implementation of the proposed action.

⁶ "2015 Statewide Transportation Improvement Program (STIP)" *Connecticut Department of Transportation*. November 2014.

⁷ "PM 2.5 Air Quality Conformity Determination-of the 2015 Regional Transportation Plans and the FY2015-2018 Transportation Improvement Programs Amendments for the Connecticut portion of the NY-NJ-CT PM 2.5 Attainment/Maintenance Area" *Connecticut Department of Transportation*. March 2015. Barnum Station project listed on page 34.

Based upon this analysis and the conclusions summarized above, no significant adverse air quality impacts from the Project are anticipated on the microscale level.

4.4.4 Impact Assessment, Mesoscale Analysis

Ozone (by proxy of its precursors NO_x and VOC) and greenhouse gas (CO₂) was evaluated on a regional mesoscale level. NO_x and VOC emissions inventories were developed using the MOVES model for a typical summer day, when atmospheric ozone creation is most favorable. CO₂ emissions inventories were developed in the MOVES model on an annual basis to compare the potential greenhouse gas savings that the Project will create.

The predominant source of ozone precursor emissions anticipated from the project is emissions from traffic related to the station. Ozone is not directly emitted by motor vehicles, but is generated when VOC and NO_x emissions from motor vehicles, stationary sources, and area sources react in the atmosphere with sunlight and heat. Project-related ozone impacts are determined by assessing the changes in VOC and NO_x emissions of motor vehicles.

4.4.4.1 Methodology

For CO₂, the mobile source emissions are calculated by performing a mesoscale analysis to evaluate the changes in emissions for the No Action and Build conditions within the traffic study area. This included an annual GHG emissions mesoscale analysis to evaluate the estimated change in CO₂ across the two conditions.

Traffic Scenarios

The mesoscale study demonstrated compliance with the Transportation Conformity by evaluating air quality impacts for the same 2040 conditions used in the microscale analysis.

The 2040 No Action conditions projected the 2015 existing traffic condition to the future years based on background growth. The analysis compared these values to the Proposed Project (2040). The mesoscale inventory used state-wide VMT estimates under the above conditions to calculate the pollutants emitted.

Emissions Modeling

EPA's Office of Transportation and Air Quality (OTAQ) has developed MOVES. MOVES is USEPA's latest motor vehicle emissions model for state and local agencies to estimate VOC, NO_x, CO₂ and other emissions from cars, trucks, buses, and motorcycles.

All the vehicle emissions used in the mesoscale analysis were obtained using USEPA's MOVES emissions model. MOVES calculates emission factors from motor vehicles in mass per distance format (often grams per mile) for the analysis year and applies these factors to Vehicle Miles Travelled (VMT) data to obtain emissions inventories. The emissions calculated for this air quality assessment include Tier 3 emission standards, which is an USEPA program that sets new vehicle emissions standards, including lowering the sulfur content of gasoline, heavy-duty engine, and vehicle greenhouse gas regulations (2014-2018), and the second phase of light-duty vehicle GHG regulations (2017-2025). It also includes Connecticut specific conditions, such as the state vehicle registration age distribution and the statewide Inspection and Maintenance (I/M) Program. These inputs were obtained from CTDOT.

The MOVES model was run at a county-level to obtain an emission inventory for the entire study area of the mesoscale analysis. The model was set to calculate the emissions burden by choosing to model emissions processes that are specifically related to on-road travel.

4.4.4.2 Mesoscale Emission Results

Project-related emission calculations are based upon changes in traffic volumes and delays in the study area network related to the traffic introduced by Barnum station. The traffic data include VMT under both conditions on the statewide network. The emission factor data included emission reduction programs, shifts in vehicle populations, and other factors.

The No Action condition considered the travel network in 2040 without the Barnum Station project. Under this condition NO_x emissions are expected to be 6,210 kilograms per day and VOC emissions are expected to be 2,412 kilograms per day in the peak ozone season. CO₂ emissions are expected to be 10,958,337 short tons per year. Note that the mesoscale emissions are large in scale because they represent a statewide VMT.

The Build condition considered the travel network in 2040 with the Barnum Station project. VMT under this condition declined as more commuters were using rail during their commute instead of their vehicles. Under this condition NO_x emissions are expected to be 6,209 kilograms per day and VOC emissions are expected to be 2,411 kilograms per day in the peak ozone season. CO₂ emissions are expected to be 10,957,185 short tons per year.

These results are summarized in Table 4-9 below. For all pollutants, the Proposed Project results in less emissions during the respective time frame. This decrease in emissions is directly contributed to the decrease in VMT due to the travel mode shift of commuters. The proposed Barnum Station should reduce congestion in the statewide network resulting in these lower emissions.

TABLE 4-9 MESOSCALE AIR QUALITY ANALYSIS RESULTS

Pollutant	Projected Emissions (2040)		Emission Savings
	No Action	Build	
Projected Daily Vehicles Miles Traveled (VMT) ¹	104,115,934	104,104,972	
Oxides of Nitrogen (NO _x) [kg/day]	6,210	6,209	1
Volatile Organic Compounds (VOC) [kg/day]	2,412	2,411	1
Carbon Dioxide (CO ₂) [short tons/year]	10,958,337	10,957,185	1,152

¹ Statewide Daily VMT calculated in travel demand modeling conducted by the Connecticut Department of Transportation.

4.4.4.3 Mesoscale Analysis Conclusion

The mesoscale assessment demonstrates that the Proposed Project complies with local, state, and federal air quality requirements. The air quality assessment demonstrates that the proposed Barnum Station complies with CAAA and is consistent with the guidelines of CTDEEP because it will reduce VOC and NO_x emissions in the mesoscale analysis study area. The Proposed Project is properly programmed into the 2015 Statewide Transportation Improvement Program (STIP) as project number

0015-0373⁸ and has been through the process of regional conformity to show that emissions estimates for the project are below the MVEBs. Additionally, the Proposed Project conforms to NEPA guidelines and regulatory criteria related to GHG as it will reduce the amount of CO₂ generated annually in the mesoscale study area when compared to the No Action Alternative.

4.4.5 Mobile Source Air Toxics Analysis

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990 and analysis of air toxic emissions has since become a requirement for transportation projects under NEPA. The USEPA identified seven compounds with significant contributions from mobile sources that include acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. MSAT analyses are intended to capture the net change in emissions within an affected environment, defined as the transportation network affected by the project.

The science of mobile source air toxics is still evolving and the methods for analyzing MSAT are still limited. The FHWA has developed a tiered approach to address MSAT whereby a project may qualify for one of three tiers of analysis: no analysis, qualitative analysis, and quantitative analysis. Barnum Station does not create or significantly alter any major intermodal freight facility nor does it create new or add significant capacity to any roadway with an AADT in the range of 140,000 to 150,000. A quantitative analysis is therefore not required under FHWA guidelines. Barnum Station is not an exempt project under 23 CFR 771.117 (c), exempt under the CAA conformity rule under 40 CFR 93.126, or a project with no meaningful impacts on traffic volumes or vehicle mix. Barnum Station therefore requires only a qualitative MSAT analysis under FHWA guidelines. The FHWA methodology was applied to the Barnum Station project because all air quality emissions are associated with automobiles. The FTA has not developed guidelines for MSAT analysis.

The qualitative analysis shows that the proposed Barnum Station will increase traffic at local intersections but decrease VMT across the region as commuters switch modes from personal vehicle travel to rail travel. This decrease in overall VMT from the No Action Alternative is expected to result in decreased MSAT emissions when Barnum Station is constructed. A detailed MSAT discussion and analysis is provided in Appendix B.

4.5 Noise and Vibration

A noise and vibration impact assessment has been conducted according to the FTA's *Transit Noise and Vibration Impact Assessment Guidance Manual* in support of the CEPA and NEPA environmental review processes. This section presents the regulatory context of the noise and vibration analysis, methodology on predicting and assessing impact, a summary of noise and vibration-sensitive land use in the study area and characterization of existing conditions including ambient noise measurement results, results from the impact assessment for the No Action Alternative and the Proposed Project, and evaluates the need for noise and vibration mitigation.

The proposed commuter rail station would relocate existing tracks, introduce new special trackwork, modify train operations associated with trains stopping at the station, and increase vehicular traffic in the area. With these changes to existing noise and vibration sources in the study area, the proposed

⁸ "2015 Statewide Transportation Improvement Program (STIP)" *Connecticut Department of Transportation*. November 2014.

station would have the potential to affect noise and vibration conditions at receptors. Potential noise and vibration impact has been assessed according to FTA regulations which compare existing noise and vibration conditions to future conditions. Constructing the proposed station would introduce temporary sources of noise and vibration. Potential construction noise and vibration impact and the need for mitigation is also assessed in Section 4.16.

4.5.1 Regulatory Compliance

The rules and regulations of NEPA 40 CFR Chapter V Parts 1500 to 1508 and CEPA and its implementing regulations at Sections 22a-1a-1 through 12 of the Connecticut General Statutes require the potential environmental impacts and benefits of Proposed Projects be evaluated including noise and vibration. The FTA's Noise and Vibration Impact Assessment guidance manual prescribes the impact assessment procedures for federally-funded mass transit projects. There are no state-level requirements for assessing potential noise and vibration impact associated with mass transit projects. Therefore, the impact assessment conducted in accordance with FTA's guidance manual is considered to fulfill NEPA and CEPA requirements for noise and vibration.

4.5.2 Methodology

The noise and vibration impact assessment methodology involves categorizing sensitive land use within the study area, characterizing the existing noise and vibration conditions, predicting future noise and vibration conditions with the Proposed Project and assessing potential impact according to the FTA noise impact criteria. At locations where potential noise or vibration impact may occur, mitigation is considered.

Further detail on the basic descriptors used to quantify noise and vibration, FTA noise and vibration land use categories, noise and vibration impact criteria and noise and vibration prediction methods can be found in the FTA Transit Noise and Vibration Impact Assessment guidelines⁹.

4.5.3 Existing Conditions

4.5.3.1 Noise and Vibration-Sensitive Land Use

The study area for noise and vibration extends along both sides of the rail corridor from slightly west of Pembroke Street to slightly east of Seaview Avenue. The study area encompasses the proposed station platforms, relocated tracks and locations of new special trackwork. The study area includes a mix of residential, commercial, institutional and industrial land uses. Land use on the south side of the rail corridor includes Saints Cyril and Methodius Church, single family homes on Pembroke Street, Church Street, Martin Luther King Drive, and the permitted residential homes planned at the Crescent Crossing development. Land use on the north side of the rail corridor includes single-family and multi-family residences on Pembroke Street, Barnum Avenue, Caroline Street and Hallett Street, First Church-Gods and Saints, The Household of Faith church, and industrial and undeveloped lands north and south of Barnum Avenue. Noise and vibration-sensitive receptors have been included up to 700 feet from the tracks, which is sufficiently far from the rail corridor to identify all potential impacts.

Existing noise and vibration conditions near the proposed station are dominated by Amtrak Acela, Amtrak Regional, and MNR and SLE commuter operations. Additional noise sources include automobile and truck traffic on local roads.

⁹ *Transit Noise and Vibration Impact Assessment*. Federal Transit Administration, Office of Planning and Environment. May 2006.

4.5.3.2 Noise Measurement Results

Ambient noise measurements were conducted at four locations throughout the study area including one long-term (24-hour) and three short-term (1-hour) site as shown in Figure 4-4. The predominant noise sources included train activity and local vehicular traffic. The results of the ambient noise measurements are shown in Table 4-10. The day-night average sound level was 66 dBA at a distance of approximately 80 feet from the near tracks and 25 feet from the edge of pavement of Crescent Avenue.

TABLE 4-10 AMBIENT NOISE MEASUREMENT RESULTS

Site Location	Address/Location	Peak-hour Equivalent Sound Level (dBA), Leq	Hour	Day-night Average Sound Level (dBA), Ldn
LT-1	640 Crescent Ave	66	8:00 AM	66 ¹
ST-1A	Waterview Park	55	4:00 PM	--
ST-1B	Waterview Park	59	1:00 PM	--
ST-2	42 Crescent Place	61	11:00 AM	--

Source: HMMH, 2015.

1 Ldn level was filtered to account for significant bird sounds between 3:00 and 5:00 AM.

4.5.4 Impact Assessment

4.5.4.1 Noise and Vibration Assessment Methodologies

Existing and future noise levels have been predicted according to the detailed assessment methodology in the FTA guidance manual. This methodology is based on reference noise emissions for commuter and freight trains and takes into account the number and type of train operations (such as diesel or electric locomotive-hauled passenger coaches or freight trains), the number of train events per day and per night, the consist of locomotives and coaches or rail cars, the track that the trains are operating on, train speed, presence of special trackwork (like crossovers or track switches) and whether the trains would stop and dwell at the station.

The proposed station would affect existing vehicular traffic conditions due to site-generated activity including drop-off and pickups at the station and use of the park and ride lot. Existing and future noise conditions associated with the proposed station have been quantified according to methods described in the FTA guidance manual.

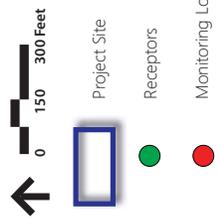


Figure 4-4
Noise and Vibration Monitoring Locations
and Receptors

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Noise impact has been assessed according to FTA criteria which compare existing to future noise levels taking into account changes in future noise that is due to the Proposed Project. There are two categories of potential noise impact; “moderate” where the change in noise levels is noticeable to most people, but may not be sufficient to cause strong adverse reaction and “severe” where there is the potential for a significant percentage of people to be highly annoyed by the change in noise conditions.

For projects in existing rail corridors, vibration impact is assessed according to whether future vibration levels would exceed absolute impact criteria (for example, 72 VdB for residences) and whether the Proposed Project would increase vibration levels by more than 3 VdB or double the number of vibration events. Existing and future vibration levels have been predicted at receptors according to the generalized ground vibration curves in the FTA guidance manual.

4.5.4.2 No Action Alternative

The No Action Alternative assumes that CTDOT would not build a commuter rail station in East Bridgeport. Without a station, existing train operations and traffic conditions would not be affected. Since both noise and vibration impact is assessed according to the change due to the Proposed Project, there would be no impact.

4.5.4.3 Proposed Project

Noise and vibration impact has been assessed at a total of 19 receptor locations where residences, institutions (such as churches) and parks with passive recreation currently exist or are already permitted within the study area.

Table 4-11 presents the results of the noise impact assessment including the existing noise levels, moderate and severe impact criteria, future noise level, future increase in noise level and a determination of potential noise impact. This table shows that existing noise levels range from 46 to 66 dBA (Ldn) for Category 2 (residential) land uses and 56 dBA to 65 dBA (Leq) for Category 3 (institutional/park) land uses and that the proposed station would only increase future noise levels by one decibel or less due to changes in train and traffic operations. Future noise levels would decrease up to 2 dBA at some receptors primarily due to the reduced speed of train operations that would stop at the proposed station. There would be no noise impact due to the Proposed Project and no need for noise mitigation.

Table 4-12 shows the results of the vibration impact assessment. This table shows that existing interior vibration levels are estimated to be 65 VdB or lower at all receptors and that the proposed station including changes to train operations, shifting existing tracks and new special trackwork (switches and cross-overs) would cause only a one decibel or less increase. Future vibration levels would be below the absolute vibration criterion of 72 VdB, so there would be no vibration impact and no need for mitigation.

TABLE 4-11 NOISE IMPACT ASSESSMENT RESULTS

Receptor	Location	FTA Cat ¹	Existing Noise Level (dBA, Ldn)	Moderate Impact Criterion (dBA, Ldn)	Severe Impact Criterion (dBA, Ldn)	Future Noise Level (dBA, Ldn)	Noise Level Increase (dBA, Ldn)	Noise Impact?
1	605 Barnum Ave*	3	64.6	68.1	71.9	65.8	1.2	None
2	631, 649 Barnum Ave	2	64.7	66.1	68.4	65.9	1.2	None
3	671, 673, 685 Barnum Ave	2	64.7	66.1	68.4	65.9	1.2	None
4	980, 990, 1002 Pembroke St 23 Caroline St	2	54.1	57.5	61.7	55.0	0.9	None
5	620-656 Maple St 431 Hallett St ²	3	56.2	62.1	67.0	56.1	-0.1	None
6	439 Hallett St 42 Caroline St	2	55.6	58.5	62.4	55.8	0.2	None
7	676-714 Maple St 99 Church St*	3	65.1	68.5	72.2	62.8	-2.3	None
8	800-838 Pembroke St	2	62.4	64.0	66.6	61.3	-1.1	None
9	762-786 Pembroke St	2	57.6	60.1	63.5	57.2	-0.5	None
10	9-75 Martin Luther King Dr	2	51.7	56.0	60.6	50.1	-1.6	None
11	235-261 Hallett St	2	56.2	59.0	62.7	54.9	-1.2	None
12	185-221 Hallett St	2	53.0	56.7	61.1	51.3	-1.7	None
13	Crescent Crossing P1 Front	2	54.5	57.8	61.9	53.3	-1.3	None
14	Crescent Crossing P1 Hallett St	2	49.1	54.5	59.8	47.9	-1.2	None
15	Crescent Crossing P1 Center	2	47.4	53.7	59.3	45.4	-2.0	None
16	Crescent Crossing P2 Front	2	52.9	56.7	61.1	51.5	-1.5	None
17	Crescent Crossing P2 Center	2	46.8	53.5	59.2	44.9	-2.0	None
18	Crescent Crossing P2 Waterview Ave	2	46.3	53.2	59.1	44.3	-2.0	None
19	Waterview Park*	3	57.0	62.6	67.4	56.0	-1.0	None

1 Category 1 are buildings or parks where quiet is essential; Category 2 are residences and buildings where people normally sleep and nighttime sensitivity is critical; Category 3 are institutional land uses with primarily daytime and evening use.

2 Peak-hour equivalent noise levels (Leq) are reported for Category 3 land uses.

Source: VHB, 2016.

TABLE 4-12 VIBRATION IMPACT ASSESSMENT RESULTS

Receptor	Location	Existing Vibration Level (VdB)	Future Vibration Level (VdB)	Vibration Level Increase (VdB)	Vibration Impact?
1	605 Barnum Ave	49	50	1	None
2	631, 649 Barnum Ave	51	52	1	None
3	671, 673, 685 Barnum Ave	52	52	1	None
4	980, 990, 1002 Pembroke St 23 Caroline St 620-656 Maple St	47	48	1	None
5	431 Hallett St	48	49	1	None
6	439 Hallett St 42 Caroline St 676-714 Maple St	47	48	1	None
7	99 Church St	65	66	1	None
8	800-838 Pembroke St	64	64	0	None
9	762-786 Pembroke St	53	53	0	None
10	9-75 Martin Luther King Dr	45	45	0	None
11	235-261 Hallett St	54	55	1	None
12	185-221 Hallett St	48	48	0	None
13	Crescent Crossing P1 Front	51	52	1	None
14	Crescent Crossing P1 Hallett St	48	49	1	None
15	Crescent Crossing P1 Center	47	47	1	None
16	Crescent Crossing P2 Front	48	49	1	None
17	Crescent Crossing P2 Center	45	46	1	None
18	Crescent Crossing P2 Waterview Ave	44	45	1	None

Source: VHB, 2016.

4.5.5 Mitigation Measures

According to the FTA guidance manual, for noise impact which falls into the severe category, mitigation is typically warranted as long as it is feasible, reasonable and effective. For noise impact which falls into the moderate category, the need for mitigation is considered based on a range of factors including where within the moderate impact range future noise conditions would be, the number and density of affected receptors, the land use category of the receptors, the acoustical and cost effectiveness of mitigation and whether ambient noise conditions are already heavily influenced by transportation noise. When there would be no noise impact according to FTA criteria, mitigation is not warranted. For vibration, mitigation is typically warranted if reasonable and effective if there would be impact according to FTA guidelines, when there would be no vibration impact, vibration mitigation is not warranted.

Since there would be no noise or vibration impact associated with the Proposed Project, noise and vibration mitigation is not warranted.

4.6 Land Use and Zoning

This section presents the evaluation of current zoning and land uses as they relate to the proposed station and the impacts of the Proposed Project on land use.

4.6.1 Methodology

The zoning classifications used as a basis for this section are based on the city of Bridgeport Zoning Map adopted and effective as of March 7, 2016. Current land uses are based on the zoning map and field observation.

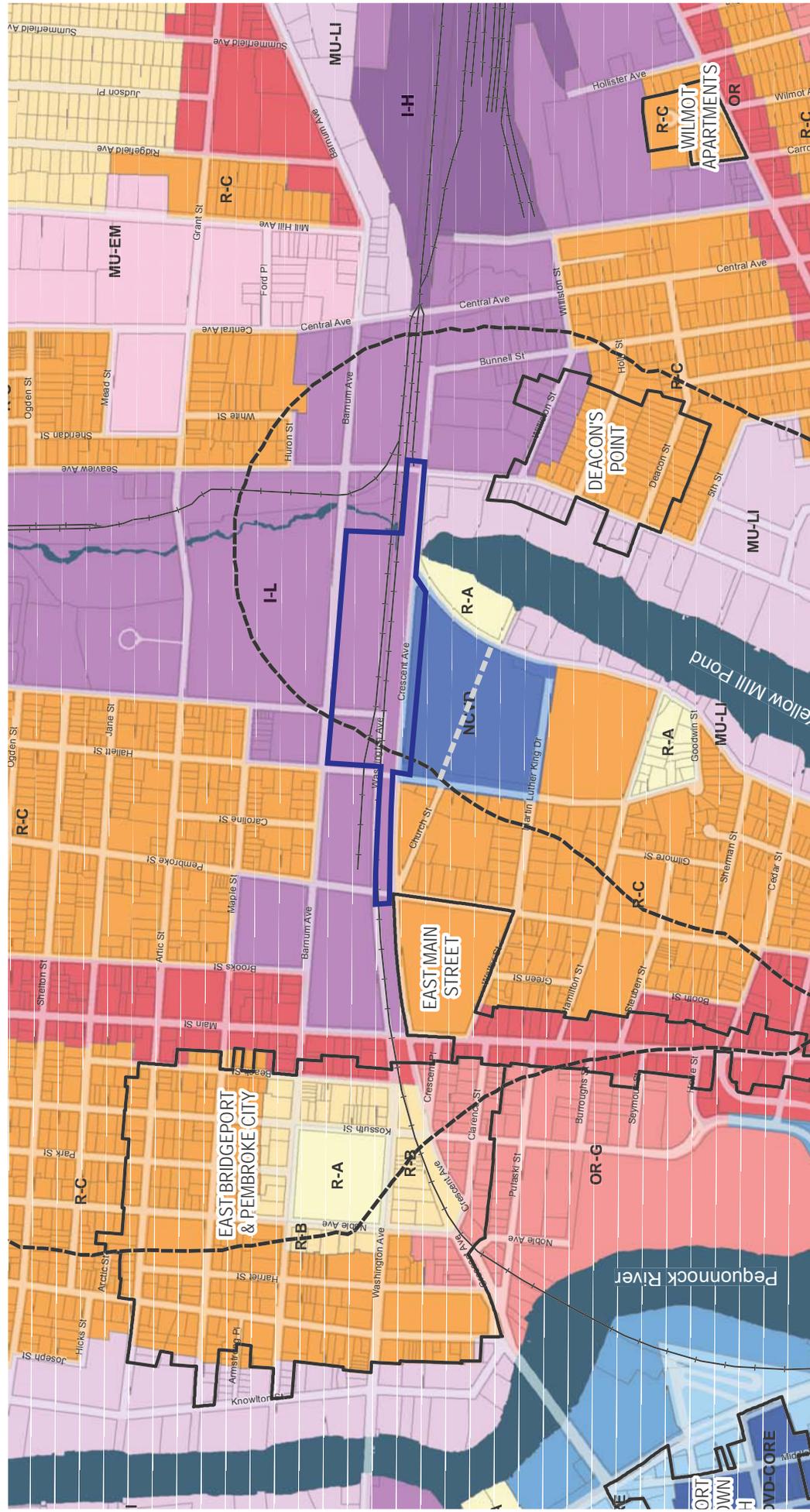
4.6.2 Existing Conditions

The Barnum Station site is adjacent to the NHML ROW in the East Side neighborhood of the city of Bridgeport, approximately 1 mile north of the I-95 interchange (Exit 29). The site is comprised of industrial and former industrial sites in a predominantly urban setting. The surrounding neighborhood consists of commercial, office, industrial, public/institutional, multi-family, and single-family residential properties.

The Proposed Project site consists of two separate parcels and the NHML ROW. The first and largest parcel is a portion of the former Remington Arms Facility at 812 Barnum Avenue and is currently owned by the City of Bridgeport. This parcel was left vacant after the demolition of the dilapidated and structurally unsound structures on the site. The second and smaller parcel is located adjacent to the Remington Arms parcel to the west at 965 East Washington Avenue, and is currently owned by Campus Office Park Associates. This parcel consists of an open area covered in pavement and is currently used as one of multiple sites for training tractor trailer drivers.

The project site is currently comprised of open parking areas and is devoid of buildings and, to a large extent, vegetation on the portion of the site north of the raised railroad ROW. It is surrounded by chain link fence which effectively cuts it off from adjacent land uses. The raised railroad ROW effectively divides the site from the area south of the tracks, currently comprised of Crescent Avenue and undeveloped land abutting the south side of Crescent Avenue.

In January 2015, the City of Bridgeport Planning and Zoning Commission adopted a revised zoning map. Existing zoning within the vicinity of the site is generally consistent with the existing land use. Zoning for the Barnum Station site is Industrial Light (I-L) zone, which has stricter performance standards than the Heavy Industrial Zone category, and is appropriate for the proposed station. The site area north of the railroad tracks and south of the railroad tracks up to Crescent Avenue is also zoned as I-L, Light Industrial. Development and performance standards in the I-L zone are designed to promote uses that are compatible with non-industrial areas to minimize potential land use conflicts. Certain commercial and mixed-uses would be permissible in this zone. This type of zoning would encourage development that would benefit from the proposed station, including mixed use development and allowing for attractive development of the land that is compatible with the future development of the Remington Arms site to the north of the proposed station. Figure 4-5 shows the current zoning in the vicinity of the Proposed Project.



Zoning Districts

- R-A, Residential - A Single Family Zone
- R-B, Residential - B Two Family Zone
- R-C, Residential - C Multi-Family Zone
- NCVD, Neighborhood Center Village District
- Local/Federal Historic Districts

- MU-LI, Mixed Use - Light Industrial Zone
- MU-EM, Mixed Use - Educational/Medical Zone
- OR, Office/Retail Zone
- OR-G, Office/Retail General

- DVD-CORE, Downtown Core Village District
- DVD-TOD, Downtown Transit-Oriented Development Village District
- DVD-CVIC, Downtown Civic Village District
- I-H, Industrial Heavy Zone
- I-L, Industrial Light Zone

- Project Site
- Church Street Extension
- Coastal Boundary

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Figure 4-5
Project Vicinity Zoning

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Bridgeport, Connecticut**

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In 2015, the City of Bridgeport initiated a structural analysis and adaptive reuse study for the Remington Arms site north of the proposed station. The project will proceed concurrent with the final design for the proposed station, and will produce a TOD plan for the 0.5-mile radius around the proposed station. This development is consistent with the current zoning, and would benefit from the use of the adjacent project site for the commuter rail station.

As discussed in Chapter 2, Purpose and Need, there are multiple development projects underway in the vicinity of the Proposed Project that are currently in the planning or permitting process. Existing and future developments include:

- Steelpointe Harbor Development
- Seaview Plaza
- Seaview Industrial Park
- Crescent Crossing Housing Development
- Waltersville Elementary/Barnum Elementary Schools
- Harding High School
- The Barnum TOD Structural Evaluation and Adaptive Reuse Study
- The Bridgeport Comprehensive Waterfront Plan

4.6.3 Impact Assessment

4.6.3.1 No Action Alternative

Under the No Action Alternative, the site's current land usage, predominantly open un-improved paved areas surrounded by chain link fence, would continue to detract from the surrounding area. Active uses of the site would remain unlikely given the condition of the site and current lack of a need for large parking areas in the vicinity. The lack of lighting, landscaping and other improvements would continue to cause a real or perceived safety and security concern for the neighborhood, and the existing fencing would continue to preclude pedestrian use of the site.

Reconnect 1 Region is a comprehensive plan for development and policy intended to guide land use, housing, transportation, infrastructure, economic development, and sustainability. MetroCOG, in coordination with member cities, developed this plan in 2015. It identifies specific regional goals that a station along Barnum Avenue in the city of Bridgeport would help achieve. It highlights TOD strategies, and identifies the Barnum Station site as an ideal location for implementing such strategies. If the proposed station were not constructed under the No Action Alternative, this plan would still specify denser land use patterns, increased transit access, and improved pedestrian and cyclist circulation that are associated with TOD.

BGreen 2020, which the City of Bridgeport developed in coordination with the Bridgeport Regional Business Council in 2010, outlines a ten-year strategic sustainability plan for the city. This plan establishes goals and identifies opportunities that will help improve the quality of life, social equity, and economic competitiveness of the city, while reducing carbon emissions and increasing the community's resilience to the effects of climate change. Recognizing that the transportation sector contributes approximately one-third of the city's total greenhouse gas emissions, *BGreen 2020* adopts a "Transit First" policy to prioritize bus operations expansion, enhanced bus corridors, and new transit

station construction where needed. Even if the proposed station were not constructed under the No Action Alternative, *BGreen 2020* would still encourage investment in bus operations and enhanced bus corridors through the project area.

The City of Bridgeport's *Master Plan of Conservation and Development* was published in 2008. It sets a series of policies aimed at improving the quality of development in the city. The policies include encouraging dense transit-oriented development and investment in East Bridgeport neighborhoods, increasing new residential and commercial development in the area and capitalizing on the area's waterfront capital through creation of waterfront greenways. Under the No Action Alternative, the City of Bridgeport would continue to encourage residential and commercial development in East Bridgeport neighborhoods.

4.6.3.2 Proposed Project

The Proposed Project is consistent with the City of Bridgeport's vision for the area, and would support existing and planned land uses in the area. The proposed station would convert one major underutilized parcel and one smaller parcel into surface parking to support the station. The New England Tractor Trailer Training School of Connecticut - Bridgeport currently conducts tractor trailer driving training on the western parcel and would be displaced. The proposed station would complement the Crescent Crossing Housing Development that is currently underway directly south of the NHML ROW. The Crescent Crossing Housing Development includes an extension of Church Street from Hallett Street to Waterview Avenue that would support vehicular traffic rerouted by the closure of Crescent Avenue.

Given the current poor condition of the open paved areas and surrounding chain link fence which characterize the site, the proposed station would substantially improve the land use and appearance of the site and the surrounding area. Site improvements, including gateway pedestrian entrances, improved pedestrian walkways and plazas, paved and landscaped parking areas, perimeter streetscape plantings and both pedestrian and vehicle lighting, will introduce an inviting environment complimenting surrounding land uses. Improved pedestrian connections to and from the station will integrate the site with its surroundings and the station design with associated site amenity and landscape improvements will present an attractive destination.

The Proposed Project would require that one existing business, the tractor-trailer driving school facility, be displaced.

4.6.4 Mitigation Measures

The proposed station is in alignment with the current zoning and is compatible with the surrounding environment. Therefore, no mitigation is required.

4.7 Socioeconomic Environment and Environmental Justice

This section characterizes existing social and economic conditions in areas that include and are adjacent to the project, as well as describes the project's potential to affect these conditions.

4.7.1 Methodology

To establish existing conditions and determine the extent of the potential of the project to affect the local socioeconomic environment, this section reviews information on population and households, as well as employment and income in the vicinity of the project. It compares these conditions to the city

of Bridgeport and State of Connecticut for contextual purposes. This section also considers Environmental Justice concerns, in accordance with the CTDEEP Environmental Justice Program and related Environmental Equity Policy. The potential impact of the Proposed Project was assessed by whether a disproportionate environmental effect would occur to Environmental Justice populations or existing social or economic conditions.

The study area includes neighborhoods proximate to the project, which include Mill Hill, East Side, and East End. These neighborhoods comprise U.S. Census Tracts 732, 733, and 737 (Mill Hill); 735, 736, 738, 739, and 740 (East Side); and 743 and 744 (East End). Data primarily derive from the U.S. Census, specifically the 2010 Decennial Census and American Community Survey 5-year estimates (2010-2014).

4.7.2 Existing Conditions

Demographics

In 2014, the city of Bridgeport had a total population of 146,680, which represented 4.1 percent of the statewide population (U.S. Census, 2014). The city's population increased 2.9 percent between 2010 and 2014, a rise of 4,104 persons (U.S. Census, 2014). This rate of growth is higher than that of the state (1.3 percent) during the same period (U.S. Census, 2010a; 2014).

In 2014, the total population within the study area was 32,987, an increase of 3.7 percent or 1,171 persons from 2010 (U.S. Census, 2014). Population density within the study area was approximately 10,954 persons per square mile (U.S. Census, 2010b; 2010-2014). This is similar to the citywide population density of 9,183 persons per square mile, but much higher than the statewide population density of 742 persons per square mile (U.S. Census, 2010b; 2010-2014). Tables 4-13 and 4-14 provide other notable demographic characteristics for the combined study area, city of Bridgeport, and Connecticut.

TABLE 4-13 SELECT HOUSEHOLD CHARACTERISTICS (2014)

Geography	Total Occupied Housing Units	Average Household Size
State of Connecticut	1,356,206	2.56
City of Bridgeport	50,034	2.84
Study Area Total ¹	11,185	
Mill Hill		
U.S. Census Tract 732	1,075	2.29
U.S. Census Tract 733	1,214	2.64
U.S. Census Tract 737	1,660	2.80
East Side		
U.S. Census Tract 735	1,143	3.02
U.S. Census Tract 736	638	3.79
U.S. Census Tract 738	727	3.40
U.S. Census Tract 739	1,197	2.73
U.S. Census Tract 740	660	2.91
East End		
U.S. Census Tract 743	1,435	2.86
U.S. Census Tract 744	1,436	3.17

Source: U.S. Census Bureau. (2014). *American Community Survey, 2010-2014 estimates*. Retrieved from <http://factfinder2.census.gov/>

¹ Due to potential sample size errors from averaging individual census tracts, an average household size within the Study Area is not included.

TABLE 4-14 DEMOGRAPHIC CHARACTERISTICS (2014)

Population Characteristic	Study Area	City of Bridgeport	State of Connecticut
Total Population	32,987	146,680	3,592,053
Gender			
Male	47.3%	48.4%	48.7%
Female	52.7%	51.6%	51.3%
Age			
Under 5	9.5%	7.4%	5.4%
Under 18	30.1%	25.2%	22.1%
Over 65	8.0%	9.8%	14.8%
Educational Attainment (Population 25 and Over)			
Less than 9th grade	13.6%	12.6%	4.3%
9th to 12th grade, no diploma	15.3%	13.1%	6.1%
High school graduate (or equivalency)	36.8%	32.1%	27.6%
Some college, no degree	19.1%	19.7%	17.6%
Associate's degree	5.6%	6.1%	7.3%
Bachelor's degree	6.8%	10.2%	20.6%
Graduate or professional degree	2.7%	6.2%	16.4%

Source: U.S. Census Bureau. (2014). *American Community Survey, 2010-2014 estimates*. Retrieved from <http://factfinder2.census.gov/>

Note: Totals may not sum to 100 percent due to rounding.

Employment and Income

Bridgeport has faced a challenging job market. In 2014, the city had an unemployment rate of 16.6 percent, which was 7 percentage points higher than the statewide unemployment rate of 9.6 percent (U.S. Census, 2014). During the same period, the unemployment rate of the study area was 19.5 percent (U.S. Census, 2014). As of June 2016, the city's unemployment rate was 8.4 percent, while the state's was 5.8 percent (Bureau of Labor Statistics, 2016a; 2016b). Estimates of per capita and median household income in the city and study area, which Table 4-15 presents, reflect the impact of this high unemployment.

TABLE 4-15 SELECT INCOME CHARACTERISTICS (2014)

Geography	Per Capita Income (\$)	Median household Income (\$)
State of Connecticut	38,480	69,899
City of Bridgeport	20,442	41,204
Mill Hill		
U.S. Census Tract 732	21,878	40,823
U.S. Census Tract 733	22,164	49,139
U.S. Census Tract 737	17,053	35,585
East Side		
U.S. Census Tract 735	14,213	34,323
U.S. Census Tract 736	12,882	38,143
U.S. Census Tract 738	14,468	29,375
U.S. Census Tract 739	15,092	30,291
U.S. Census Tract 740	12,690	22,300
East End		
U.S. Census Tract 743	14,711	31,809
U.S. Census Tract 744	13,097	33,426

Source: U.S. Census Bureau. (2014). *American Community Survey, 2010-2014 estimates*. Retrieved from <http://factfinder2.census.gov/>

The civilian labor force within the study area is comprised of 16,516 persons. The largest industry within the study area by employed population is education services, health care, and social assistance (3,310 workers), followed by retail trade (1,792 workers) and manufacturing (1,771 workers). The following are the top employers within the study area by neighborhood (City of Bridgeport, 2015) include:

- Bridgeport Hospital
- Ahlbin Centers for Rehabilitation Medicine
- City of Bridgeport Board of Education
- Optimus Health Care
- Hall Neighborhood House
- Lacey Manufacturing
- American Medical Response
- Greater Bridgeport Transit
- Northeast Builders Supply & Home Center
- Moore Tool Company/PMT Group

- Rotair Industries
- Valley Container
- Viking Construction
- Alloy Engineering

In addition to the above employers, there is a truck driving school that holds training on the western parcel of the project site. Although the truck driving training is held on this site, the business operates out of the Bridgeport Trade and Technology Center located at 480 Barnum Avenue.

Table 4-15 presents select income data for households and persons within the study area, the city of Bridgeport, and Connecticut. All census tracts within the study area have median household incomes less than the state, representing between 31.9 percent (Census Tract 740 in East Side) and 70.3 percent (Census Tract 733 in Mill Hill) of the state value of \$69,899 (U.S. Census, 2014). Census Tract 733 in Mill Hill is the only census tract to exceed the median household income value of the city, \$49,139 compared to \$41,204 (U.S. Census, 2014).

Per capita income in the study area ranges from \$12,690 (Census Tract 740 in East Side) to \$22,164 (Census Tract 733 in Mill Hill) (U.S. Census, 2014). None of the per capita income values associated with census tracts within the study area exceed the state per capita income value of \$38,480, and only two census tracts exceed the city per capita income value of \$20,422 (Census Tract 733 [\$22,164] and Census Tract 732 [\$21,878] in Mill Hill) (U.S. Census, 2014).

Because of the challenging job market, city residents must turn to regional employment opportunities. To compound this challenge, among workers 16 years and over, approximately 10.5 percent of city residents and 13.5 percent of persons residing in the study area do not have access to a vehicle (U.S. Census, 2014). This compares to 3.5 percent statewide (U.S. Census, 2014).

Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and related procedures developed by the U.S. Department of Transportation (e.g., Order 5610.2[a]), require the consideration of a project's potential human health and environmental effects specific to minority and low-income populations. In doing so, they aim to prevent a project from disproportionately and adversely affecting these populations, as well as to protect equal access to the project's environmental benefits.

Accordingly, and consistent with the CTDEEP Environmental Justice Program and Environmental Equity Policy, this assessment reviews demographic data on race and poverty within the study area, comparing them to the city of Bridgeport and Connecticut to identify the potential presence of minority and low-income populations.

As Table 4-16 presents, all census tracts within the study area have minority populations greater than 50 percent (U.S. Census, 2014). This is consistent with the city at 78.8 percent, but much higher than the state at 30.2 percent (U.S. Census, 2014). All census tracts within the study area have higher populations below the poverty level than the state (10.5 percent) and the majority are higher than the city (23.6 percent) with exception to Census Tracts 732 (11.3 percent) and 733 (15.6 percent) in Mill Hill (U.S. Census, 2014). The relative concentration of minority and poverty level residents in the study area, particularly in comparison to the state, demonstrates that the population in Bridgeport and in the vicinity of the project is disproportionately minority and low-income.

TABLE 4-16 RACE/ETHNICITY AND POVERTY (2014)

Geography	Percent Minority ¹	Percent Below Poverty Level ²
State of Connecticut	30.2	10.5
City of Bridgeport	78.8	23.6
Study Area Average	92.4	29.9
Mill Hill		
U.S. Census Tract 732	69.1	11.3
U.S. Census Tract 733	88.4	15.6
U.S. Census Tract 737	92.0	29.6
East Side		
U.S. Census Tract 735	98.7	31.9
U.S. Census Tract 736	95.1	34.9
U.S. Census Tract 738	96.2	37.5
U.S. Census Tract 739	97.9	33.2
U.S. Census Tract 740	98.1	43.9
East End		
U.S. Census Tract 743	94.0	32.2
U.S. Census Tract 744	94.3	28.8

Source: U.S. Census Bureau. (2014). *American Community Survey, 2010-2014 estimates*. Retrieved from <http://factfinder2.census.gov/>

(1) Defined as all persons except those identified as White alone, not Hispanic or Latino

(2) Defined as persons below 100 percent of the poverty level among the population for whom poverty status is determined

Communities

There are currently no residential communities directly adjacent to the proposed site. The areas north and west of the proposed station site are industrial and commercial, and do not support residential land uses. There is a pocket of smaller residential homes to the northwest of the proposed site, north of Barnum Avenue between Pembroke Street and Hallett Street. To the southwest, the site of the former Father Panik Housing Development now supports light residential development south of Church Street between Pembroke Street and Hallett Street.

The NHML ROW runs through the south of the Proposed Project site, parallel to Crescent Avenue. The Crescent Crossing Housing Development is a multi-stage residential development south of Crescent Avenue, also on the site of the former Father Panik Housing Development. The development is planned to eventually occupy the entire parcel between Hallett Street and Waterview Avenue, extending south from Crescent Avenue to Martin Luther King Drive. The development includes extending Church Street from Hallett Street to Waterview Avenue, through the Crescent Crossing site. The site is only partially built, with the area north of the Church Street extension remaining vacant.

4.7.3 Impact Assessment

4.7.3.1 No Action Alternative

Under the No Action Alternative, the socioeconomic environment of the project area would remain unchanged.

4.7.3.2 Proposed Project

The Proposed Project will not result in a significant adverse effect on demographics within the study area. The project will not alter the existing housing stock within the study area, and though the project will improve accessibility and mobility, it is not expected to result in a measureable population shift. The project will displace part of the truck driving school, but this activity is expected to relocate within the general vicinity of its current location. For that reason, the displacement of this business is not expected to result in a net loss to local employment.

The neighborhoods, businesses, and institutions of the study area currently suffer from a lack of convenient rail service. Commuting by rail to these neighborhoods requires persons to disembark and walk distances from 0.5 to 2 miles or transfer to a local bus route before arriving at their destination. The project will provide an additional transportation option alternative to conventional transport (such as single-occupancy vehicles). As Section 4.3.2 discusses, this is significant, as many workers within the study area do not have access to a vehicle and the project will provide them with the transport necessary to obtain regional employment. Businesses within the study area will also benefit from expanded transportation access, as the project will improve accessibility to customers and employees, as well as support employee recruiting and retention efforts.

The project intends to support anticipated future growth, as there are several substantial development projects underway in the project's vicinity (see section 4.18, Secondary and Cumulative Impacts). Further, the project has the potential to induce growth in the form of new residential and new commercial development.

The project will have temporary effects on local noise, air quality, and vehicular circulation during construction; however, these temporary effects are expected to be minor as mitigation measures and best management practices will be applied. During construction, the project will utilize temporary employment, a percentage of which will derive from the local workforce.

With respect to Environmental Justice, the determination of disproportionate and adverse effects is dependent on the potential of the project to have adverse effects in other resource categories. As the project is not expected to have an adverse effect, through either avoidance or mitigation, it would not have a disproportionate and adverse effect on minority and low-income populations within the study area. As the above paragraphs describe, the project will have beneficial effects, including enhanced accessibility and mobility, the potential for induced growth, and temporary construction jobs. All of these benefits will provide minority and low-income populations with economic opportunity.

The Proposed Project is not anticipated to impact residential communities in the vicinity. The Crescent Crossing Housing Development is adjacent to the NHML ROW; however, the City of Bridgeport has consulted with the developer of the Crescent Crossing Housing Development to ensure that the design for the northern portion of the site is compatible with the proposed commuter rail station.

The Proposed Project is anticipated to displace one business currently located on the western parcel of the project site. It is anticipated that this displacement will not impact the social or economic

conditions of the surrounding area; there are alternative available parcels within East Bridgeport that are of adequate size and appropriate zoning to accommodate the truck driving school.

4.7.4 Mitigation Measures

Based on the impact assessment, the land use changes associated with the Proposed Project would be beneficial to the community because of new use (potential business and residential development due to public transportation accessibility). There would be no adverse impact to neighborhoods, communities, or community facilities based on current conditions. No mitigation measures are required as the Proposed Project is not anticipated to have a negative effect on the surrounding area's socioeconomic conditions. Outreach materials and public information for the Proposed Project would be made available in Spanish to accommodate foreign language populations.

The City and CTDOT would develop and implement an outreach program during the construction period to keep the public informed about construction status and schedule, and to provide a mechanism for CTDOT to receive and respond to construction questions from the public. The outreach program will include coordination with the Saints Cyril and Methodius Slovakia Roman Catholic Church, located adjacent to the project site.

4.8 Visual Impacts and Aesthetics

The visual quality of the proposed station site is an important consideration, as the construction of the station should be sensitive to and enhance the visual quality of the area and be consistent with the city planning objectives. This section discusses the potential visual impacts of the proposed station.

4.8.1 Methodology

The visual quality of the proposed station site was based upon an on-the-ground review of existing conditions. Current site and public way pavements, plantings and site amenities were inventoried and reviewed as to their condition, as was the type and quality of existing surrounding development.

4.8.2 Existing Conditions

The major portion of the Proposed Project site north of the railroad tracks consists of large open areas of deteriorated bituminous concrete pavement and unpaved gravel with no vegetation other than weeds along some edges. The perimeter is enclosed by a combination of rusted ornamental metal fence and damaged chain link fence. The sidewalks along the Barnum Avenue and Hallett Street frontages are deteriorated bituminous concrete, with utility poles



FIGURE 4-6 PROPOSED STATION SITE LOOKING SOUTHWEST TOWARD THE RAILROAD ROW EMBANKMENT.



FIGURE 4-7 THE NHML ROW RETAINING WALL LOOKING NORTH FROM CRESCENT AVENUE.

and overhead wires dominating the view. There are no street tree plantings.

The existing raised railroad ROW along the south side of the main site area is characterized by approximately 10 to 20-foot high stone retaining walls. The existing rail line, catenary poles, and wires are prominent visual features above this raised embankment.

Views from the site north of the tracks are of adjacent, predominantly older commercial buildings.

The view of Barnum Avenue opposite the site is of a combination of bituminous concrete and concrete sidewalks, much of it in deteriorated condition, and

largely devoid of street trees. Views south of the embankment, which comprise Crescent Avenue and the raised railroad tracks, are predominantly of a 10-foot wide unmaintained grass strip between Crescent Avenue and the retaining wall, along with the catenary towers and wires. Views looking south from this portion of the site are of a large, open grassed area and construction site for the Crescent Crossing Housing Development.

The retaining walls, bridges, and overhead catenary structures within the APE are contributing elements to the historic NHML railroad. The APE is defined in Section 4.9.2.1 of this EIE. These elements are marked with graffiti in numerous sections through the project area, and show visually contrasting areas in which rehabilitation or other construction work has been done in the past.

4.8.3 Impact Assessment

4.8.3.1 No Action Alternative

Under the No Action Alternative, the site's current poor visual quality will remain unchanged. Currently this presents a blighted appearance that takes away incentive for adjacent properties to make improvements.

4.8.3.2 Proposed Project

The proposed station will substantially improve the visual aesthetic of the site and the surrounding area, replacing the current conditions of deteriorated parking areas and perimeter chain link fence with a fresh development designed to create a visually inviting environment. Entrance points will be designed as visual gateways, with an aesthetic developed to draw pedestrians, cyclists and drivers to the site. Comprehensive streetscape improvements including new lighting, sidewalks and street tree plantings will provide an attractive interface between the site and its neighboring uses. Parking areas will be paved, reduced in visual scale by landscape islands and illuminated at night by LED fixtures to minimize glare. The station design will feature a palette of site amenities and landscape improvements to further develop the site as a pedestrian friendly environment.

As described in Chapter 3, *Alternatives*, the Proposed Project will provide pedestrian access to the platforms through either an overhead walkway or an at-grade concourse underneath the elevated ROW. The overhead pedestrian walkway would have a greater visible impact as a result of the higher elevation and the relatively unobstructed views of the site from surrounding areas. Should CTDOT choose to construct the overhead walkway, it would be constructed in a manner consistent with that



FIGURE 4-8 PROPOSED STATION SITE LOOKING NORTHEAST TOWARD THE FORMER REMINGTON ARMS FACILITY.

of other overhead walkways on the NHML (for example, at the Fairfield Station). The option to provide pedestrian access at-grade underneath the ROW would have a limited impact on the visual environment. The pedestrian access option will be selected during final design of the Proposed Project upon further subsurface investigations and evaluation of the retaining wall fill.

The Proposed Project would require demolishing and reconstructing three railroad bridges (Pembroke Street, Hallett Street, and Seaview Avenue), as well as the railroad retaining wall. The Proposed Project would reconstruct the bridges and railroad retaining wall in a manner consistent with the visual character of the NHML. The impacts on these elements from a historic perspective are discussed further in Section 4.9, Historic and Archaeological Resources.

4.8.4 Mitigation Measures

The Proposed Project will improve the visual and aesthetic environment of the site and surrounding area, and would not require mitigation measures.

4.9 Historic and Archaeological Resources

Historic properties are defined as archaeological sites and above-ground resources such as historic buildings, structures, sites, objects, and districts included in, or eligible for inclusion in, the National Register of Historic Places (“National Register” or NRHP). The evaluation of impacts to above-ground resources considers both direct and indirect impact. Direct impacts result from ground disturbance due to Project construction, and indirect impacts are due to secondary effects such as visual appearance, noise, and vibration.

4.9.1 Regulatory Compliance

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (54 USC 306108) states that any federally funded project must “take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places.” The Section 106 regulations include the criteria of adverse effect (36 CFR 800.5(a)(1)), which specifically assess how a project may affect the characteristics that qualify a historic property for the NRHP. In addition to above-ground resources, a historic property “includes above-ground resources, artifacts, records, and material remains that are related to and located within such properties, as well as properties of religious and cultural importance to an Indian Tribe or Native Hawaiian organization and that meet the National Register criteria.” (36 CFR Part 800.16(l)(1)).

Section 106 further requires agencies to seek comments from a representative of the Advisory Council on Historic Preservation (ACHP) and from the State Historic Preservation Officer (SHPO). In accordance with the Section 106 process, CTDOT initiated consultation with the CTSHPO and FTA to determine whether the project has the potential to affect historic properties.

4.9.2 Methodology

Potential historic resources were identified by searching CTSHPO site files for recorded properties within one-half mile of the Project; consulting National Register nomination forms and comprehensive building surveys conducted in the vicinity of the Project; and a reconnaissance-level survey of the Project site and vicinity conducted by a professional who meets the Secretary of the Interior’s *Professional Qualifications Standards* for Architectural History and History (36 CFR Part 61), to assess

the integrity of previously-recorded properties and identify any additional potential historic properties.

4.9.2.1 Area of Potential Effects (APE)

Section 106 defines the APE as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The [APE] is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" (36 CFR Part 800.16). The APE for the Barnum Station Project was confirmed by the FTA, CTSHPO, and CTDOT.

Above-Ground Resources

The APE for above-ground resources is defined for this Project as 500 feet from the centerline of the project area railroad tracks, or 400 feet from the project boundary, whichever is larger (Figure 4-6; Appendix C, *Photographs of Site and Area of Potential Effects*). The 500-foot APE is consistent with the noise and vibration analysis being performed for this project, which assumes that noise and vibration impacts could occur up to 500 feet from the tracks, depending on the details of the project and the existing noise conditions.

The 500-foot radius also includes the extent of the potential visual effects of the project, which extends approximately 400 feet from the project boundary, based on the limited visual impact of project elements (including new platforms, parking lot, and bridge rehabilitation/replacement) and intervening areas of development.

Archaeological Resources

The Barnum Station Project APE for archaeological resources is defined as the Project footprint, which is the extent of construction where earthmoving could potentially occur for the Project. The APE for archaeological resources is shown on Figure 4-9 as the project boundary. If staging areas or access roads are identified in the future that are located outside of this APE, the APE will be re-evaluated to consider the inclusion of new direct impact areas.



Figure 4-9
Historic Resources in
the Vicinity of the Project Site

**Barnum Station
Bridgeport, Connecticut**

-  Project Site
-  National/State Register Listed or Eligible Properties
-  Area of Potential Effects
-  Approximate former extent of the Remington Arms Company Barnum Avenue Complex

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4.9.2.2 Section 106 Consultation

Consultation regarding the presence of, and impacts to, historic properties was coordinated between CTDOT, CTSHP, FTA, the City of Bridgeport, and the Advisory Council for Historic Preservation (ACHP). As discussed in Section 1.5.1, Public input was sought through a public scoping notice posted in the State of Connecticut's CEQ Environmental Monitor on August 2, 2016.

Public meetings on May 24, 2016 conducted by the City of Bridgeport included discussions of the Section 106 process and the identification of historic resources; no comments resulting from these public meetings addressed historic properties, and no Consulting Parties were identified. An additional informational meeting was held on October 13, 2016 to provide further information on these projects. A website was created that provides links to information on the Proposed Project and the Barnum Station TOD Study: <http://www.barnumstation.com/>.

CTDOT is consulting with the City of Bridgeport Historic District Commission Number 1 regarding the presence of and impacts to historic properties. The City identified the commission as a stakeholder for ongoing coordination after the public meetings.

4.9.3 Existing Conditions

The East Bridgeport area was well-developed by the end of the 19th century, with an established road system and railroad, and several residences, commercial buildings, and industrial facilities. The Remington Arms Factory complex, then part of the Union Metallic Cartridge Company, was surrounded by similarly large-scale industrial development, including a complex owned by the Singer Sewing Machine Company, the American British Manufacturing Company, and an appliance factory. The need for housing for the growing workforce resulted in a large amount of residential development in the east portion of Bridgeport in the decades around the turn of the 20th century.

The built environment within the APE has changed considerably during the past few decades. It currently consists of a combination of early 20th century development, primarily isolated concentrations of mostly industrial buildings, and extensive new development on sites south of the railroad track between Waterview Avenue and Pembroke Street (Appendix C, *Photographs of Site and Area of Potential Effect*, Photos 5 to 12).

Above-Ground Resources

Research and survey in the vicinity of the Project identified four recorded above-ground resources within the APE, which includes three historic districts listed or eligible for inclusion in the National Register of Historic Places, and one historic district that has not been evaluated for National Register eligibility. For detailed information on these resources, see Appendix D, Proposed Project Historic Resources. No additional historic resources were identified within the APE.

Archaeological Resources

One archaeological site has been recorded in the vicinity of the Project site, site 15-20. Documented in 1941, the site consisted of several stone posts with possible pre-Contact period ceremonial associations. The site was subsequently destroyed and there are no stone posts currently located on or near the recorded location (Heritage Consultants, 2016).

The Project site is not considered to have potential to yield intact archaeological deposits. The dominant soil type in the vicinity of the site is "Urban Land," characterized by repeated episodes of ground disturbance and considered to have little or no potential for intact archaeological features. The

buildings that formerly occupied the site have been razed and the site graded. The gravel surface is mixed with crushed brick in some areas, likely leftover material from the demolition episodes.

4.9.4 Impact Assessment

4.9.4.1 No Action Alternative

The No Action Alternative would continue the existing conditions and result in no effects to Section 106 resources.

4.9.4.2 Proposed Project

Above-Ground Resources

The portion of the NHML within the APE is recommended as an eligible linear historic district under National Register Criteria A and C.¹⁰ The Proposed Project would impact railroad features that are contributing resources to the historic segment of the NHML within the APE, including the bridges, retaining walls, and overhead catenary structures. This section discusses potential effects the Project may have on significant historic properties within the district and potential measures to minimize or mitigate Project impacts.

Nine catenary support structures within the Project site, which are original to the 1914 system and are contributing features to the historic district, would be replaced with new structures. Additional elements of the district impacted by the Proposed Project are associated with the 1902 elevation of the railroad. Reconstructing the 1902 girder bridges over Seaview Avenue, Hallett Street, and Pembroke Street would be necessary to accommodate the new track alignments needed for island platforms. Widening the embankment would require reconstructing the stone retaining wall within the ROW between east of Seaview Avenue and west of Pembroke Street, impacting this railroad feature.

Replacing the bridges would likely constitute an adverse effect under Section 106, through the “physical destruction or damage to all or part of a property” 36 CFR 800.5(a)(2)(i). Reconstructing the embankment and replacing the catenary structures would also constitute an adverse effect.

The portion of the former Remington Arms Complex on which the Project site is located is not considered eligible for the National Register. The shot tower and immediately associated buildings, which are considered eligible, are located approximately 250 feet north of the APE boundary. Given the distance of the shot tower and associated elements from the APE and Project site, no historic properties would be affected by the Project (36 CFR 800.4(d)(1)).

The National Register-listed East Main Street Historic District and Deacon’s Point Historic District are located at the west and east ends of the APE, respectively. All contributing buildings located within the APE at the time of the district listing are no longer extant, therefore no historic properties would be affected by the Project (36 CFR 800.4(d)(1)).

Archaeological Resources

The Project site is contained within an area of high ground disturbance that exhibits little archaeological potential. The at-grade concourse under consideration is similarly expected to be sited entirely on fill associated with the elevation of the railroad in the early 20th century, and/or disturbed

¹⁰ *How to Apply the National Register Criteria for Evaluation bulletin*. U.S. Department of the Interior, National Park Service, Cultural Resources. Published 1990; revised 1991, 1995, 1997; revised for internet 1995.

soil. If further design of this potential element indicates that excavation will extend deeper than the known extent of disturbed soil, CTDOT and FTA will consult with CTSHPO regarding a strategy to assess archaeological sensitivity.

4.10 Wetlands and Floodplains

This section summarizes the existing wetland resources and floodplains in the vicinity of the Proposed Project. These on-site resources include tidal and freshwater wetland areas regulated by the U.S. Army Corps of Engineers and CTDEEP, and flood zones as defined by the FEMA FIRM maps. Expected wetland and floodplain impacts are identified and evaluated below. Measures to avoid, minimize, and mitigate impacts are evaluated and means to implement them are recommended.

4.10.1 Regulatory Compliance

In Connecticut, wetlands are protected under two different sections of the Connecticut General Statutes. The CTDEEP has direct regulatory jurisdiction over activities occurring in tidal wetlands and toward the ocean of the high tide line. The Connecticut Tidal Wetlands Act (CGS sections 22a-28 through 22a-35) and the statutes governing the placement of structures, dredging, and fill in tidal, coastal or navigable waters (CGS sections 22a-359 through 22a-363f, inclusive) apply to proposed activities within this regulatory jurisdiction. Tidal wetlands are defined as *banks, bogs, salt marsh, swamps, meadows, flats, or other low lands subject to tidal action* which are vegetated by certain plant species known to occur in wetlands that are listed in the statute.

As defined in CGS Section 22a-359, the regulatory jurisdiction is defined by the Coastal Jurisdiction Line (CJL). The CJL is the location of the topographical elevation of the highest predicted tide for the period beginning in 1983 and ending in 2001, referenced to the most recent National Tidal Datum Epoch as published by the National Oceanic and Atmospheric Administration and described in terms of feet of elevation above the North American Vertical Datum of 1988. In the project vicinity, the CJL is 5 feet NAVD.

In 1972, the Connecticut state legislature enacted the Inland Wetlands and Watercourses Act (IWWA, sections 22a-36 through 22a-45 of the General Statutes of Connecticut), which requires the regulation of activities affecting the wetlands and watercourses in Connecticut. In 1987, the IWWA was amended to require that municipalities regulate such activities. Inland Wetlands and Watercourses are not subject to the ebb and flow of tides. They are identified by soil types that are poorly drained, very poorly drained, alluvial or floodplain. Watercourses including waterbodies are also afforded protection under this Act.

The U.S. Army Corps of Engineers administers Section 404 of the Clean Water Act (CWA) which establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. The jurisdictional limit of tidal wetlands is Mean High Water, equivalent to approximately 3.15 feet NAVD88 in the areas surrounding Yellow Mill Channel.

The project has been designed to minimize impacts to wetland resource areas located proximal to the site which include both tidal and non-tidal resource areas. Wetlands, watercourses and water bodies may provide a variety of functional values, such as wildlife habitat, fish habitat, educational potential, visual/aesthetic quality, water-based recreation, flood flow desynchronization, groundwater and surface water use potential, nutrient retention, sediment trapping, shoreline stabilization and dissipation of erosive forces, forestry potential, and archaeological potential. Ecological functions and

societal values vary with each wetland. Factors affecting wetland function include size, location in the watershed, number and interspersions of plant cover types, and the degree of disturbance.

4.10.2 Methodology

The project site and immediate surroundings were investigated to determine if wetlands existed at the Site. A site visit on March 26th, 2016 documented the extent of wetland boundaries, vegetation and surrounding conditions. Inland wetlands and watercourse boundaries were determined and delineated by VHB Wetland Scientists on August 5th, 2016. Floodplain limits were determined based on a review of available Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM). Impacts were evaluated by determining the Proposed Project's limits of work and the location and area of any disturbance or construction within wetland areas or floodplains, and assessing potential impacts to wetland resources or floodplain functions as a result of the disturbance or construction. Wetland impacts were analyzed in terms of the total amount of wetland altered from the proposed alternative, the type of wetland filled and the functions that would be affected from the wetland filling. Impacts to floodplains include placing fill into a floodplain that would reduce flood storage volume, or increase the depth or duration of flooding.

4.10.3 Existing Conditions

The proposed site of the new Barnum Station is located within the Yellow Mill Channel Sub-Regional Drainage Basin. Wetland resource areas are located along the eastern portion of the Proposed Project site. Figure 4-10 illustrates the existing natural resources in the vicinity of the Proposed Project. Wetlands and waterways were delineated on the site and consist of an unnamed stream, wetlands on either side of the railroad ROW, and floodplains.

Wetland areas are associated with a freshwater stream north of the railroad, and with Yellow Mill Channel south of the railroad and Crescent Avenue. To the north, there is a vegetated wetland dominated by the invasive plant, *Phragmites australis*, between the stream and the uplands. The boundary of this wetland is formed by the railroad retaining wall and the foundation of a demolished building, along the south side. An unvegetated man-made channel runs along the retaining wall between the vegetated wetland and the culvert under the railroad. To the south, there are steep slopes on both sides of Yellow Mill Channel, with a narrow fringe of salt marsh between the upland slope and the tidal mud flat. The salt marsh does not extend to the culvert, but ends approximately 25 feet south of the existing culvert.

Wetlands

- Estuarine and Marine Deepwater
- Freshwater Pond
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

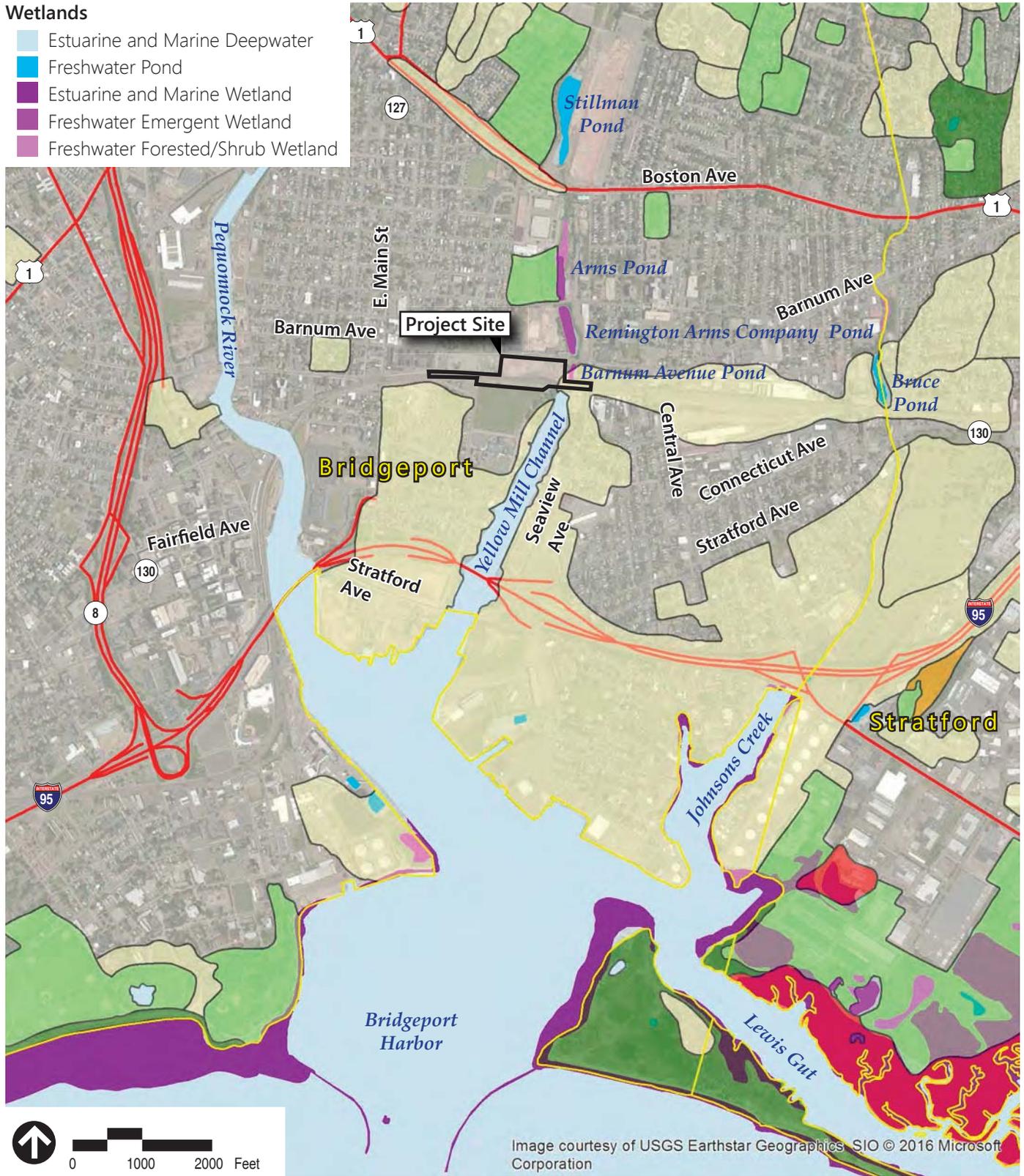


Image courtesy of USGS Earthstar Geographics, SIO © 2016 Microsoft Corporation

Source: Soil Survey Geographic (SSURGO) database for the State of Connecticut (2007) & National Wetland Inventory (2016)

Soils

- Excessively Drained
- Moderately Well Drained
- Well Drained
- Poorly Drained
- Very Poorly Drained



Figure 4-10
Wetlands and Soils

**Barnum Station
Bridgeport, Connecticut**

Unnamed Stream 1

An unnamed perennial stream is located to the east of the project site (Unnamed Stream 1). This is a non-tidal stream that flows through a series of ponds north of the site before entering a culvert under the railroad and Crescent Avenue and flowing into the Yellow Mill Channel to the south.

Wetland 1 (tidal)

Wetland 1 is a tidal salt marsh located along Yellow Mill Channel located adjacent to Waterview Park. Vegetation within Wetland 1 consists of dense stands of smooth cordgrass (*Spartina alterniflora*). Mussels (*Mytilus* sp.) were observed at the base of vegetation throughout the wetland. Wetland 1 is bound by the remains of a concrete platform to the north and rocky substrate adjacent to Yellow Mill channel to the east. On the east side of Yellow Mill Channel, additional stands of smooth cordgrass are also found along the channel, along with areas of open mudflats and rocky deposits. Vegetation along the adjacent upland slopes include staghorn sumac (*Rhus typhina*), oriental bittersweet (*Celastrus orbiculatus*), pokeweed (*Phytolacca americana*) and Tree of Heaven (*Ailanthus altissima*). Wetland 1 also includes the tidal mud flats of Yellow Mill Channel.

Wetland 2 (inland)

Wetland 2 is a vegetated wetland that contains an unnamed perennial stream which flows from north to south from before being diverted into a culvert that outlets into the Yellow Mill Channel underneath the NHML and Crescent Avenue. On historic maps, this was referred to as Barnum Avenue Pond or Lower Pembroke Lake. The wetland is bounded by the foundation of a demolished industrial building to the west, Barnum Avenue to the north, and a wooden retaining wall associated with an abandoned railroad spur to the south. Vegetation consists primarily of dense stands of common reed (*Phragmites australis*) and oriental bittersweet, wild grape (*Vitis* sp.), red maple (*Acer rubrum*), blue vervain (*Verbena hastata*) and Catalpa (*Catalpa speciosa*).

Floodplain

According to the latest FEMA FIRM flood plain maps for Bridgeport (MAP #09001C0441G dated July 8, 2013), portions of the site are located within mapped floodplains. Figures 4-11 and 4-12 show the Proposed Project site in context of the FEMA FIRM floodplain map and latest hurricane surge risk zones. Portions of the site to the north and south of Crescent Avenue are located within areas designated as Zone AE flood zones. The flood zone north of the ROW is an inland riparian floodplain, with an elevation of approximately 12 feet NAVD (1-percent annual chance of occurrence). The flood zone south of the ROW is a coastal estuarine floodplain with an elevation of approximately 10 feet NAVD (1-percent annual chance of occurrence).

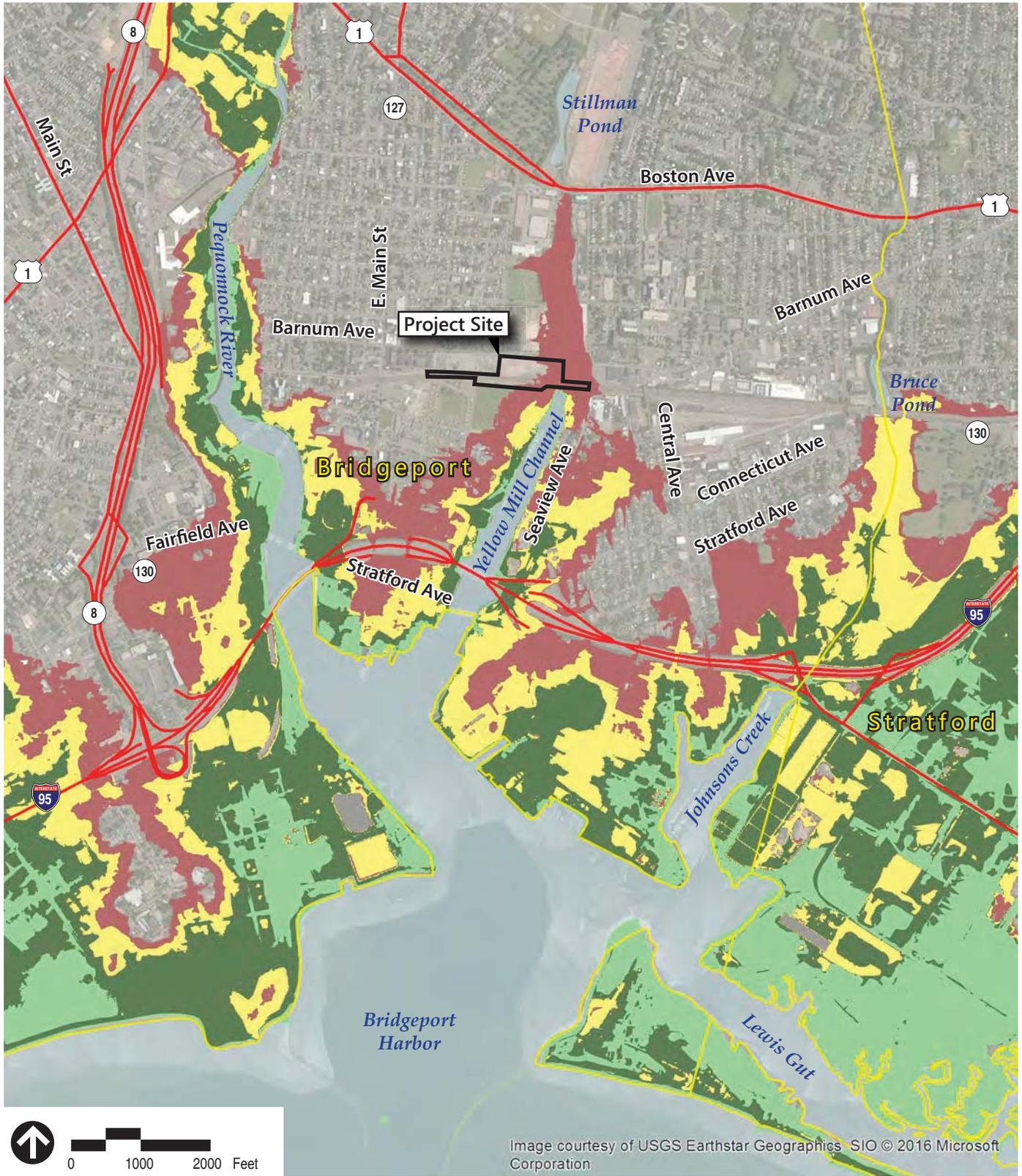


Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation

Source: Hurricane Surge Inundation (2008)

- Category 1 - Very Dangerous
- Category 2 - Extremely Dangerous
- Category 3 - Devastating
- Category 4 - Catastrophic



Figure 4-12
Hurricane Surge Map

**Barnum Station
Bridgeport, Connecticut**

4.10.4 Impact Assessment

4.10.4.1 No Action Alternative

Under the No Action Alternative, the wetlands and waterways would persist in their current state.

4.10.4.2 Proposed Project

Impacts to wetlands are defined as the reasonably foreseeable effects to wetlands, and include direct and temporary effects. Direct effects are the physical loss or alteration of a wetland due to the construction of the proposed station and supporting infrastructure, while temporary effects are associated with construction activities and are typically short term. Impacts to wetlands include both the direct loss of wetland area (quantitative) as well as any effects on the principal valuable functions provided by those wetlands (qualitative effects). These effects depend largely on the size and location of the impact in relation to the wetland.

The Proposed Project would require several modifications to the surrounding infrastructure that have the potential to affect wetlands and floodplain areas. The NHML ROW would be widened on both the north and south sides, and Crescent Avenue would be shifted to the south to accommodate the widened NHML ROW. As a result, the culvert connecting the unnamed stream to Yellow Mill Channel would be replaced and lengthened in its current alignment. The northern retaining wall and extended culvert would require that the remaining foundation of the demolished building be partially removed in order to reroute the unnamed stream to meet the lengthened culvert (Figure 3-2). The potential impacts of each of these modifications on wetlands and floodplains are discussed below.

Wetland 1 (tidal)

The schematic design plans show the widened railroad embankment and a shifted two-lane Crescent Avenue (with sidewalk), with retaining walls used on both the north and south sides. On the south side of the railroad ROW, the widened NHML ROW and shifted Crescent Avenue would impact approximately 1,260 square feet of tidal mud flat within Yellow Mill Channel. The impact is a result of the retaining wall and headwall that would need to be constructed in order to shift Crescent Avenue to the south to accommodate the widened NHML ROW. As part of the widening, the culvert connecting the unnamed stream to the Yellow Mill Channel would be replaced and extended. No vegetated tidal wetland areas within Wetland 1 would be affected.

Wetland 2 (inland)

On the north side of the railroad ROW, the widened NHML ROW would impact approximately 3,600 square feet of inland wetland area. This impacted area is along the unnamed freshwater stream, immediately before it enters the culvert that runs underneath the ROW. This narrow wetland area consists of a man-made channel that runs between the NHML retaining wall and the foundation of the demolished building, and has little functional value. The majority of the impacted wetland area is not vegetated. As the design is finalized, CTDOT will determine what portion of the impacted wetland area is vegetated. This wetland impact would result from constructing the retaining walls to support the widened NHML ROW and the replaced and lengthened culvert connecting the unnamed stream to the Yellow Mill Channel. Temporary impacts may be required to re-route the stream to accommodate the changed culvert inlet.

Floodplain

The widened railroad embankment would cumulatively impact approximately 1,600 square feet of floodway, 1,590 square feet of floodplain in the 1 percent annual chance zone (100-year flood), and 4,000 square feet of floodplain in the 0.2 percent annual chance zone (500-year flood). These impacts would result from constructing a retaining wall in portions of the unnamed stream parallel to the existing northern retaining wall to widen the ROW, and constructing a retaining wall south of Crescent Avenue within Yellow Mill Channel to accommodate shifting Crescent Avenue to the south.

4.10.5 Mitigation Measures

A sequential approach to wetland mitigation has been followed during the planning phase of the Proposed Project. This process strove to avoid and minimize adverse impacts and to compensate for unavoidable adverse impacts to existing aquatic resources.

The Proposed Project would require the partial removal of the building foundation to reroute the unnamed stream to meet the replaced and extended culvert. CTDOT will work with FEMA, USACE, CTDEEP, and the City of Bridgeport, to design the rerouted stream in a manner that provides sufficient stream flow, flood storage volume and maintains flood level depths.

Wetland impacts of the Proposed Project would require permitting by the CTDEEP for tidal wetlands, and under the Connecticut Inland Wetlands and Watercourses Act and under Section 404 of the federal Clean Water Act. CTDOT will work with USACE, CTDEEP, and the City of Bridgeport to adopt appropriate compensatory mitigation measures for the potential wetland and floodplain impacts.

Temporary mitigation measures during construction would ensure the protection and continued function of wetlands. Construction best practices would be developed in advance of construction, and would include sedimentation controls, erosion controls, and clearly defined limits of work and construction laydown areas.

4.11 Water Quality

This section summarizes existing surface water and groundwater resources in the vicinity of the Proposed Project. These on-site and adjacent resources include wetlands and waterways. Expected water quality impacts, including construction and operational impacts, are identified and evaluated below. Measures to avoid, minimize, and mitigate impacts are evaluated, and means to implement them are recommended.

4.11.1 Regulatory Compliance

The project will be designed to comply with the Connecticut Water Quality Standards (WQS). The WQS includes three elements: the Standards, Criteria, and a series of Classification Maps. The construction of the project will be designed in accordance with the 2004 Connecticut Stormwater Quality Manual. The WQS set an overall policy for management of water quality in accordance with the directive of the Connecticut General Statutes, Section 22a-426.

4.11.2 Methodology

CTDOT conducted a visual site inspection to determine the existing stormwater behavior, identify existing stormwater management infrastructure if it existed, and identify the likely receiving waters. CTDOT reviewed the existing water quality characteristics of the water resources in the vicinity of the

Proposed Project, and evaluated the potential impacts to these waters based on the conceptual design for the Proposed Project.

The following section describes the existing surface and groundwater resources within the vicinity of the Proposed Project, existing stormwater management systems, and water quality at the project site. The information presented in this section was collected from existing data, maps and reports and field investigation.

4.11.3 Existing Conditions

The project site is located in the Yellow Mill Channel Sub-Regional Drainage Basin which is included in the Long Island Sound watershed, a designated National Estuary¹¹. The Local Study Area for the project includes the proposed site and adjacent water resource areas that may be affected by activities from construction. The surface water resources at the project site include an unnamed stream that flows underneath Barnum Avenue and through a culvert under Crescent Avenue before daylighting into Yellow Mill Channel south of Crescent Avenue at the southern limits of the project site.

The unnamed stream at the site is classified by CTDEEP¹² as Class B. This designation is known or presumed to meet Water Quality Criteria which support the designated uses (recreational use, fish and wildlife habitat, agricultural and industrial supply, and other legitimate uses, including navigation). Yellow Mill Channel is classified by CTDEEP¹³ as Class SB. This designation is known or presumed to meet Water Quality Criteria which support the designated uses (habitat for marine fish and aquatic life and wildlife; commercial shellfish harvesting; recreation; industrial water supply; and navigation).

Groundwater at and near the site is classified by the CTDEEP¹⁴ as a GB groundwater area. The GB classification indicates groundwater within a historically highly urbanized area or an area of intense industrial activity, and where public water supply service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals, or land use impacts. There are no known stormwater collection, conveyance, or treatment devices on the site. The site can be presumed to discharge typical urban runoff constituents by overland flow to the adjacent wetlands.

4.11.4 Impact Assessment

Anticipated environmental consequences were determined by comparing existing conditions with expected conditions for the project site, based on the schematic design. The project was evaluated for both direct and indirect impacts.

4.11.4.1 No Action Alternative

Under the No Action Alternative, the water quality in local and regional water bodies would remain consistent with that typically found in a highly urbanized area. The site would continue to discharge directly to the unnamed stream and Yellow Mill Channel.

4.11.4.2 Proposed Project

The Proposed Project would convert primarily developed land into the station facilities and paved parking lots (Figure 3-1). Construction based on the schematic design will result in a net decrease in impervious surface and stormwater runoff. A closed drainage system would be constructed for the site

¹¹ Section 320 of the Clean Water Act of 1987

¹² Water Quality Classification Map of Connecticut (WQCMC), CTDEP, 1997

¹³ WQCMC, 1997

¹⁴ WQCMC, 1997

and stormwater would be collected from the paved surfaces through a series of catch basins and conveyed through the closed pipe system to a suitable outfall. The systems would be designed to match the existing flows based on the appropriate design storm. Development of this site would have a beneficial effect compared to the No Action Alternative due to a reduction in the rate and volume of stormwater discharge and improved water quality.

Water quality control measures would be designed and implemented to meet the discharge requirements of 80 percent removal of Total Suspended Solids from the discharge. Various technologies such as swirl concentrators will be evaluated. Additional mitigation measures to remove pollutants associated with vehicular traffic would be incorporated where feasible. These measures may include swales, wet detention ponds and bio- filtration swales. The system would be designed to follow best management practices (BMPs) and comply with the National Pollutant Discharge Elimination System standards.

The Proposed Project is not anticipated to affect water quality in Yellow Mill Channel because appropriate BMPs including sediment controls and treatment technologies would be implemented in the design and construction of the station. Actual impacts will be determined during final design when the final footprint of the station and stormwater management features are designed.

4.11.5 Mitigation Measures

The BMPs included in the project design are anticipated to have an overall beneficial effect on water quality, providing water collection and treatment and reducing the rate and volume of stormwater discharge.

4.12 Coastal Resources

This section describes the relationship of the Proposed Project to coastal zone resources and evaluates the consistency of the Project with state regulations and policies.

4.12.1 Regulatory Compliance

Compliance with the Federal Coastal Zone Management Act of 1972 requires that the Proposed Project be consistent with the Connecticut Coastal Management Act, enacted in 1980¹⁵. Section 307 of the Coastal Zone Management Act requires federal agency actions affecting any coastal use or resource in Connecticut to be consistent with Connecticut's approved coastal management program (15 CFR 930.30 through 930.46) The CTDEEP OLISP must conduct a Coastal Consistency Review for projects located within the Coastal Boundary as defined in Connecticut General Statutes Section 22a-94 (b).

4.12.2 Existing Conditions

The Connecticut Coastal Area consists of land and water within the area delineated by the limit of the state's jurisdiction in Long Island Sound and the coastal municipalities of the state¹⁶. The Proposed Project site lies within the Coastal Area. Within the Connecticut Coastal Area, the Connecticut Coastal Boundary is a continuous line within the Coastal Area delineated by the 100-year coastal flood zone, a 1,000-foot setback from the mean high water mark in coastal waters, or a 1,000-foot setback from the

¹⁵ GSC Sec. 22a-90 to 22a-111

¹⁶ CGS Sec. 22a-94 (a)

inland boundary of tidal wetlands, whichever is farthest inland¹⁷. The Proposed Project site lies within the Coastal Boundary. Figure 4-13 shows the project site within the Coastal Boundary

As described in the Connecticut Coastal Management Act, “coastal resources” consist of the coastal waters of the state, their natural resources, related marine and wildlife habitat and adjacent shorelands, both developed and undeveloped, that together form an integrated terrestrial and estuarine ecosystem. This includes coastal bluffs and escarpments, rocky shorefronts, beaches and dunes, intertidal flats, tidal wetlands, freshwater wetlands and watercourses, estuarine embayments, coastal hazard areas, developed shorefront, islands, nearshore waters, offshore waters, shorelands, and shellfish concentration areas.

Yellow Mill Channel is part of the Bridgeport Estuary (Estuary 7) watershed. The CTDEEP assessed the segments of the Bridgeport Estuary and included them in the CT 2010 303(d) List of Impaired Waterbodies. Yellow Mill Channel is within Segment 1 (CT-W1_001-SB) of the Bridgeport Estuary, running from Pleasure Beach to the saltwater limit in the Pequonnock River and Lewis Gut, and including Johnsons Creek and Bridgeport Harbor. Segment 1 is classified as SB, designated uses are habitat for marine fish and aquatic life and wildlife, commercial shellfish harvesting, recreation, industrial water supply, and navigation. This segment is impaired due to elevated bacteria concentrations, affecting the designated use of shellfish harvesting¹⁸.

4.12.3 Impact Assessment

This section describes the potential direct and indirect effects of the Proposed Project on coastal resources.

4.12.3.1 No Action Alternative

The No Action Alternative would not result in direct impacts on coastal resources because no construction would occur.

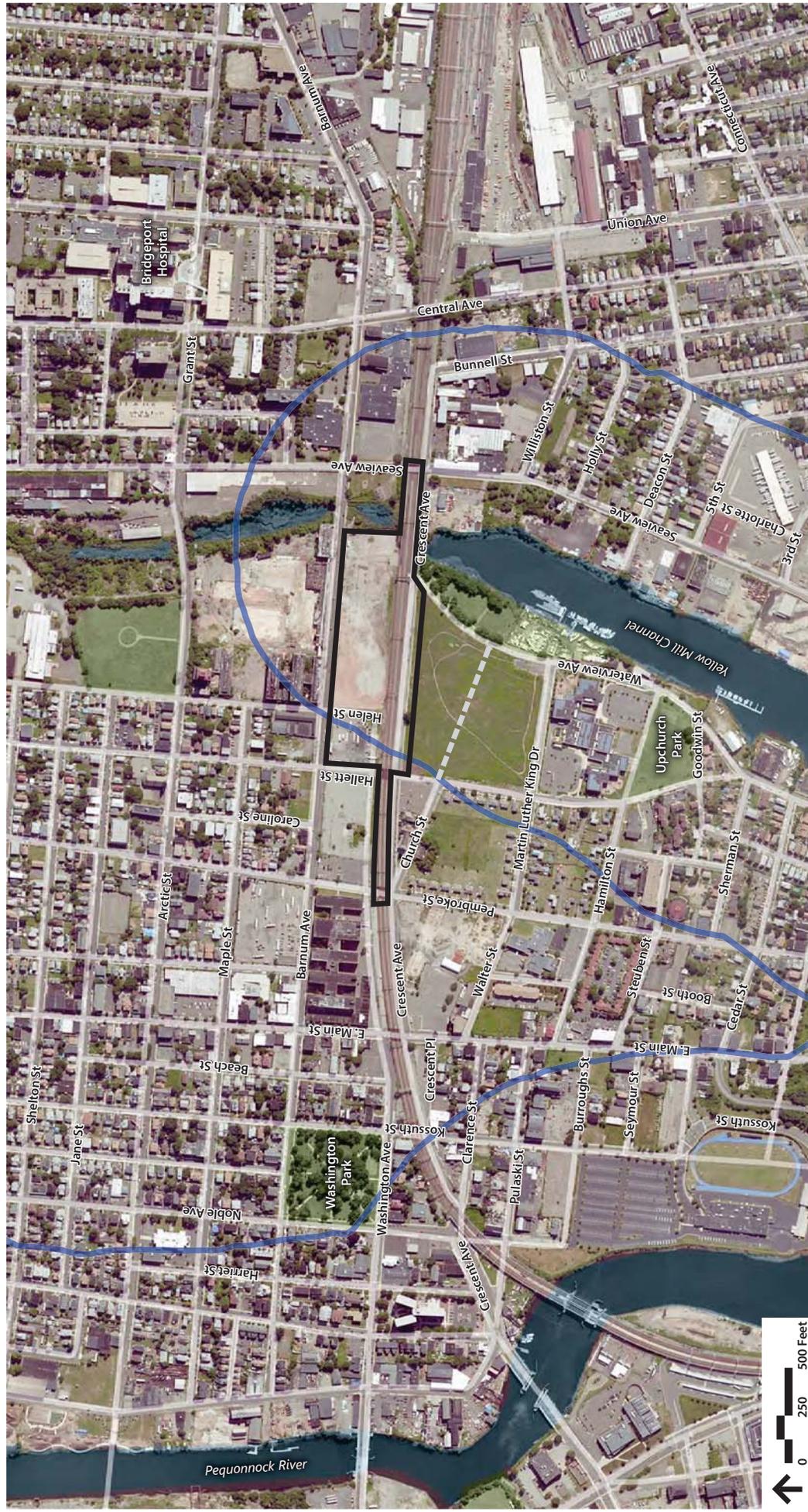
4.12.3.2 Proposed Project

The majority of the Proposed Project lies within the Coastal Boundary. The land uses on the site consist of paved, vacant land, or railroad infrastructure, and no coastal resources are located on the site. However, reconstructing the railroad embankment and shifting Crescent Avenue to the south will require a new retaining wall within coastal resources (mud flat, coastal flood zone, intertidal waters). The Proposed Project is consistent with the policies and procedures of the Coastal Management Act since it will improve water quality and visual quality of the surrounding water bodies, and will not result in adverse impact to characteristics and functions of resources, coastal flooding, coastal water circulation patterns, drainage patterns, patterns of shoreline erosion and accretion, visual quality, water quality, or to wildlife, finfish, or shellfish habitat. Mitigation for the loss of coastal wetland resources will be developed during the final design and permitting phase of the Project. During final design, CTDOT will request formal Coastal Consistency Review from CTDEEP.

¹⁷ CGS Sec. 22a-94 (b)

¹⁸ A *Statewide Total Maximum Daily Load Analysis for Bacteria Impaired Waters*. CTDEEP. 2012. Appendix A, Watershed Specific Bacteria Impairment Appendices. Appendix 79, Estuary 7: Bridgeport.

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Source: CTDEP



Project Site

Coastal Boundary

Church Street Extension



Figure 4-13
Coastal Boundary

**Barnum Station
Bridgeport, Connecticut**

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4.12.4 Mitigation Measures

The Proposed Project will include compensatory mitigation for the loss of coastal wetland resources. CTDOT will develop mitigation measures in coordination with CTDEEP during final design. The proposed station is consistent with policies and procedures of the Coastal Management Act, and no additional mitigation measures are proposed.

4.13 Hazardous Materials

There is potential for construction activities to encounter hazardous materials, hazardous wastes, or contaminated soils during construction at the Proposed Project site and within the railroad ROW. Based on historical land uses of the property as manufacturing and industrial facilities likely to have used/generated or stored hazardous materials and/or hazardous wastes, this section describes the known hazardous environmental conditions associated with the Proposed Project site.

4.13.1 Methodology

As part of the Barnum Station project, the City undertook a Phase I Environmental Site Assessment (ESA) for the Proposed Project site. The Phase I ESA included background characterization of soils, groundwater and land uses; an Environmental Data Resources Inc. Radius Map™ Report with GeoCheck® (EDR Report) for sites within a standard half-mile radius of the Proposed Project site¹⁹, review of CTDEEP files and prior documents for the site; interviews with property owners; and a site reconnaissance. The EDR Report identified multiple sites on and around the Proposed Project site that have had recorded incidents with one or more national or state databases. Each database logs specific types of incidents. The State databases included:

- CT AUL
- CT BROWNFIELDS
- CT CPCS
- CT ENF
- CT LUST
- CT SPILLS
- CT UST
- CT MANIFEST
- CT PROPERTY
- CT LWDS
- CT SDADB
- CT NPDES
- CT AIRS

Federal databases included:

- CERCLIS
- CERCLIS-NFRAP
- CORRACTS
- ECHO
- FINDS
- RCRA-LQG
- ICIS
- MLTS
- US AIRS
- RCRA NonGen/NLR
- US BROWNFIELDS
- RCRA-CESQG
- US AIRS
- RCRA-SQG

The Proposed Project site itself was identified in records under CT LUST, CT SPILLS, CT BROWNFIELDS, and CT ENF. Appendix E provides a summary of a Phase I Environmental Site Assessment (ESA) conducted in 2016.

¹⁹ The EDR Radius Map Report with GeoCheck. 812-1016 Barnum Avenue. Environmental Data Resources Inc. Prepared for VHB. March 18, 2016.

4.13.2 Existing Conditions

The proposed station site (812 Barnum Avenue and 965 East Washington Avenue) was the subject of Phase I and Phase II Environmental Site Assessments conducted between the late 1980s and 2006 for the prior owner, Remington Arms Company. These parcels (referred to in prior studies as the South Parcel) contained buildings used for manufacturing ammunition, metal finishing, and general machinery, as well as a water treatment building and several underground storage tanks. A variety of hazardous materials, including solvents, plating waste, metal waste, and petroleum products were stored and used on the site. The Phase II ESAs identified “constituents of concern” in soils and groundwater, and identified areas where Phase III studies were warranted in order to evaluate the full nature and extent of contamination in soils and groundwater.

The Phase I ESA identified several Recognized Environmental Conditions (RECs) associated with the historical use of these properties. RECs indicate that there is a potential that oil and hazardous material has been released to the environment. Previous subsurface investigations have confirmed that hazardous waste and hazardous materials, including petroleum products, have been used, stored, spilled or released to the environment. These RECs include:

- The former power house located at the southeast corner of 812 Barnum Avenue (the foundations of this building are still present). Historical soil sampling in this area has identified petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls and heavy metals above CTDEEP remediation standards.
- The former fuel pump house located immediately west of the power house. Historical soil sampling in this area has identified petroleum hydrocarbons, PAHs and heavy metals.
- Former buildings in the western portion of the site. Historic soil sampling has identified petroleum hydrocarbons, volatile organic compounds (VOCs), PBCs and heavy metals at various locations within this area.
- 965 East Washington Avenue. This site was previously used for industrial manufacturing operations which may have resulted in impacts to soil and groundwater.

The Dupont Corporation, through a Memorandum of Understanding with the City of Bridgeport dated October 26, 2000, is responsible for remediation of the 812 Barnum Avenue parcel to support future development of industrial or commercial uses on the site, and to meet the Industrial/Commercial Direct Exposure Criteria established by the CT Remediation Standard regulations.

4.13.3 Impact Assessment

Project activities could encounter a discharge, spillage, controlled loss, seepage, or filtration of hazardous wastes, contaminated materials, or other substances. The following sections summarize the potential impacts. The Proposed Project will provide a net benefit by removing contaminated soils from the site.

4.13.3.1 No Action Alternative

Under the No-Action Alternative, the Dupont Corporation, in accordance with the Memorandum of Understanding with the City of Bridgeport, would remediate the 812 Barnum Avenue parcel to support future development of industrial or commercial uses on the site, and to meet the Industrial/Commercial Direct Exposure Criteria established by the CT Remediation Standard regulations.

4.13.3.2 Proposed Project

As shown in Figure 3-1, the Proposed Project site consists of two parcels and a section of the existing railroad ROW. Subsurface investigations would be conducted for the Proposed Project site prior to construction. As there is no structure demolition proposed, there is no potential for exposure to asbestos-containing materials, lead-based paint, Polychlorinated Biphenyls (PCBs), or mercury-containing equipment present in structures. The Phase II ESA would include collecting and analyzing soil and groundwater samples in areas of concern for analysis of constituents of concern (such as oil or other hazardous materials). Any contaminated media would be compared to the CTDEEP Remediation Standard Regulations (RSRs) for regulatory compliance.

The Proposed Project would require soil excavation to install subsurface utilities (electric and drainage), to replace the Yellow Mill Channel culvert, and to install footings for new retaining walls. A portion of the foundation of the former power house would be removed. The excavated soil in these areas is likely to contain petroleum hydrocarbons, heavy metals, and other hazardous materials. Impacted soils identified will be excavated and transported off site by a licensed hauler to a licensed disposal facility. Impacted soils generated as part of the Project will be managed in accordance with the RSRs. Impacted groundwater will be evaluated for treatment or disposal options in accordance with the standing MOU between the City of Bridgeport and Dupont. Appendix F provides a letter from Dupont confirming responsibility for site cleanup. Groundwater generated as part of the Project will be evaluated prior to discharge in accordance with the appropriate permit from DEEP.

4.13.4 Mitigation Measures

Subsurface investigations would be conducted prior to construction of the project. A site specific Health and Safety Plan (HASP) would be developed, and appropriate hauling routes and disposal facilities will be used.

4.14 Energy

This section provides information on existing energy utilities in the vicinity of the Proposed Project, and assesses the potential impacts of the project on energy utility services.

4.14.1 Existing Conditions

The area around the Proposed Project is serviced by energy utilities typical of an urban setting. Electric distribution in the vicinity of the Proposed Project is provided by the United Illuminating Company, with regional electric transmission provided by both the United Illuminating Company and the Northeast Utilities Service Company. The majority of distribution in the project vicinity is provided through above ground transmission lines. United Illuminating Company operates a substation near the intersection of Seaview Avenue and Barnum Avenue at 1677 Seaview Avenue. This property houses cable terminators that transition UI underground electric ducts that run beneath the Pequonnock River and Yellow Mill Channel to aerial transmission lines supported on towers that continue further north. Natural gas service in the vicinity of the Proposed Project is provided by Southern Connecticut Gas.

4.14.2 Impact Assessment

4.14.2.1 No Action Alternative

The No Action Alternative would have no long term or temporary effects on energy utilities and service in the project vicinity. An increase in overall energy demand over time would likely occur as a result of background population and economic growth.

4.14.2.2 Proposed Project

The Proposed Project would have no long term adverse effects on local energy utilities in the project vicinity. The proposed station would not require major relocation or reconstruction of existing utility lines and routes. Prior to construction, underground utilities will be identified and surveyed. If any energy utility relocation is required in the area of construction, it would be relocated in accordance with CTDOT construction specifications.

The Proposed Project would marginally increase energy usage. Electricity would be needed for vehicular and pedestrian lighting throughout the parking lot and station platform areas and for elevators, ticket vending machines, and other station amenities.

4.14.3 Mitigation Measures

Long term mitigation for energy utilities is not needed or proposed. No interruption to power service is anticipated. During final design, CTDOT and the City of Bridgeport will coordinate with the United Illuminating Company and Southern Connecticut Gas to identify the need for any utility relocation and determine the best routing.

4.15 Safety and Security

The safety and security of a rail station is critical to ensuring that riders feel comfortable using the station and ensuring that the station is able to provide critical public transportation services during emergency situations. CTDOT considers safety in order to minimize pedestrian and vehicular hazards that may lead to accidents or injuries, and security in order to ensure the project maintains or provides access to appropriate emergency services. Public agencies highly prioritize providing a safe and secure station environment for all patrons. Commuter rail stations are designed with a variety of safety and security elements in place, including designing the station to enhance rapid patron evacuation, providing sufficient ambient and emergency lighting, installing emergency communication systems, and providing sufficient emergency support equipment for fire and other emergencies. This section discusses the existing safety and security features of the site and assesses the potential effects of the Proposed Project.

4.15.1 Existing Conditions

The proposed station site does not currently provide any safety or security elements. The eastern parcel of the site is vacant and a perimeter fence limits pedestrian and vehicular access. The site does not have any built improvements, and limited flood lighting is provided at the western parcel. The site does not support any night time activity and people are generally not present through evening nighttime hours. The site pavement, fencing, and limited vegetation are not maintained. The sidewalk on the perimeter of the site is narrow and in disrepair with cracks and uneven surfaces. The lack of active uses of the site, limited lighting, and poor maintenance discourage pedestrian activity in the area and detract from the surrounding area's safety and security.

The City of Bridgeport provides other dedicated safety and security departments; the Police Department, Fire Department, and Health and Social Services are responsible for safeguarding the public within the city limits. To date, there have been no significant or recurring health, safety, or theft incidents at Bridgeport Station, the city of Bridgeport's existing commuter rail station.

The City of Bridgeport's Office of Emergency Management and Homeland Security (OEMHS) provides 24-hour public emergency assistance. OEMHS operates the City of Bridgeport Emergency Operations Center (EOC) which serves as a central facility for preparing for, responding to, and recovering from emergencies and disasters. The OEMHS is broadly responsible for reacting to natural hazards like severe weather events, man-made hazards like terrorist attacks, transportation emergencies, utility failures, environmental hazards, epidemics, and war related incidents. The OEMHS responds to specific transportation incidents involving rail, waterways, roadways, and aircraft (City of Bridgeport, 2016).

The City of Bridgeport Health and Social Services Department serves as a Medical Reserve Corps Volunteer Unit, recognized as part of the White House's USA Freedom Corps initiative and the Department of Homeland Security's Citizen Corps. The Medical Reserve Corps organizes volunteers that agree to support the city in the event of a public health emergency.

MNR trains are patrolled by the Metropolitan Transportation Agency (MTA) Police Department. MTA officers are empowered in New York State, and commissioned in the state of Connecticut. MTA equips MNR trains with on-board train emergency and evacuation instructions in print that review actions to take in an emergency and provide important contact information.

4.15.2 Impact Assessment

4.15.2.1 No Action Alternative

Under the No Action Alternative, the proposed site would continue to detract from the surrounding area's safety and security. Active uses of the site would remain unlikely and the lack of adequate lighting and built improvements would continue to discourage pedestrian activity on and around the site.

4.15.2.2 Proposed Project

The proposed station would improve the safety and security of the site and the surrounding area. Built enhancements like additional lighting, sidewalk improvements, signage and markings, and emergency communications would improve upon the existing vacant parcel. Installing pedestrian-scale and vehicle-scale lighting throughout the site would promote a safe environment for passengers using the proposed station during early morning and evening hours, and would help discourage theft and other criminal activity. Constructing pedestrian accessways to and from the station with appropriate pavement markings minimize vehicular traffic exposure for pedestrians moving to, from, and within the proposed station area. The station platforms would be equipped with cameras, and call boxes would be installed in highly visible and accessible areas. The design of the proposed station would incorporate safety and security conscious landscaping and pavement improvements that clearly define pedestrian and vehicular spaces and create public areas with high visibility.

Based on current practices at stations along the NHML in Connecticut, CTDOT expects that the City of Bridgeport Police Department's Patrol Division would incorporate the proposed station into its patrol program. The MTA Police Department would continue to provide security on MNR trains that stop at the proposed station.

The proposed site is located in close proximity to emergency response services, enabling a low response time in the event of an emergency and ensuring that station users have sufficient access to emergency services. Crescent Avenue would remain open to vehicular traffic between Waterview Avenue and Seaview Avenue in part to ensure adequate access for emergency vehicles. The city of Bridgeport's law enforcement and fire I services would serve as the primary emergency responders in the event of an emergency at the proposed station. The proposed station site is located approximately 1.4 miles by road from the Police Department at 300 Congress Street, and approximately 0.7 miles by road from the Fire Station at 1035 Central Avenue.

The City of Bridgeport provides a full-time emergency response force (police, fire) and the city's fire stations are staffed 24 hours daily. In addition, Bridgeport Hospital is approximately 0.7 miles by road from the proposed station site. Bridgeport Hospital is a not-for-profit general medical and surgical hospital with a Level II trauma center that provides comprehensive trauma care with 24-hour availability for all essential specialties, personnel, and equipment. Prior to construction, CTDOT will work with the city's emergency response services to review the HASP and expected temporary street closures and alternative emergency access routes.

4.15.3 Mitigation Measures

The proposed station would be incorporated into existing safety and security programs, and additional mitigation measures would be developed as design advances. Specific safety and security measures incorporated into the design may include security conscious landscaping and pavement markings, security cameras, emergency telephones, adequate lighting, and fencing where necessary. A safety and security plan would be developed prior to construction, and would include fencing and site access control. The City is also exploring installing a safety camera at a nearby intersection that would provide views of Barnum Avenue.

4.16 Construction Impacts

Construction impacts are temporary or short-term in nature and occur only during construction. Typical construction equipment could include bulldozers, dump trucks, backhoes, excavators, and cranes. No special construction equipment is anticipated. Long-term impacts of the Proposed Project are described and evaluated in the preceding sections. This section discusses potential impacts from construction activities and the mitigation measures that would be taken to reduce these impacts during construction.

4.16.1 Transportation

The Proposed Project would have substantial impacts to roadway traffic during the temporary construction period. Demolishing and reconstructing the three bridges at Seaview Avenue, Hallett Street, and Pembroke Street would require street closures and detours. CTDOT would minimize disruptions to local circulation during construction by scheduling construction during non-peak hours and phasing the bridge closures. CTDOT would phase the bridge closures so that at least one of the three bridges is open for vehicular traffic at any point in time to avoid constricting traffic flow across or under the NHML ROW. Prior to construction, CTDOT will develop a Traffic Management Plan (TMP) to manage and mitigate the flow of construction traffic as well as to manage and mitigate the effects of roadway closures. Project construction would impact railroad operations during the construction

period. As the design advances, CTDOT will coordinate with MNR, Amtrak, and SLE to develop a phased construction approach to manage and minimize impacts to railroad traffic.

4.16.2 Air Quality

Demolition and construction activities will result in short-term increases in dust and particulate emissions generated by construction and construction equipment in the area around the project site. CTDOT will adopt dust control BMPs during the construction period as necessary, including using dewatering, mulching or hydro-seeding, or soil stabilizers as well as protective fencing. CTDOT will seek to minimize equipment-related emissions by ensuring construction equipment is well maintained.

CTDOT will employ air quality construction mitigation best practices to minimize air quality impacts in the short term. Construction vehicle emission impacts can be mitigated through implementing and maintaining a comprehensive traffic control plan, enforcing emission standards for gasoline and diesel construction equipment, and stipulating that unnecessary idling and equipment operation is to be avoided.

USEPA has set emissions standards for engines used in most new construction equipment. However, construction equipment can last for a long time, and it may take several years before all equipment is furnished with engines that meet USEPA standards.

Supplemental practices to reduce pollutant emissions from older diesel engines include:

- Reducing idling: By reducing unnecessary idling at the construction site, emissions will be reduced, and fuel will be saved.
- Properly maintaining equipment: Proper maintenance of the diesel engine also will allow the engine to perform better and emit less pollution through burning fuel more efficiently.
- Using cleaner fuel: Switching to fuels that contain lower levels of sulfur reduces particulate matter. Using ultra-low sulfur diesel does not require equipment changes or modification, and the fuel is readily available. Using fuels that contain a lower level of sulfur also tends to increase the effectiveness of retrofit technologies.
- Retrofitting diesel engines with diesel-emission control devices: Retrofitting off-road construction equipment with diesel-emission control devices can reduce particulate matter, nitrogen oxides, carbon monoxide, or hydrocarbons, in addition to other air pollutants. Diesel particulate filters can be used to physically trap and oxidize particulate matter in the exhaust stream, and diesel oxidation catalysts can be used to oxidize pollutants in the exhaust stream.

During final design, CTDOT will consider including the measures on a voluntary or mandatory basis.

4.16.3 Noise and Vibration

Constructing the project would introduce short-term noise and vibration sources. The FTA has guidelines for limiting construction noise based on a typical 8-hour work period according to the type of sensitive land use (such as residences or commercial). FTA noise guidelines are to keep construction noise levels below 80 dBA (Leq) during the day and 70 dBA (Leq) at night at residential receptors. For construction vibration, FTA has vibration limits of 90 to 102 VdB (according to the type of building) to minimize the risk of structural damage.

City of Bridgeport, CT (Chapter 8.80) Noise Control Regulations limits the emissions of general noise sources to protect, preserve and promote the health, safety, and welfare of Bridgeport citizens.

Construction activities that occur during daytime hours (7:00 AM to 6:00 PM Monday to Friday and 9:00 AM to 6:00 PM on weekends) are exempt from the general noise limits. It is assumed that construction of the proposed station would occur primarily during the day and therefore the FTA noise guidelines have been used to evaluate potential construction noise impact.

Construction noise has been evaluated according to typical equipment used for track and station construction. For a typical scenario including use of an air compressor, back hoe, back-up alarms, crane, dump truck, grader and tie inserter, construction noise is estimated to be 86 dBA (8-hour Leq) at a distance of 50 feet. At distances of 85 feet or farther from the center of construction activity, noise levels would be 80 dBA or less and below the FTA construction noise daytime limit. The only noise-sensitive receptor within 85 feet of construction is the Saints Cyril and Methodius Church at 99 Church Street (80 feet from track construction activities). To minimize the potential for construction-noise impact at this receptor, the following mitigation measures would be implemented:

- Notifying nearby receptors of planned construction activities
- Scheduling construction activity to avoid noise-sensitive periods
- Locating equipment as far as possible from sensitive locations
- Implementing quieter backup alarms or using flagging to eliminate backup alarms

Construction vibration has been evaluated according to typical equipment used for track and station construction. For vibration-generating sources including vibratory rollers, vibration levels would be below 90 VdB at distances of 34 feet or farther from the source. Since there are no sensitive structures within this distance of construction activity, there is no construction vibration impact and no need for mitigation.

4.16.4 Water Quality/Wetlands Waterways

During construction, minor vegetation removal and earthwork activities would expose soils and create dust. If not properly controlled, stormwater flows may cause erosion and result in sedimentation and deposition of particulate matter in wetlands and streams. At the project site, stormwater currently drains off site into the unnamed stream and subsequently Yellow Mill Channel, or onto public streets and into the municipal storm sewer system. During construction, sedimentation may result in increased turbidity downstream of the work area.

A CTDEEP Construction Stormwater General Permit would be required prior to beginning construction, requiring development and adoption of a Stormwater Pollution Control Plan to control stormwater and sedimentation during construction and to address stormwater impacts to water bodies upon completion of construction.

Water quality impacts during construction would be minimized through sound erosion and sediment control practices in accordance with the CTDEEP Guidelines for Soil Erosion and Sediment Control (2002). CTDOT may be required to submit an Erosion and Sediment Control Plan to the CTDEEP as part of the Construction Stormwater General Permit. All erosion controls and sediment controls like silt fences, hay bales, mulch, and soil stabilization blankets would be installed and maintained in accordance with the appropriate regulations and guidance. If dewatering is required to construct the surface parking lot or during demolition activities, discharge would be managed in accordance with the appropriate permit requirements.

4.16.5 Hazardous Materials

During construction of the Proposed Project CTDOT is likely to encounter contaminated soils and may encounter hazardous materials during demolition of the NHML ROW retaining wall. Task 210 Subsurface Investigations would be conducted prior to construction. Demolishing the retaining wall may generate solid waste, asbestos-containing materials, lead-based paint, or PCBs. A comprehensive inspection would be conducted of the retaining walls prior to any demolition activities. Prior to construction, CTDOT would conduct subsurface investigations. Appropriate hazardous waste disposal facilities and trucking routes would be identified prior to excavation or demolition, and a HASP would be required for all on-site workers.

A subsurface plume of #2 fuel oil is believed to exist on the eastern end of the 812 Barnum Avenue site, near the existing building foundation. The foundation may be acting as a barrier that is preventing the spread or release of this contaminant into the stream. The presence, location, and condition of this plume is currently being assessed. If it is determined that the plume is present, that the foundation is acting as a barrier and that the foundation wall must be removed, CTDOT will develop a plan for removing the foundation that does not risk releasing the plume. This plan will be developed in coordination with CTDEEP, the City of Bridgeport, and the Dupont Corporation during final design.

4.17 Secondary and Cumulative Impacts

4.17.1 Secondary Impacts

Secondary impacts are defined as the impact on the environment of actions that occur as a result of the proposed action, but at a different location or at a different time. In this EIE/CE, secondary and cumulative impacts are considered to be results of induced development; reasonably foreseeable changes in the areas adjacent to the proposed station site that would occur as a consequence of constructing the commuter rail station.

CTDOT anticipates future development as a consequence of constructing the Proposed Project. The proposed station meets transportation needs that are already present in East Bridgeport but also supports future growth that is already planned or underway in the area. The presence of the proposed station has the potential to influence property values and improve the attractiveness of the area for new businesses and residents.

Two projects are currently underway in the immediate vicinity of the Proposed Project that CTDOT considers under secondary impacts. The Crescent Crossing Housing Development is a multi-phase housing development to the south of the NHML ROW, and the City of Bridgeport's planning study to evaluate the potential to reuse structures remaining from the former Remington Arms Facility and develop concepts for TOD in the area.

4.17.1.1 Crescent Crossing Housing Development

Crescent Crossing is a 187-unit mixed-use housing development south of the NHML ROW between Hallett Street and Waterview Avenue on the site of the former Father Panik housing development. The Crescent Crossing project is already underway, and would proceed even if the proposed station is not constructed. The three-phase project is currently in the second phase. CTDOT considers the housing development a secondary impact because the project is being completed in phases, and the proposed station would encourage the full build out of the project to Phase 3.

The Father Panik housing development was the first public housing project in Connecticut. It provided very high-density public housing, with approximately 5,400 people living on an estimated 40 acres²⁰. Demolition of the site was completed in 1994, and the Crescent Crossing development broke ground in October 2015²¹.

The development is jointly-funded by a private developer, Park City Communities (formerly the Housing Authority of the City of Bridgeport), and state and federal funding sources (including income tax credits for affordable housing and the Community Development Block Grant Disaster Recovery program). A significant portion of the development is dedicated affordable housing, and the project complies with the city of Bridgeport's minority hiring ordinance. The project is located entirely on a previously developed parcel, and includes the construction of an extension of Church Street through the property to connect to Waterview Avenue.

CTDOT anticipates limited secondary impacts as a result of the Crescent Crossing Housing Development. The project site is heavily disturbed, and previously supported a significant number of residents. CTDOT's analysis of potential traffic, air quality, and noise and vibration impacts included the housing development in background development assumptions. The Crescent Crossing project may have limited beneficial secondary impacts on the area's visual and aesthetic character and the project area's safety and security from enhanced lighting, construction of sidewalks and amenities, and improved neighborhood character.

4.17.1.2 Barnum Station TOD and Adaptive Reuse Study

The City of Bridgeport is currently leading a project to study the adaptive reuse potential of the remaining structures on the Remington Arms site, and develop a TOD plan for the area. The study area is adjacent to the proposed station site, abutting Barnum Avenue. This study may stimulate commercial and residential development interest by reducing the risks and uncertainty for a potential developer. If the proposed station were not constructed, this planning study would independently encourage development; however, the presence of the proposed station would increase the likelihood of development by increasing the attractiveness of the area.

The study is not yet completed, but CTDOT anticipates it would recommend structure reuse options, denser land use patterns, improved pedestrian and cyclist circulation, and other elements that are typically associated with TOD.

CTDOT anticipates secondary impacts may result from the Barnum Station TOD and Adaptive Reuse study. As development on this site is currently speculative, the traffic, air quality, and noise and vibration impacts assessed in this EIE did not include development here in background assumptions.

4.17.2 Cumulative Impacts

Under CEQ Regulations (40 CFR 1508.7), cumulative impacts are defined as "the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions²²." Although the individual impact of the separate projects might be minor, the additive effects to the environment from all the projects could be significant.

²⁰ Tuohy, Lynne. *Father Panik Village, Where Dreams Turn To Dust*. The Hartford Courant. August 7, 1994. Accessed October, 2016.

²¹ U.S. Department of Housing and Urban Development. *Groundbreaking Held on New Affordable Housing Complex*. October, 2015. Accessed October 2016.

²² 40 Code of Federal Regulations 1508.7, Council for Environmental Quality Regulations for Implementing NEPA

This section describes the potential cumulative impact of the Proposed Project and considers whether the combination of the action's impacts with other impacts will result in a serious deterioration of environmental functions. Consistent with CEQ guidance, the analysis determined whether the resource, ecosystem, or human community will sustain its structure and function when the effects of the Proposed Project are added to the effects of other past and future actions.

Cumulative impacts were assessed for each alternative based on the study areas for each resource. In the vicinity of the Proposed Project site, there are a limited number of actions that have affected the environment. Investments have been made in improving the interstate transportation corridors and MNR and Amtrak rail corridors. Past and recent projects in the vicinity of the project site include the demolition of the vacant and dilapidated Remington Arms Facility, replacement/reconstruction of the NHML overhead catenary system, and general maintenance and improvements on Interstate 95.

Reasonably foreseeable future actions include public and private developments and infrastructure improvements within the vicinity of the Proposed Project that are currently in the planning or permitting process. Table 4-17 summarizes the past, current, and future actions that were considered to evaluate the Proposed Project's potentially cumulative effects to the environment.

TABLE 4-17 CUMULATIVE EFFECTS SUMMARY

Action	Time	Land	Traffic	Socioeconomic	Air Quality	Noise and Vibration	Natural Resources	Historic Resources
Remington Arms site closed	Past	Loss of business	Decrease	Loss of jobs	Eliminates emissions source	Eliminates noise source	Barnum Pond drained to wetland	No effect
Remington Arms site demolished	Past	Create vacant land	Decrease	No effect	No effect	No effect	No effect	Loss of historic structure
Father Panik Housing Development demolished	Past	Create vacant land	Decrease	Loss of housing	Eliminates emissions source	Eliminates noise source	No effect	No effect
Crescent Crossing Housing Development	Current / Recent	Redevelopment	Increase	Add to affordable housing	Vehicle emissions	Minor or negligible increase	No effect	No effect
Steelpointe Harbor Development	Current / Recent	Redevelopment; brownfield remediation	Increase, but mitigated	Add to jobs	Vehicle emissions	Minor or negligible increase	No effect	No effect
Waltersville Elementary/Barnum Elementary	Current / Recent	Redevelopment	Increase, but mitigated	Add to schools	No effect; temporary construction impacts	No effect; temporary construction impacts	No effect	No effect
Waterview Park	Current / Recent	Redevelopment	No effect	Add community resource	No effect	No effect	Improve shore and public access	No effect
Seaview Avenue Corridor Improvements	Future	Redevelopment	Increase, but mitigated	No effect	No effect	No effect; temporary construction impacts	No effect	No effect
Harding High School Relocation	Future	Redevelopment	No effect	Improve school	No effect; temporary construction impacts	No effect; temporary construction impacts	No effect	No effect
Seaview Plaza	Future	Redevelopment	Increase, but mitigated	Add to jobs	No effect; temporary construction impacts	No effect; temporary construction impacts	No effect	No effect
Seaview Avenue Industrial Park	Future	Redevelopment	Increase, but mitigated	Add to jobs	No effect; temporary construction impacts	No effect; temporary construction impacts	No effect	No effect
Bridgeport Comprehensive Waterfront Plan	Future	Redevelopment; maximize waterfront land	No effect	No effect	No effect	No effect	Improve shore and public access	No effect
Remington Arms site TOD Study	Future	Redevelopment	Increase, but transit-oriented	Introduces mixed-use; gentrification	No effect; temporary construction impacts	No effect; temporary construction impacts	No effect	Reuse and preservation of historic property
Total Potential Cumulative Effect with Proposed Action		Positive, redevelopment	Increasing, but mitigated	Positive for current and future actions	Neutral, projects were considered in air quality analysis	Neutral, projects were considered in noise/vibration analysis	Neutral; cumulatively negative, but will be mitigated to no net loss.	Neutral; past loss of historic building, future reuse

4.17.2.1 Land Use

The proposed rail station would be compatible with and supportive of the associated proposed future land uses and zoning. The past, current, and reasonably foreseeable future actions in the vicinity of the Proposed Project generally consist of closure and demolition in the past, and the redevelopment of vacant property in the present and future. The Proposed Project is anticipated to have a cumulatively beneficial effect on land use when considered with past, current, and reasonably foreseeable actions.

4.17.2.2 Transportation

The Proposed Project is not anticipated to have a cumulative effect on public transportation. The analysis of linked trips presented in Table 4-3 includes the current and reasonably foreseeable actions within the area and shows that GBT bus service linked trips would not vary significantly.

Past actions in the vicinity of the Proposed Project decreased the vehicle traffic in the area as a result of closing businesses and demolishing housing. Current and future projects are anticipated to cause increases in traffic that would be managed with mitigation measures. The Traffic Impact Study analyzed future traffic conditions using projections that include the current and reasonably foreseeable actions within the area. The Proposed Project is not anticipated to have a cumulative adverse effect on traffic.

The past, current, and reasonably foreseeable actions in the project vicinity have no adverse impact on rail transportation, but will improve commuter and passenger rail services. Therefore, the Proposed Project is anticipated to have a cumulative beneficial effect on rail transportation.

4.17.2.3 Socioeconomics

The past, current, and reasonably foreseeable future actions in the vicinity of the Proposed Project consist of job and housing loss in the past, and job and housing creation in the present and future. Current and future actions also include the construction and improvement of schools. The Barnum Station TOD Study would encourage developing residential areas within a formerly industrial area. Potential future residential TOD has the potential to cause gentrification in the area, possibly resulting in increases in property values and rental rates. The Proposed Project is not anticipated to have a substantial cumulative adverse effect on socioeconomic conditions when considered with past, current, and reasonably foreseeable actions, but would contribute to a beneficial cumulative effect.

4.17.2.4 Air Quality

The past, current, and reasonably foreseeable future actions in the vicinity of the Proposed Project removed emissions sources in the past, cause potential increases in emissions from vehicle traffic in the present, and would not have an effect in the future. The Crescent Crossing and Steelpointe Harbor projects are anticipated to have minor air quality effects due to increased vehicular traffic. Multiple actions within the vicinity of the project are anticipated to cause short-term construction impacts to air quality that would be mitigated on a project by project basis. The air quality analysis of the Proposed Project used traffic projections that included the current and reasonably foreseeable actions within the area, and therefore accounts for future emissions that may result from increased vehicle traffic. The Proposed Project is not anticipated to have a cumulative adverse effect on air quality when considered with past, current, and reasonably foreseeable actions.

4.17.2.5 Noise and Vibration

The past, current, and reasonably foreseeable future actions in the vicinity of the Proposed Project eliminated sources in the past, cause minor or negligible increases in the present, and would not have an effect in the future. The Crescent Crossing Housing Development and the Steelpointe Harbor projects are large projects that may cause a minor or negligible increase in noise due to vehicular traffic generated from the residential and commercial areas. The analysis of noise and vibration conducted for the Proposed Project included these projects among the other current and reasonably foreseeable future actions in order to develop accurate projections of future noise and vibration levels. The Proposed Project is not anticipated to have a cumulative adverse effect on noise and vibration when considered with past, current, and reasonably foreseeable actions.

4.17.2.6 Natural Resources

The proposed station site is heavily disturbed and previously developed. As part of the closure of the Remington Arms site, the small water body formerly known as Barnum Pond was drained, becoming a wetland area along the unnamed stream. The future Bridgeport Comprehensive Waterfront Plan is anticipated to enhance coastal access and improve the aesthetic environment of the city of Bridgeport's waterfront areas. Other past, current, and reasonably foreseeable future actions are not anticipated to have an effect on water quality, wetlands, waterways, tidelands, or threatened and endangered species. The number of redevelopment activities may have a beneficial effect on water quality due to additional stormwater treatment and conveyance infrastructure.

The Proposed Project itself is anticipated to have an adverse effect on wetland areas adjacent to the unnamed stream, but the project will include mitigation measures to reach a neutral impact with no net wetland loss. The Proposed Project is not anticipated to have a cumulative adverse effect on natural resources when considered with past, current, and reasonably foreseeable actions.

4.17.2.7 Historic Resources

The past, current, and reasonably foreseeable future projects in the vicinity of the Proposed Project caused adverse effects in the past, no effect in the present, and a potentially beneficial effect in the future, as the Barnum Station TOD Study presents opportunities for the reuse and preservation of historic elements of the site. None of the past, current, or future actions have an effect on the historic NHML.

The Proposed Project itself is anticipated to have an adverse effect on the historic NHML. CTDOT is working with CTSHPO, the City of Bridgeport, and historic stakeholders in the Bridgeport community to assess impacts to historic resources and to develop mitigation measures to compensate for potential adverse impacts. The Proposed Project is not anticipated to have a cumulative adverse effect on historic resources when considered with past, current, and reasonably foreseeable actions.

4.17.2.8 Summary

The Proposed Project, in the context of past, current, and reasonably foreseeable future actions, would not adversely affect the natural, built, or social environment, and the cumulative impacts of the Proposed Project would not result in a serious deterioration of environmental functions.

5 Distribution

Distributing this Environmental Impact Evaluation (EIE) to the public is the best way to provide the public with the information needed to formulate an opinion. The following is a list of recipients of this EIE include representatives of governmental agencies, community groups, and local residents.

This EIE is available on CTDOT's website (www.ct.gov/environmentaldocuments) and on the project website at www.barnumstation.com. Persons may request limited printed copies of this EIE from Lynn Haig telephone (203)-576-7317, email: Lynn.Haig@bridgeportct.gov.

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Connecticut Department of Energy and
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Attn: Catherine Smith, Commissioner
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Connecticut Office of Long Island
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Connecticut Natural Diversity Database
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Office of Governor Dannel P. Malloy
State Capitol Building
210 Capitol Avenue
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Regional Agencies

Connecticut Metropolitan Council of
Governments
Attn: Matthew Fulda, Acting Director
1000 Lafayette Boulevard, Ste. 925
Bridgeport, CT 06604

Local

Office of Mayor Joseph P. Ganim
999 Broad Street
Bridgeport, CT 06604

City of Bridgeport Fire Department
Attn: Fire Chief
1035 Central Avenue
Bridgeport, CT 06607

City of Bridgeport Zoning Office
Bridgeport City Hall
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City of Bridgeport Office of Planning
and Economic Development
999 Broad Street
Bridgeport, CT 06604

City of Bridgeport – Engineering Office
45 Lyon Terrace, Room 216
Bridgeport, CT 06604

City of Bridgeport Public Library
Burroughs-Saden Branch
925 Broad Street
Bridgeport, CT 06604

City of Bridgeport Public Library
Black Rock Branch
2705 Fairfield Avenue
Bridgeport, CT 06605

City of Bridgeport Public Library
Old Mill Green Branch
1677 East Main Street
Bridgeport, CT 06608

City of Bridgeport Public Library
North Branch
3455 Madison Avenue
Bridgeport, CT 06606

City of Bridgeport Public Library
Newfield Branch
1230 Stratford Avenue
Bridgeport, CT 06607

Other Interested Parties

CSXT
Attn: Environmental Coordinator
500 Water Street
Jacksonville, FL 32202

Regional Plan Association, Connecticut
Attn: Melissa Kaplan-Macey, Director
2 Landmark Square, Suite 108
Stamford, CT 06901

Amtrak
Attn: Environmental Coordinator
60 Massachusetts Avenue NE
Washington, DC 20002-4285

MTA Metro-North Railroad
Joseph Giulletti, President
420 Lexington Avenue
New York, NY 10017-3739

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Appendix A – Traffic Impact Study

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Traffic Impact Study
Barnum Station Project

City of Bridgeport, CT

October 4, 2016

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1 Introduction

1.1 Project Description

The City of Bridgeport and the Connecticut Department of Transportation (CTDOT) are evaluating a new commuter rail station along the New Haven Main Line (NHML) in East Bridgeport. The purpose of the Project is to enhance regional access to and from East Bridgeport and support anticipated future growth. The proposed station would be located along Barnum Avenue between Seaview Avenue and Pembroke Street in East Bridgeport, on the site of the former Remington Arms factory. The scope of the project is to construct a new station that will include platforms, associated vertical circulation and access between platforms, parking, and station maintenance and control facilities that would be either incorporated into the cross-track access structures or housed in a stand-alone building north of the tracks. Currently, East Bridgeport suffers from a lack of convenient rail service, needed to sustain existing businesses and meet the area's future transportation demands. Due in large part to planning and financing efforts of the City of Bridgeport, significant development projects are underway or planned in East Bridgeport; the proposed station will support this growth.

The Traffic Impact Study report documents the potential traffic impacts associated with the construction of the proposed commuter rail station. This report quantifies both the existing traffic conditions along area roadways surrounding the proposed project site and the projected future traffic conditions expected with and without the construction of the proposed station.

1.2 Proposed Station Access

Based on current plans, two parking lots are proposed to be constructed when the station opens in 2021. Access to the station parking lots will be provided by three proposed driveways: one on Hallett Street and two on Barnum Avenue. Access to the kiss-and-ride and taxi drop-off areas will be provided by a driveway on Barnum Avenue. A schematic site plan for the 2021 opening year is depicted on Figure 1-1.

In 2040, which was the design year for traffic analysis, it is assumed that a parking garage will be constructed on the northwest corner of Barnum Avenue at Hallett Street. Access to this parking garage will be provided by one driveway on Hallett Street and one driveway on Barnum Avenue. Access to the kiss-and-ride and taxi drop-off areas will continue to be provided by a driveway on Barnum Avenue. A schematic site plan for the 2040 design year is depicted on Figure 1-2.

Parking demand at the proposed station is discussed in the Ridership Results Report. The proposed location of bus stops and crosswalks are discussed in the Schematic Design Options Report.

1.3 Study Area

The study area for the Traffic Impact Analysis is relatively broad, so that the full effect of traffic impacts can be identified and analyzed. The study area includes traffic analysis at 30 intersections in the vicinity of the proposed Barnum Station, as depicted on Figure 1-3. These intersections were selected based on conversations with the City of Bridgeport and a review of the surrounding road network and likely proposed project site access and circulation. The study intersections are:

1. Main Street at East Washington Avenue and Catherine Street
2. East Washington Avenue at Housatonic Avenue
3. East Washington Avenue at Knowlton Street
4. East Washington Avenue at Noble Avenue
5. Route 127 (East Main Street) at East Washington Avenue
6. Route 127 (East Main Street) at Crescent Avenue
7. Crescent Avenue at Pembroke Street and Church Street
8. Barnum Avenue at Knowlton Street
9. Barnum Avenue at Noble Avenue
10. Barnum Avenue at Kossuth Street
11. Barnum Avenue at Route 127 (East Main Street)
12. Barnum Avenue at Pembroke Street
13. Barnum Avenue at Seaview Avenue
14. Barnum Avenue at Central Avenue
15. Barnum Avenue at Mill Hill Avenue
16. Barnum Avenue at Pixlee Place, Grant Street, and Elizabeth Street
17. Barnum Avenue at Bishop Avenue
18. Arctic Street at Pembroke Street
19. Arctic Street at Helen Street
20. Seaview Avenue at Arctic Street and Grant Street
21. Route 1 (Boston Avenue) at Seaview Avenue
22. Route 1 (Boston Avenue) at Bond Street
23. Route 1 (Boston Avenue) at Central Avenue
24. Route 1 (Boston Avenue) at Palisade Avenue
25. Seaview Avenue at Crescent Avenue
26. Seaview Avenue at I-95 Southbound Ramps
27. Route 130 (Connecticut Ave./Stratford Ave.) at Seaview Avenue
28. Seaview Avenue at I-95 NB Ramps
29. Route 127 (East Main Street) at Cedar Street and I-95 Southbound On Ramp
30. Church Street at Waterview Avenue

1.4 Organization of this Report

This report is organized to include analysis of traffic operating conditions under the following scenarios:

- Existing (2016) traffic operations
- 2021 No-Build Conditions (future conditions during the year of opening without the proposed Barnum Station project)
- 2021 Build Conditions (future conditions during the year of opening with the proposed Barnum Station)
- 2040 No-Build Conditions (future conditions during the horizon year without the proposed Barnum Station project)
- 2040 Build Conditions (future conditions during the horizon year with the proposed Barnum Station)

AUGUST 2016

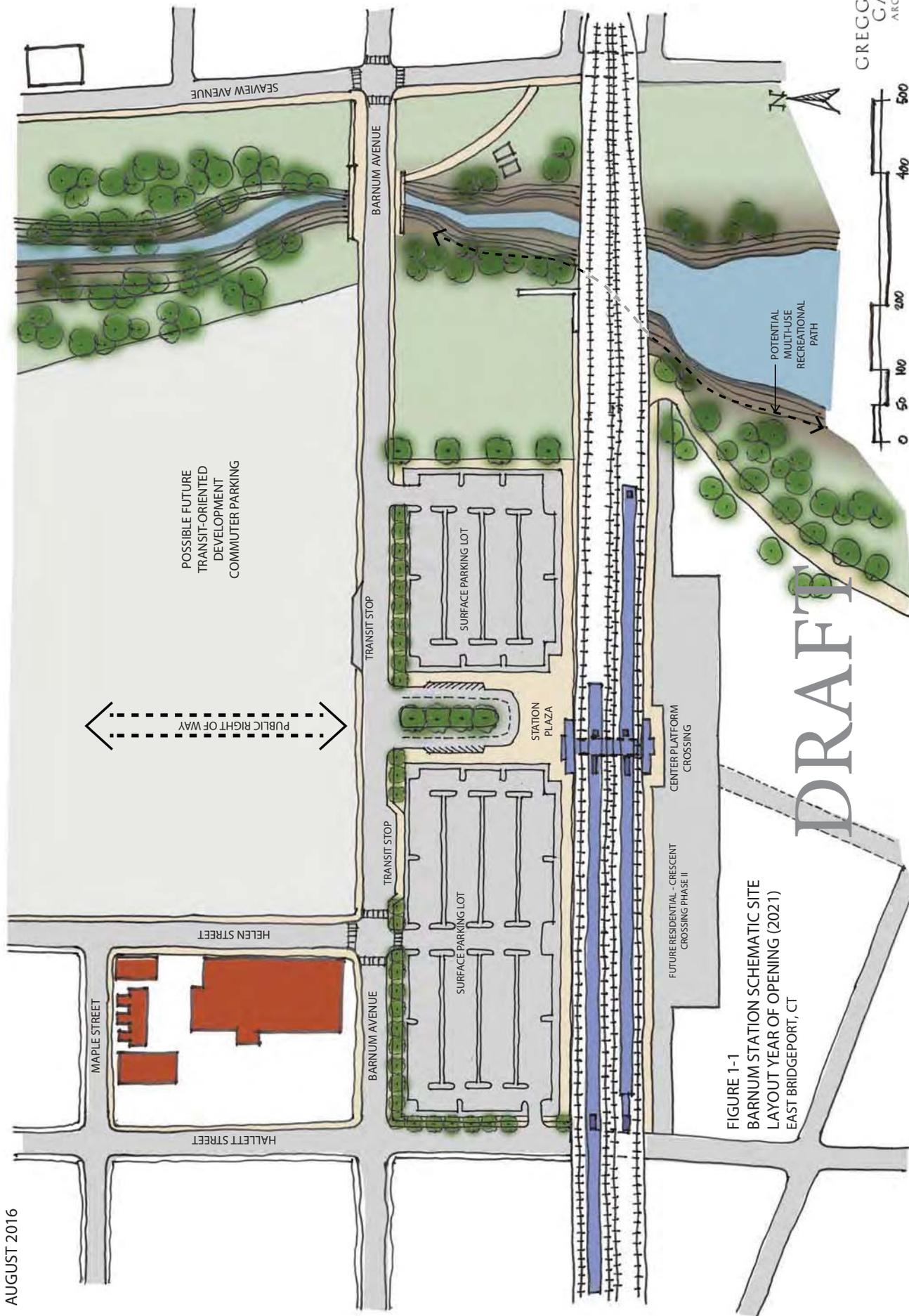


FIGURE 1-1
BARNUM STATION SCHEMATIC SITE
LAYOUT YEAR OF OPENING (2021)
EAST BRIDGEPORT, CT

DRAFT

GREGG WIES &
GARDNER
ARCHITECTS, LLC

AUGUST 2016

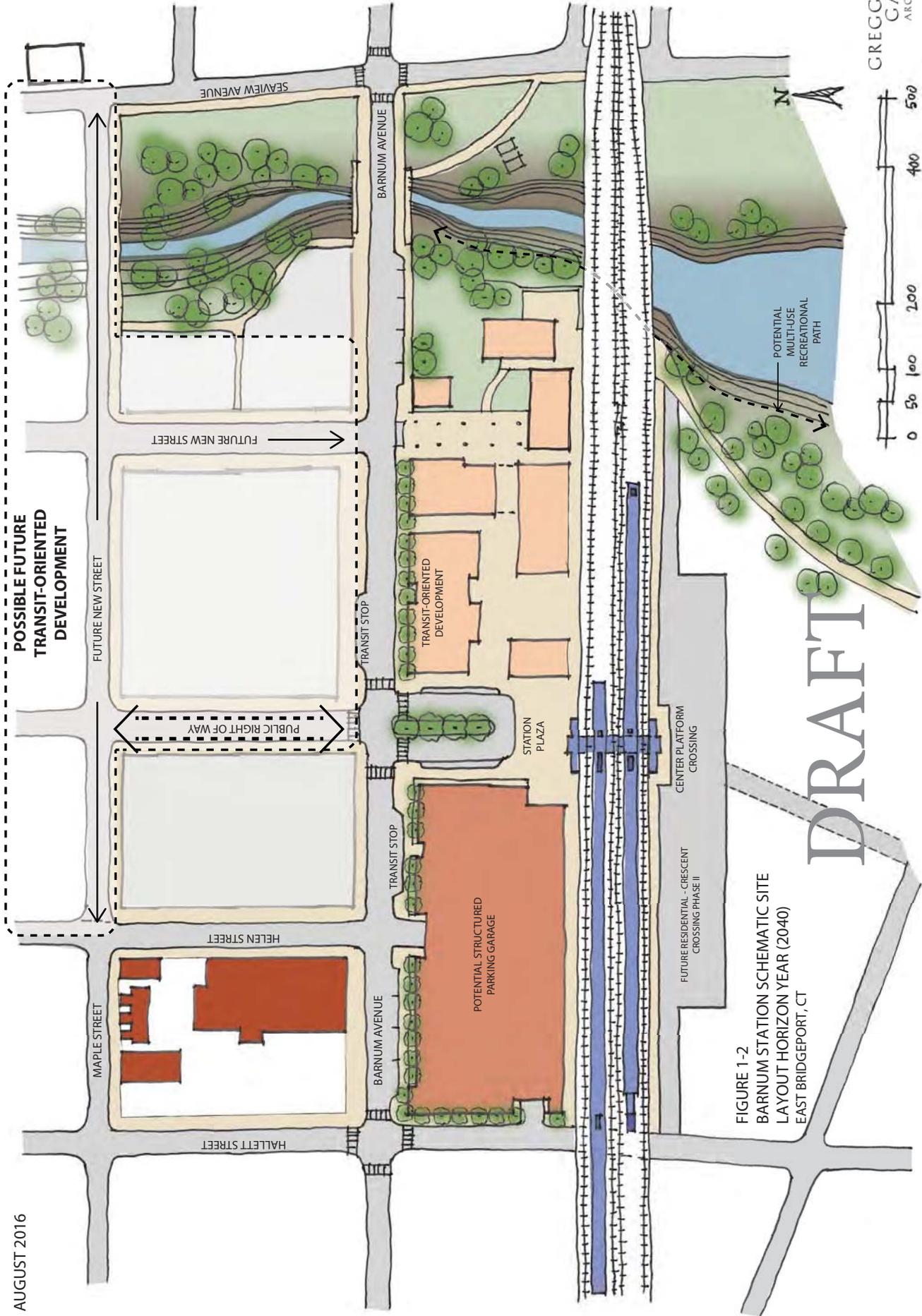


FIGURE 1-2
BARNUM STATION SCHEMATIC SITE
LAYOUT HORIZON YEAR (2040)
EAST BRIDGEPORT, CT

GREGG WIES &
GARDNER
ARCHITECTS, LLC



Figure 1-3
Project Study Area

**Barnum Station
Bridgeport, Connecticut**

2 Existing Conditions

Evaluation of the traffic impacts associated with the proposed Barnum Station requires a thorough understanding of the existing roadway system in the vicinity of the proposed project site. The Barnum Station existing conditions analysis looks at traffic operations in the vicinity of the proposed station in the year 2016. The following section provides a description of the intersection geometry, traffic volumes data, and vehicle crash history at each of the study intersections.

2.1 Intersection Geometry

A detailed description of the intersection geometry (including existing traffic control) for each of the study intersections is included in Appendix A.

2.2 Crash Data

Assessing the crash history at each of the study intersections aids in identifying trends or hot spots that could worsen from increased traffic resulting from the proposed station. Data were obtained for the three most recent years available (2012-2014) from the CTDOT Bureau of Planning and Research, which reports fatal and injury crashes as well as property damage only crashes that result in property damage in excess of \$1,000.

The crash history for the study area is summarized in Table 2-1. A detailed list of crash history and summary tables for each intersection are included in Appendix B.

Table 2-1 Crash Data Summary

Intersection	Property Damage			
	Only	Injury	Fatality	Total
1. Main Street at Catherine Street and East Washington Avenue	12	7	0	19
2. East Washington Avenue at Housatonic Avenue	10	10	0	20
3. East Washington Avenue at Knowlton Avenue	5	5	0	10
4. East Washington Avenue at Noble Avenue	4	4	0	8
5. Route 127 (East Main Street) at East Washington Avenue	14	8	0	22
6. Route 127 (East Main Street) at Crescent Avenue	13	7	0	20
7. Pembroke Street at Crescent Avenue	1	1	0	2
8. Barnum Avenue at Knowlton Street	6	2	0	8
9. Barnum Avenue at Noble Avenue	0	2	0	2

Intersection	Property			
	Damage Only	Injury	Fatality	Total
10. Barnum Avenue at Kossuth Avenue	2	3	0	5
11. Barnum Avenue at Route 127 (East Main Street)	21	8	0	29
12. Barnum Avenue at Pembroke Street	12	7	0	19
13. Barnum Avenue at Seaview Avenue	13	6	0	19
14. Barnum Avenue at Central Avenue	17	16	0	33
15. Barnum Avenue at Mill Hill Avenue	14	7	0	21
16. Barnum Avenue at Elizabeth Street, Pixlee Place, and Grant Street	2	2	0	4
17. Barnum Avenue at Bishop Avenue	4	4	0	8
18. Arctic Street at Pembroke Street	10	3	0	13
19. Arctic Street at Helen Street	1	0	0	1
20. Seaview Avenue at Arctic Street and Grant Street	5	3	0	8
21. Route 1 (Boston Avenue) at Seaview Avenue	28	19	1	48
22. Route 1 (Boston Avenue) at Bond Street	29	16	0	45
23. Route 1 (Boston Avenue) at Central Avenue	10	8	0	18
24. Route 1 (Boston Avenue) at Palisade Avenue	16	13	0	29
25. Seaview Avenue at Crescent Avenue	6	3	0	9
26. Seaview Avenue at I-95 Southbound Ramps	10	3	0	13
27. Seaview Avenue at Route 130 (Stratford Avenue/Connecticut Avenue)	19	22	0	41
28. Seaview Avenue at I-95 Northbound Ramps	13	7	0	20
29. <u>Route 127 (East Main Street) at Cedar Street</u>	<u>6</u>	<u>6</u>	<u>0</u>	<u>12</u>
Total	304	201	1	506

Source: CTDOT Bureau of Planning and Research, January 2012 to December 2014

2.3 Existing Traffic Data

Traffic operating conditions at intersections within the study area were analyzed during the weekday morning and evening peak hours, when traffic flow is at its highest. Peak hour turning movement counts, vehicle classifications, and bicycle and pedestrian counts were recorded at each of the intersections within the study area for a one-day period in November 2015 (with additional counts collected in April and May 2016) to assess existing traffic conditions within the vicinity of the proposed project site. These observations were collected on weekdays between 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m., the morning and evening peak periods, respectively.

These recorded peak hour traffic volumes were conservatively balanced to establish the existing peak hour traffic volume networks depicted on Figures 2-1a and 2-1b. The raw traffic count data is provided in Appendix C.

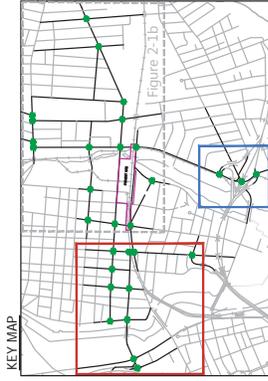


Figure 2-1a



Existing Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut

LEGEND:
 XX - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES



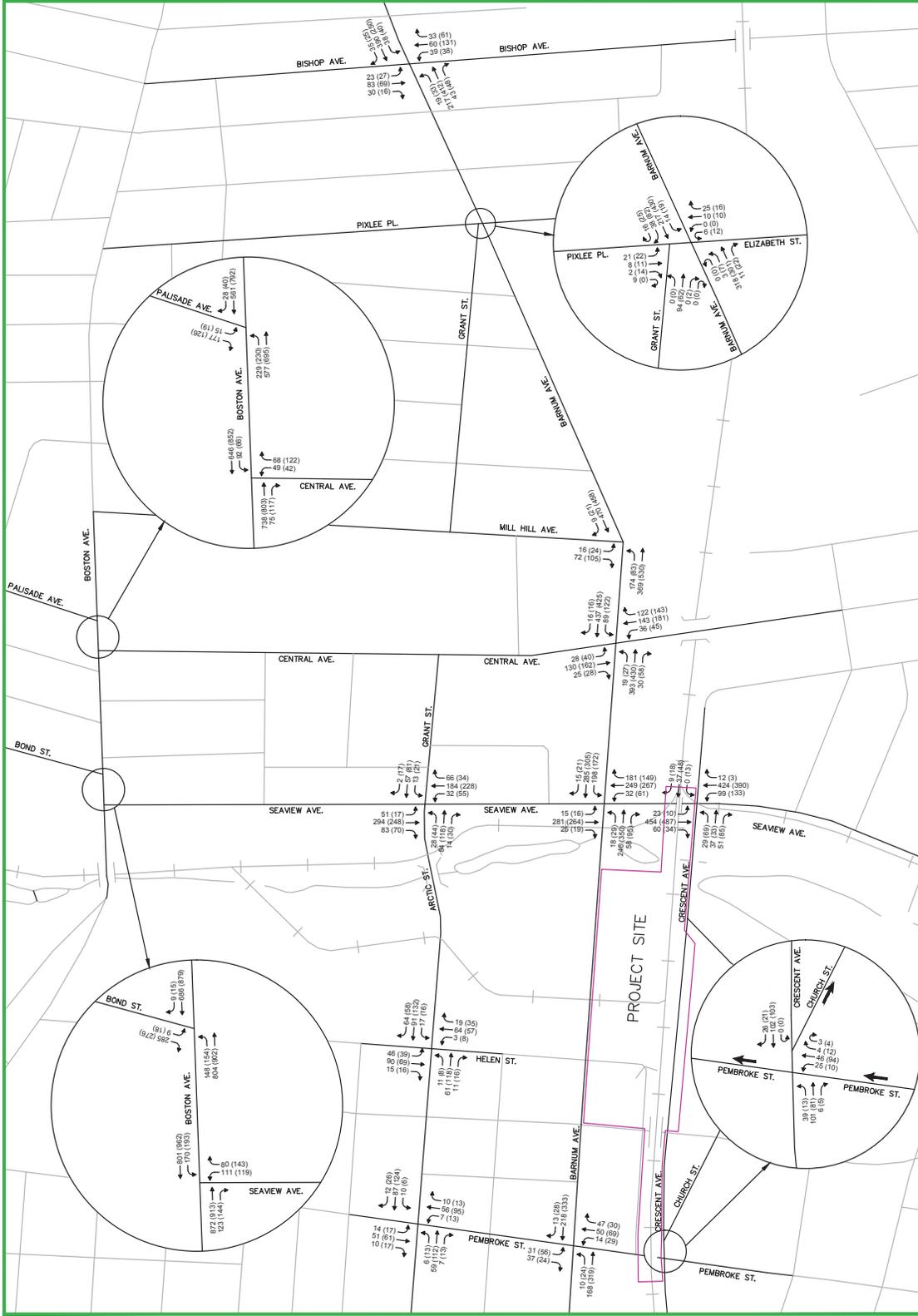
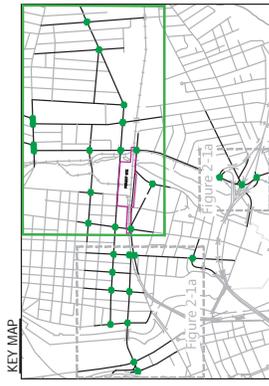


Figure 2-1b

Existing Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut

LEGEND:
 (XX) - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES



3 Future Conditions

The future conditions analysis evaluates traffic volumes and operations on the local roadway network forecasted for the years 2021 (the projected year of opening) and 2040 (the horizon year). Traffic operating conditions were evaluated under two conditions for each design year: a future No-Build Condition (without the proposed Barnum Station) and a Future Build Condition (with the proposed Barnum Station). This is done to pinpoint the impacts on the network associated with the project itself.

3.1 Background Traffic Growth Included in Future Build and No Build Conditions

Traffic growth is a function of the expected land development, economic activity and changes in demographics in the region. As such, the future traffic demand forecasts consider both background traffic growth associated with population and employment growth, and planned developments in the direct vicinity of the project.

The Future Conditions traffic analysis includes trips generated from five specific, planned developments in the vicinity of the study area. Only those developments that are currently under construction, for which construction funds have been identified, that have completed local development authorizations, or are listed in a fiscally-constrained capital improvement plan are included in the future traffic projections. A description of the planned developments included in the future traffic projections is as follows:

- **Crescent Crossing Housing Development** – Crescent Crossing is a multi-phase housing development underway on two separate parcels of land directly to the south of the proposed project. The Parcels are bisected by a future extension of Church Street from Hallett Street to Waterview Avenue. As directed by the City of Bridgeport, the future conditions traffic analysis includes only the first phase of Crescent Crossing, which consists of 187 1- or 2-bedroom apartment units. The site is located at the southeast quadrant of the intersection of Crescent Avenue at Hallett Street. The development is currently under construction.
- **Warren Harding High School (former General Electric Site)** – Development of the former General Electric (GE) site, located at the northwest quadrant of the intersection of Route 1 (Boston Avenue) at Bond Street, consists of the construction of the 146,746 square-foot Warren Harding High School. As part of this project, Warren Harding High School will vacate its existing building on Central Avenue and relocate to the former GE site. The former GE site is currently under remediation.
- **Steelpointe Harbor Development** – The Steelpointe Harbor development consists of the construction of a 52-acre mixed use development comprised of retail, office space, and residential totaling 2.67 million square-feet of gross floor area. The proposed development is located south of I-95 between the Pequonnock River and the Yellow Mill Channel. It is

bordered on the west by Route 127 (East Main Street) and is bisected by Route 130 (Stratford Avenue). The development is currently under construction.

- **Seaview Industrial Park** – The proposed Seaview Industrial Park consists of a 224,000 square-foot industrial building. The proposed development is located at the southeast quadrant of the intersection of Seaview Avenue at Crescent Avenue. According to the City, the site is currently in development.
- **Lake Success Eco-Business Park** – The proposed Lake Success Eco-Business Park is located in North Bridgeport in the vicinity of Success Lake, near the route 8/25 corridor. The Site consists of a 435-acre Brownfield site. Current proposals claim the potential for new office, institutional, and hotel development while retaining and preserving inland wetland and upland forest areas. The main roadway connecting the future business park with Barnum Station is Seaview Avenue.

Additional information regarding the planned developments noted above is included in Appendix D.

Based on a review of population, employment and household growth projections provided in the CTDOT statewide model, a 0.35-percent per year ambient growth rate was used to account for general increases in population and background growth not associated with nearby planned developments. This annual growth rate was applied to the existing volume networks over a 5-year period (from the year 2016 to the year 2021) and a 24-year period (from the year 2016 to the year 2040). The projected traffic volumes generated by the planned developments mentioned above were added to these volumes to forecast the 2021 No-Build and 2040 No-Build traffic volume networks. The 2021 No-Build traffic volumes are depicted on Figures 3-1a and 3-1b. The 2040 No-Build traffic volumes are depicted on Figures 3-2a and 3-2b.

3.2 Planned Transportation Improvements Included in Future Build and No Build Conditions

Analysis of the future No-Build and Build conditions includes all transportation improvements that are planned to be constructed prior to the 2021 opening year. Based on conversations with the City of Bridgeport, the Seaview Avenue corridor improvements outlined below are the only planned improvements within the study area. These improvements were included in the future No-Build and Build analyses to accurately model future traffic operating conditions.

The City is planning to construct roadway improvements along Seaview Avenue between Barnum Avenue and the proposed Lake Success Eco-Business Park. With these proposed improvements, the cross section of Seaview Avenue will generally consist of one travel lane in each direction with a center landscaped island and auxiliary turning lanes at critical intersections. The proposed intersection geometry for key intersections in the vicinity of the proposed Barnum Station are summarized below.

- **Barnum Avenue at Seaview Avenue** – Each approach will consist of a left-turn lane and a shared through/right-turn lane.
- **Seaview Avenue at Grant Street and Arctic Street** – Each approach will consist of a left-turn lane and a shared through/right-turn lane.
- **Route 1 at Seaview Avenue and Bond Street** – Bond Street will be realigned to the west to form a four-leg signalized intersection with Seaview Avenue and Route 1. The northbound Seaview Avenue and southbound Bond Street approaches will each consist of a left-turn lane,

a through lane, and a right-turn lane. The eastbound and westbound Route 1 approaches will each consist of a left-turn lane and a shared through/right-turn lane.

The Seaview Avenue corridor improvements are currently in design, and it is assumed that they will be constructed by the time the proposed station opens.

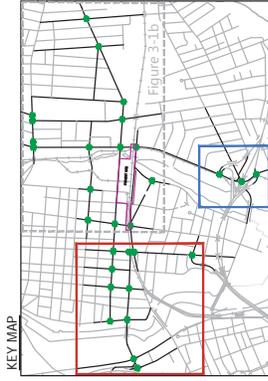
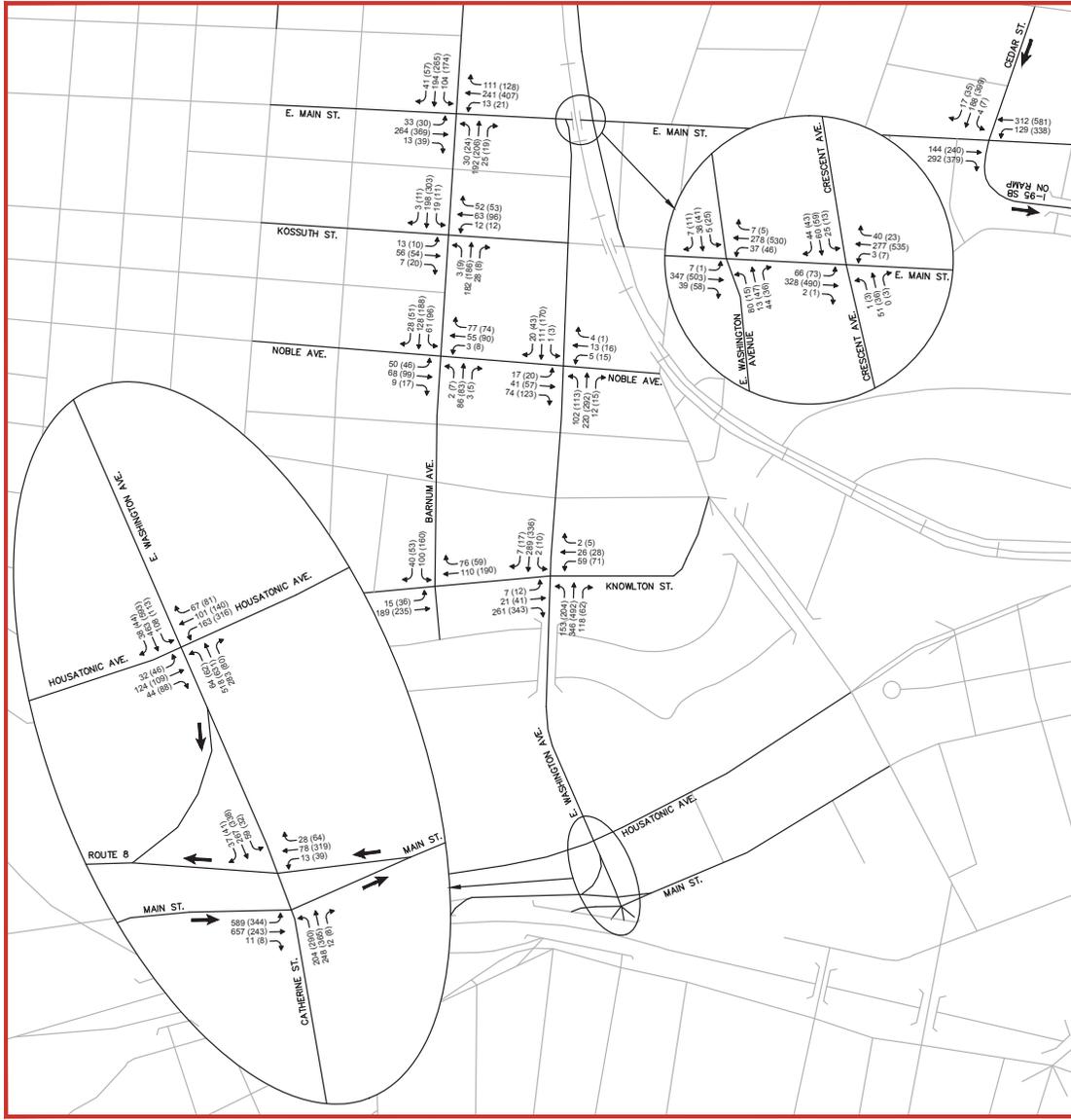


Figure 3-1a

2021 No Build Peak Hour Traffic Volumes
Barnum Station
42157.00
Bridgeport, Connecticut

LEGEND:
XX - AM PEAK HOUR TRAFFIC VOLUMES
(XX) - PM PEAK HOUR TRAFFIC VOLUMES

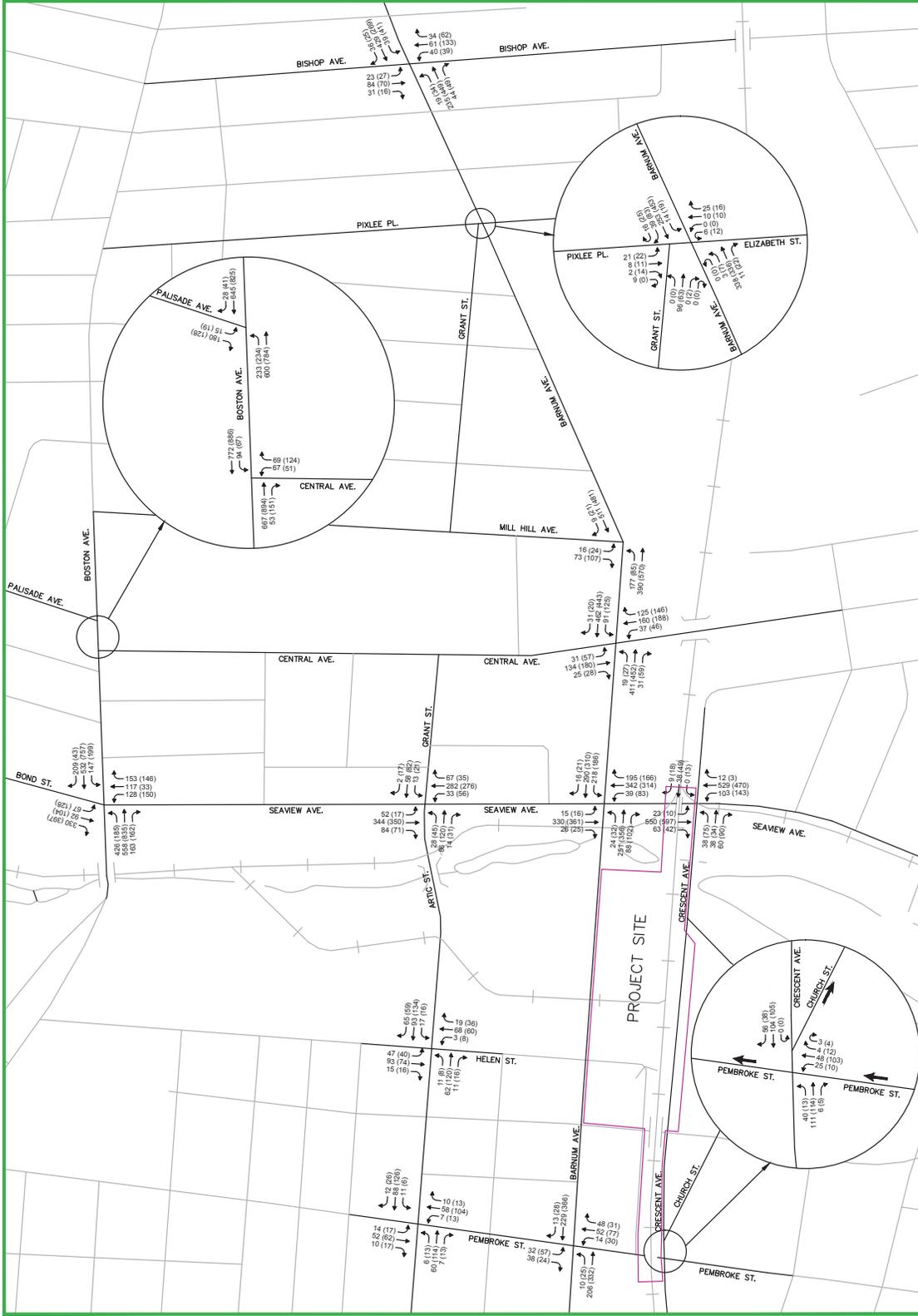
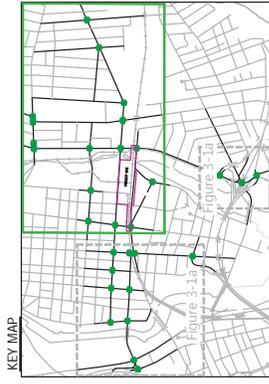


Figure 3-1b

2021 No Build Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut

LEGEND:
 (XX) - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES



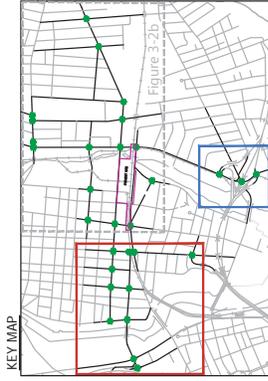


Figure 3-2a
2040 No Build Peak Hour Traffic Volumes
Barnum Station
42157.00
Bridgeport, Connecticut

LEGEND:
XX - AM PEAK HOUR TRAFFIC VOLUMES
(XX) - PM PEAK HOUR TRAFFIC VOLUMES

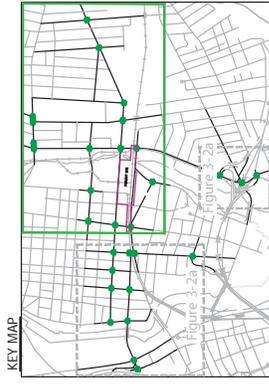


Figure 3-2b

2040 No Build Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut



LEGEND:
 XX - AM PEAK HOUR TRAFFIC VOLUMES
 XX - PM PEAK HOUR TRAFFIC VOLUMES



3.3 Future Build Conditions

3.3.1 Proposed Project Site-Generated Traffic

The daily ridership at the proposed station, by mode of access, was forecast using the Federal Transit Administration (FTA) Simplified Trips on Project Software (STOPS) model. The daily vehicle traffic generated by the proposed station was determined based on the number of riders expected to access the station by passenger vehicle. The portion of daily vehicle traffic expected to occur during the weekday morning and weekday evening peak hours was then estimated based on a review of the current Bridgeport train station schedule and 2015 Metro-North Railroad (MNR) boardings data.

The resulting proposed project site-generated traffic volume projections for the proposed station during the 2021 and 2040 design years are summarized in Table 3-1. Additional information on the ridership and trip generation forecast is included in Appendix E.

Table 3-1 Trip Generation Summary

	<u>2021 Site-Generated Traffic</u>			<u>2040 Site Generated Traffic</u>		
	<u>Park and Ride</u>	<u>Drop-off/ Pickup</u>	<u>Total</u>	<u>Park and Ride</u>	<u>Drop-off/ Pickup</u>	<u>Total</u>
Weekday Daily						
Enter	540	83	623	1,100	124	1,224
<u>Exit</u>	<u>540</u>	<u>83</u>	<u>623</u>	<u>1,100</u>	<u>124</u>	<u>1,224</u>
Total	1,080	166	1,246	2,200	248	2,448
Weekday AM Peak Hour						
Enter	130	26	156	264	39	303
<u>Exit</u>	<u>0</u>	<u>26</u>	<u>26</u>	<u>0</u>	<u>39</u>	<u>39</u>
Total	130	52	182	264	78	342
Weekday PM Peak Hour						
Enter	0	23	23	0	35	35
<u>Exit</u>	<u>117</u>	<u>23</u>	<u>140</u>	<u>238</u>	<u>35</u>	<u>273</u>
Total	117	46	163	238	70	308

3.3.2 Trip Distribution and Assignment

The origin/destination of vehicle trips generated by the proposed station was projected using the STOPS model, which provides separate origin/destination projections for park and ride and pickup/drop-off trips. The STOPS model assumes that pickup/drop-off trips typically originate within three miles of the station, while park and ride trips may be attracted from a further distance. These trips were then distributed onto the surrounding roadway networks based on a review of current traffic patterns and likely routes to/from the proposed station. The park and ride traffic distribution is depicted on Figure 3-3, and the pickup/drop-off traffic distribution is depicted on Figure 3-4.

The net site-generated traffic volumes, for the proposed project, at each project intersection for 2021 and 2040 design years are depicted on Figures 3-5 and 3-6. These traffic volumes were added to the 2021 No-Build and 2040 No-Build traffic volume networks to establish the future traffic volumes under 2021 Build and 2040 Build conditions, which are depicted on Figures 3-7a through 3-8b.

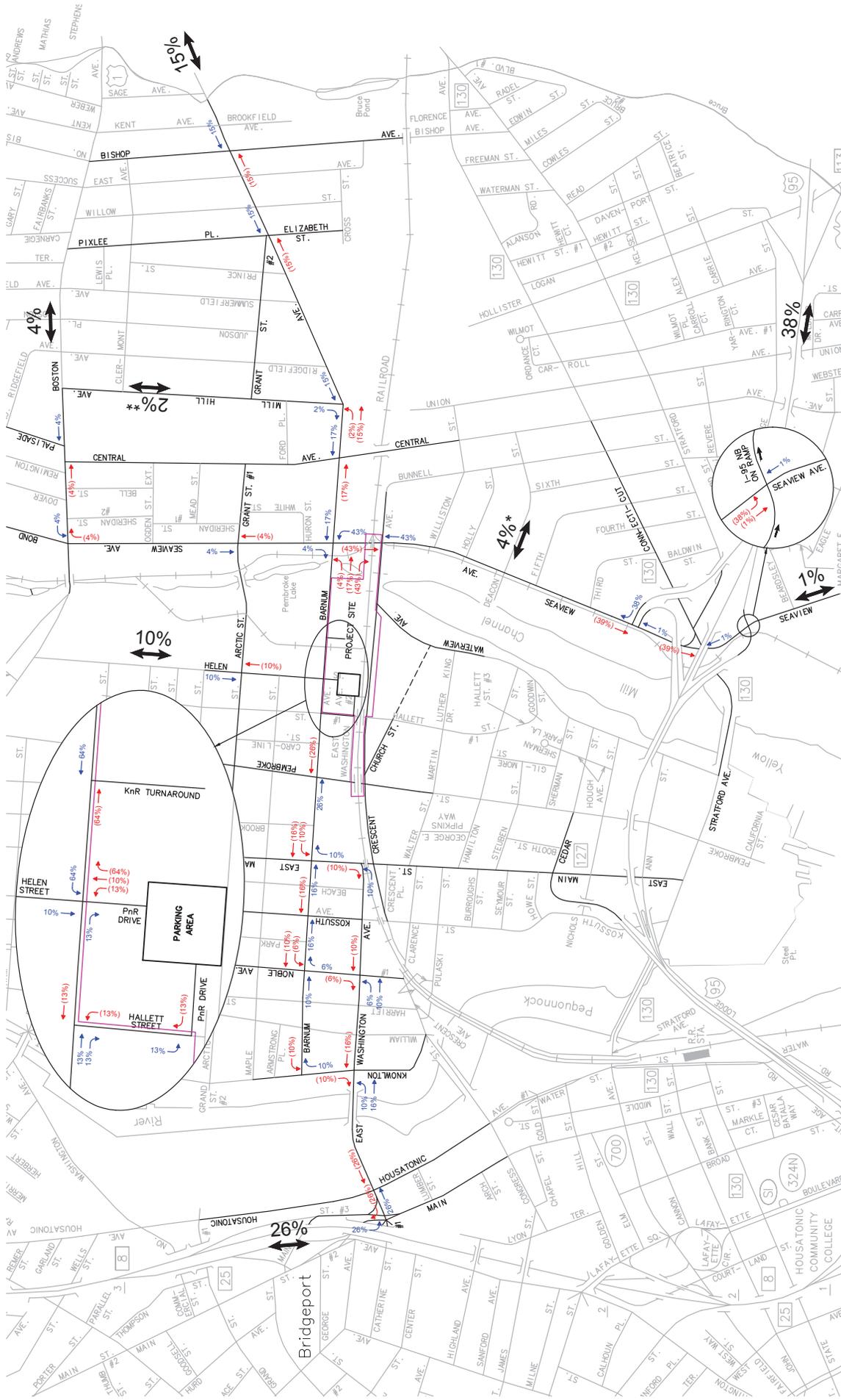


Figure 3-3

Park and Ride Traffic Distribution
 Barnum Station
 42157.00
 Bridgeport, Connecticut



Note:
 Traffic distributed along neighborhoods along
 * Seaview Avenue
 ** Mill Hill Avenue

Key:
 Entering (Exiting)



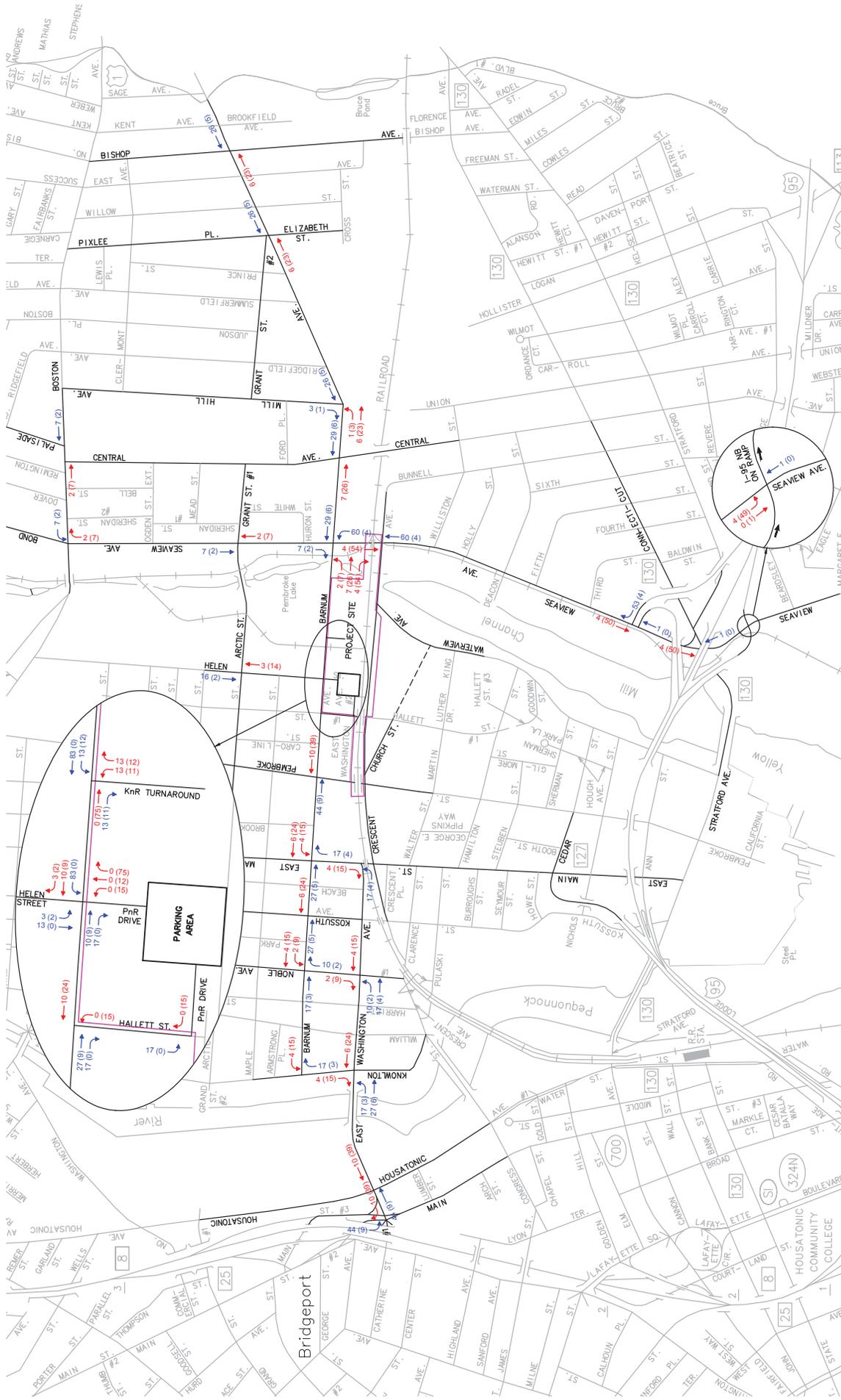


Figure 3-5

2021 Net Project Trips
Barnum Station
42157.00
Bridgeport, Connecticut



LEGEND:
XX - AM PEAK HOUR TRAFFIC VOLUMES
(XX) - PM PEAK HOUR TRAFFIC VOLUMES
↑ ENTER
↓ EXIT

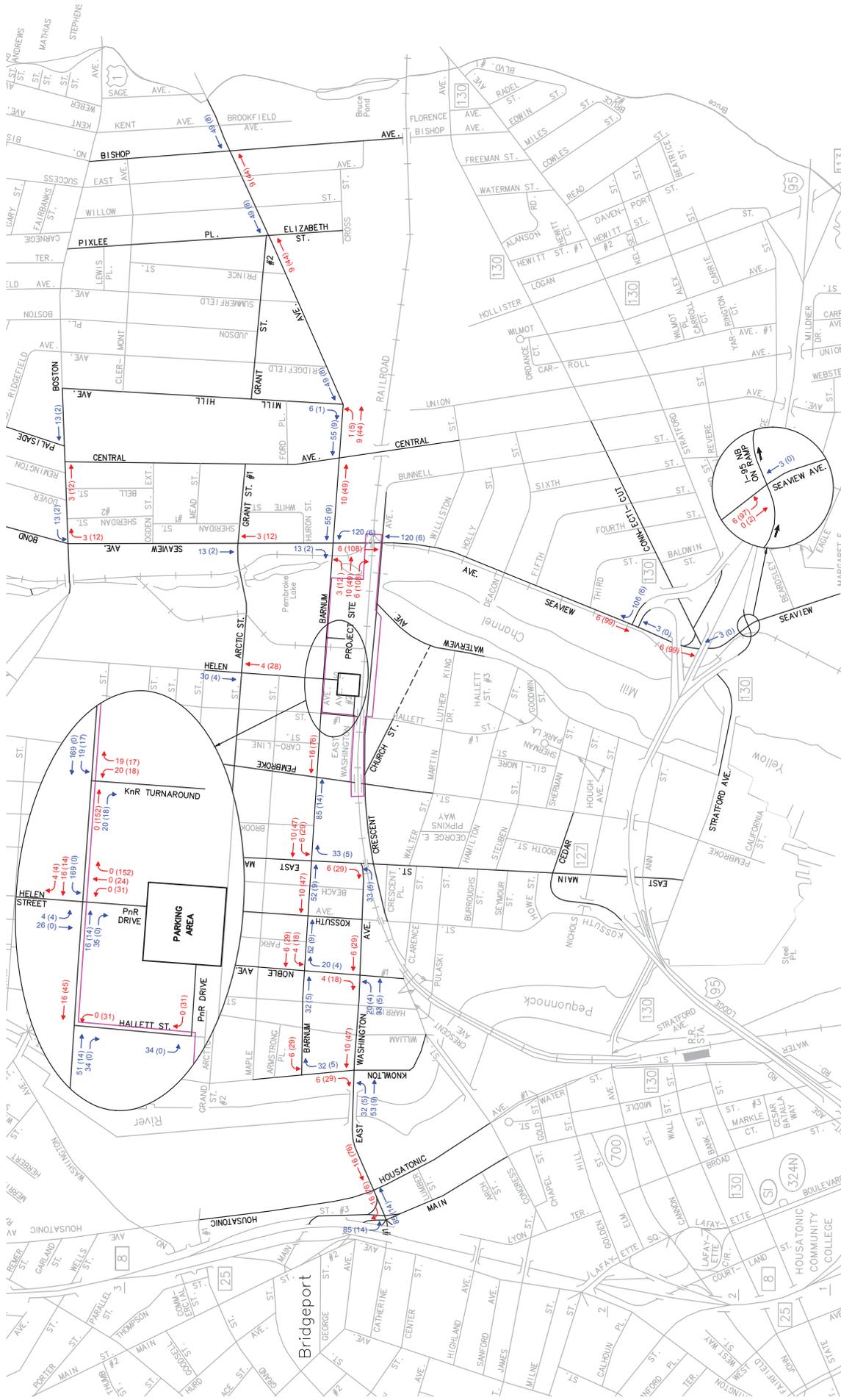


Figure 3-6

2040 Net Project Trips
Barnum Station
42157.00
Bridgeport, Connecticut



LEGEND:
XX - AM PEAK HOUR TRAFFIC VOLUMES
(XX) - PM PEAK HOUR TRAFFIC VOLUMES
← ENTER
→ EXIT



KEY MAP



Figure 3-7a

2021 Build Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut

LEGEND:
 XX - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES



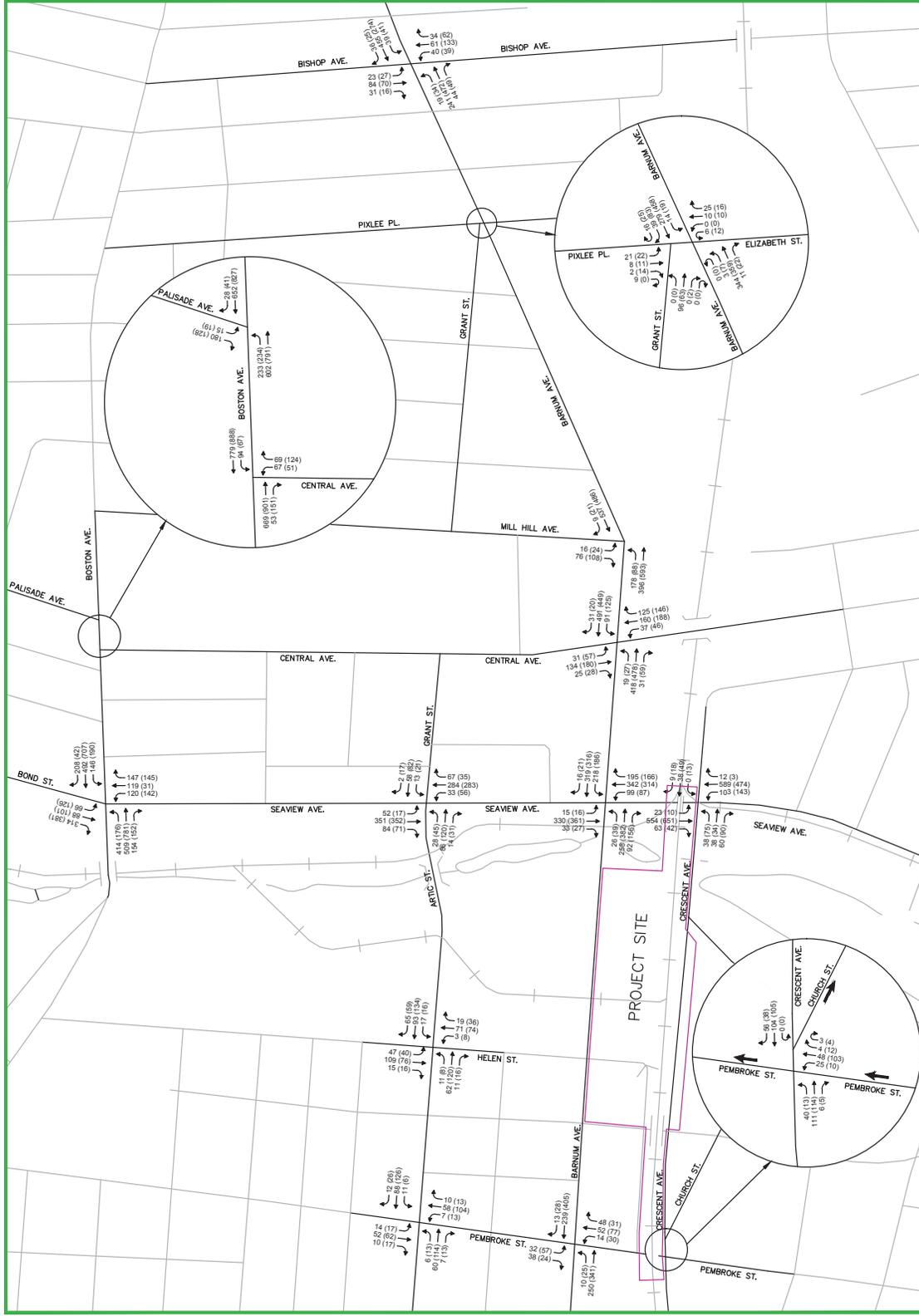
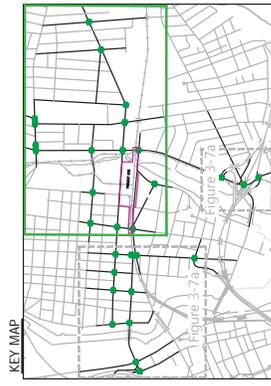


Figure 3-7b

2021 Build Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut



LEGEND:
 XX - AM PEAK HOUR TRAFFIC VOLUMES
 (ZZ) - PM PEAK HOUR TRAFFIC VOLUMES

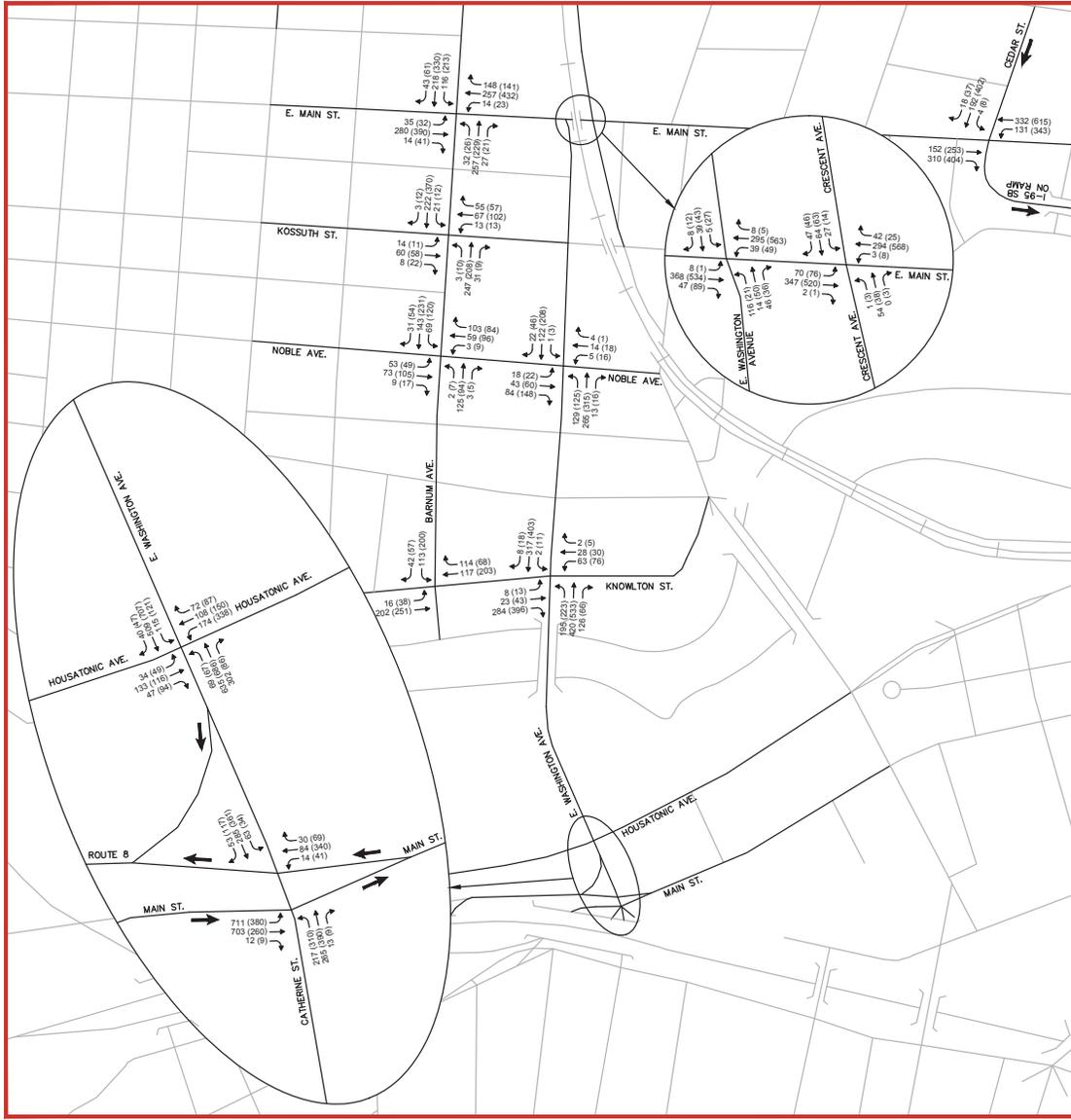


Figure 3-8a

2040 Build Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut



LEGEND:
 XX - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES

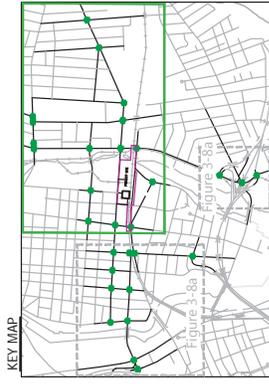


Figure 3-8b

2040 Build Peak Hour Traffic Volumes
 Barnum Station
 42157.00
 Bridgeport, Connecticut



LEGEND:
 XX - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES

4 Traffic Operations

To assess the quality of traffic flow in the study area during the peak periods, intersection capacity analyses were conducted for existing, 2021 No-Build, 2021 Build, 2040 No-Build, and 2040 Build traffic volume conditions. The following section summarizes the methods of capacity analyses used in this study and documents the results.

4.1 Method of Capacity Analysis

Capacity analyses were conducted at each of the study intersections. These analyses were conducted using Synchro software (Version 8), based on the evaluation criteria contained in the 2000 Highway Capacity Manual (HCM).¹

The analysis of future No-Build and Build conditions includes the planned infrastructure improvements previously described. Additionally, the traffic signal timing settings at each signalized study intersection were optimized for analysis of all future conditions.

The results of this analysis can be reported using a variety of performance measures. These include:

- **Seconds of Delay:** the number of seconds a vehicle, on average, waits before being able to proceed past a study intersection.
- **Volume-to-Capacity (v/c):** a ratio comparing the volume of vehicles proceeding through the study intersection with the capacity of the intersection to accommodate the vehicles. This is measured for signalized intersections only. A v/c ratio of 1.0 indicates an intersection operating at its capacity.
- **Level of Service (LOS):** The level of service designation is based on the average delay experienced by a vehicle traveling through the intersection. LOS designations are letter based, ranging from A to F, with LOS A representing the lowest vehicle delays and LOS F representing the highest vehicle delays. Traffic is not inherently bad, and thus most cities do not strive for a LOS A or even LOS B. However, for this project the threshold of LOS E or below was established as a mechanism to identify congested intersections that need investment.
- **Demand (dem):** this measure is provided for unsignalized intersections, and it represents the total traffic volumes in each lane group (all lanes with the same designation). The demand in each lane group influences the ease by which other intersection groups can make their move.

These four performance measures are shown together in order to compare – some intersections may have a high v/c ratio which would indicate an area of concern, but show low delay and/or good LOS, which indicate that perhaps volumes are high, but that the intersection performs well.

¹ [Highway Capacity Manual 2000](#); Transportation Research Board, National Research Council, Washington, DC (2000).

4.2 Signalized Intersection Capacity Analysis

The results of the signalized intersection capacity analysis, by overall intersection performance, are summarized in Table 4-1 and are depicted on Figures 4-1 through 4-5. A more detailed summary of the capacity analysis results at each intersection, including vehicle queue and delays by lane group, is included in Appendix G, and Synchro analysis reports are included in Appendix H.

The capacity analysis results indicate that all signalized intersections in the study area currently operate at an overall LOS D or better during the peak traffic periods under existing conditions. All study intersections, except four, are expected to continue operating at an overall LOS D or better under future No-Build and Build conditions. The four intersections expected to operate at an overall LOS E or F under future conditions are discussed below.

3) East Washington Avenue at Knowlton Street

Existing Conditions

- This intersection currently operates at an overall LOS D or better during the peak traffic periods under existing conditions.

2021 Opening Year Conditions

- This intersection is expected to continue operating at an overall LOS D or better during the peak traffic periods under future 2021 No-Build conditions and 2021 Build conditions.
- The additional traffic generated by the proposed station during the opening year is expected increase average delays by approximately 3 seconds during the weekday morning and evening peak traffic periods.

2040 Horizon Year Conditions

- Due to anticipated background traffic growth, the intersection is expected to degrade to an overall LOS E during the weekday evening peak traffic period under future 2040 No-Build and 2040 Build conditions.
- The additional traffic generated by the proposed station in 2040 is expected increase average delays by approximately 11 seconds during the weekday morning peak traffic period and 8 seconds during the weekday evening peak traffic period.
- It should be noted that the eastbound approach on East Washington Avenue is delineated as a single 20-foot lane, which is wide enough to accommodate two vehicles side by side (i.e. motorists traveling eastbound may by-pass a vehicle waiting to turn left onto Knowlton Street). However, the eastbound approach was conservatively modeled as a single-lane approach in the Synchro analyses. Therefore, the actual delays experienced by motorists on the eastbound approach are likely lower than indicated in the capacity analyses.

27) Seaview Avenue at I-95 Northbound Ramps

Existing Conditions

- This intersection currently operates at an overall LOS D or better during the peak traffic periods under existing conditions.

2021 Opening Year Conditions

- Due to anticipated background traffic growth, the intersection is expected to degrade to an overall LOS E during the weekday evening peak traffic period under future 2021 No-Build and Build conditions.
- The additional traffic generated by the proposed station during the opening year is expected to have a negligible impact on traffic operating conditions during the weekday morning peak traffic period, but increase average delays by approximately 9 seconds during the weekday evening peak traffic period.

2040 Horizon Year Conditions

- This intersection is expected to continue operating at an overall LOS E during the weekday evening peak traffic period under future 2040 No-Build conditions.
- With the additional traffic generated by the proposed station, this intersection is expected to operate at an overall LOS F during the weekday evening peak traffic period under future 2040 Build conditions.
- The additional traffic generated by the proposed station in 2040 is expected to have a negligible impact on traffic operating conditions during the weekday morning peak traffic period, but increase average delays by approximately 20 seconds during the weekday evening peak traffic period.

28) Seaview Avenue at I-95 Northbound Ramps

Existing Conditions

- This intersection currently operates at an overall LOS D or better during the peak traffic periods under existing conditions.

2021 Opening Year Conditions

- Due to anticipated background traffic growth, the intersection is expected to degrade to an overall LOS F during the weekday evening peak traffic period under future 2021 No-Build and 2021 Build conditions. Multiple individual turning movements are also expected to operate at LOS F under No-Build and Build conditions.
- The additional traffic generated by the proposed station during the opening year is expected to have a negligible impact on traffic operating conditions during the weekday morning peak traffic period, but increase average delays by approximately 11 seconds during the weekday evening peak traffic period.

2040 Horizon Year Conditions

- The intersection is expected to continue operating at an overall LOS F during the weekday evening peak traffic period under future 2040 No-Build and 2040 Build conditions. Multiple individual turning movements are also expected to operate at LOS F under No-Build and Build conditions.
- The additional traffic generated by the proposed station in 2040 is expected to have a negligible impact on traffic operating conditions during the weekday morning peak traffic period, but increase average delays by approximately 23 seconds during the weekday evening peak traffic period.

29) Route 127 (East Main Street) at Cedar StreetExisting Conditions

- This intersection currently operates at an overall LOS D or better during the peak traffic periods under existing conditions.

2021 Opening Year Conditions

- Due to anticipated background traffic growth, the intersection is expected to degrade to an overall LOS E during the weekday evening peak traffic period under future 2021 No-Build and 2021 Build conditions.
- The additional traffic generated by the proposed station is expected to have a negligible impact on traffic operating conditions at this intersection.

2040 Horizon Year Conditions

- Due to anticipated background traffic growth, the intersection is expected to degrade to an overall LOS F during the weekday evening peak traffic period under future 2040 No-Build and 2040 Build conditions.
- The additional traffic generated by the proposed station is expected to have a negligible impact on traffic operating conditions at this intersection.

Table 4-1 Signalized Intersection Capacity Analysis

Location	Peak Period	Existing Conditions			2021 No Build Conditions			2021 Build Conditions			2040 No Build Conditions			2040 Build Conditions		
		LOS ¹	Delay ²	v/c ³	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
1. Main Street at Catherine Street and East Washington Avenue	Weekday Morning	D	40.0	1.08	D	41.8	1.12	C	32.1	1.00	D	53.9	1.21	D	42.5	1.11
	Weekday Evening	C	24.4	0.89	C	25.7	0.96	C	26.0	0.97	C	29.7	1.04	C	31.3	1.06
2. East Washington Avenue at Housatonic Avenue	Weekday Morning	B	16.8	0.53	B	16.6	0.57	B	16.4	0.58	B	17.1	0.62	B	17.0	0.65
	Weekday Evening	C	21.5	0.77	C	22.0	0.83	C	22.7	0.85	C	25.7	0.92	C	29.0	0.97
3. East Washington Avenue at Knowlton Street	Weekday Morning	B	18.9	0.64	C	22.1	0.68	C	25.3	0.76	C	26.9	0.77	D	37.5	0.88
	Weekday Evening	D	43.0	0.91	D	47.8	0.97	D	50.2	1.00	E	60.2	1.05	E	67.9	1.09
4. East Washington Avenue at Noble Avenue	Weekday Morning	B	19.6	0.36	B	19.1	0.41	B	18.7	0.43	B	18.7	0.43	B	18.2	0.49
	Weekday Evening	C	25.1	0.41	C	28.5	0.46	C	29.1	0.47	C	30.8	0.49	C	33.0	0.52
5. East Main Street (Route 127) at East Washington Avenue	Weekday Morning	A	8.4	0.32	B	10.6	0.39	B	11.4	0.41	B	10.7	0.41	B	12.2	0.45
	Weekday Evening	A	6.7	0.37	A	7.9	0.44	A	8.0	0.46	A	8.1	0.47	A	8.3	0.49
6. East Main Street (Route 127) at Crescent Avenue	Weekday Morning	B	11.8	0.38	B	11.5	0.42	B	11.3	0.42	B	11.7	0.45	B	11.3	0.45
	Weekday Evening	A	7.9	0.38	A	8.1	0.45	A	8.1	0.45	A	8.3	0.48	A	8.3	0.48
9. Barnum Avenue at Noble Avenue	Weekday Morning	B	14.6	0.29	B	15.1	0.30	B	15.6	0.31	B	15.2	0.32	B	16.1	0.34
	Weekday Evening	C	21.2	0.40	C	21.1	0.41	C	22.0	0.43	C	21.7	0.44	C	23.7	0.48
10. Barnum Avenue at Kossuth Avenue	Weekday Morning	B	10.8	0.27	B	10.9	0.28	B	10.5	0.28	B	10.9	0.30	B	10.4	0.31
	Weekday Evening	B	10.8	0.32	B	10.9	0.33	B	10.5	0.34	B	11.0	0.35	B	10.3	0.38
11. Barnum Avenue at East Main Street (Route 127)	Weekday Morning	B	17.7	0.55	B	18.7	0.61	B	19.1	0.64	B	19.3	0.65	B	20.3	0.71
	Weekday Evening	C	21.7	0.81	C	29.9	0.92	C	34.6	0.96	D	37.6	0.98	D	54.6	1.06
13. Barnum Avenue at Seaview Avenue	Weekday Morning	C	24.5	0.78	C	21.9	0.74	C	21.9	0.75	C	23.5	0.81	C	25.2	0.83
	Weekday Evening	C	22.5	0.85	C	21.0	0.69	C	21.5	0.75	C	22.8	0.76	C	27.0	0.96
14. Barnum Avenue at Central Avenue	Weekday Morning	B	17.0	0.70	B	18.6	0.75	B	19.0	0.77	C	20.4	0.80	C	22.0	0.84
	Weekday Evening	B	18.3	0.77	C	20.4	0.81	C	20.7	0.82	C	24.0	0.88	C	25.3	0.91
15. Barnum Avenue at Mill Hill Avenue	Weekday Morning	B	16.4	0.74	B	15.3	0.75	B	17.7	0.79	C	24.3	0.86	D	48.8	0.98
	Weekday Evening	B	11.6	0.59	B	11.5	0.64	B	12.4	0.67	B	13.7	0.72	B	17.8	0.78
16. Barnum Avenue at Elizabeth Street, Pixlee Place, and Grant Street	Weekday Morning	B	15.5	0.42	B	14.2	0.45	B	14.3	0.47	B	14.9	0.48	B	15.0	0.52
	Weekday Evening	B	14.7	0.61	B	14.9	0.64	B	14.9	0.64	B	17.1	0.68	B	17.2	0.69
17. Barnum Avenue at Bishop Avenue	Weekday Morning	B	11.6	0.47	B	11.6	0.51	B	11.5	0.53	B	12.1	0.54	B	12.1	0.58
	Weekday Evening	B	13.1	0.51	B	13.1	0.54	B	13	0.55	B	13.4	0.57	B	13.4	0.6
21. Boston Avenue (Route 1) at Seaview Avenue	Weekday Morning	B	16.5	0.74	C	25.7	0.82	C	25.7	0.82	C	27.4	0.85	C	27.4	0.85
	Weekday Evening	B	18.7	0.83	D	36.3	0.92	D	36.3	0.92	D	40.2	0.97	D	40.2	0.97
22. Boston Avenue (Route 1) at Bond Street	Weekday Morning	B	17.4	0.58	--	--	--	--	--	--	--	--	--	--	--	--
	Weekday Evening	B	16.7	0.57	--	--	--	--	--	--	--	--	--	--	--	--
23. Boston Avenue (Route 1) at Central Avenue	Weekday Morning	B	14.5	0.72	B	16.1	0.66	B	16.1	0.66	B	17.5	0.71	B	17.5	0.72
	Weekday Evening	B	14.3	0.71	C	23.3	0.76	C	23.6	0.76	C	26.2	0.81	C	27.0	0.82
24. Boston Avenue (Route 1) at Palisade Avenue	Weekday Morning	B	12.1	0.52	B	12.6	0.55	B	12.7	0.56	B	13.4	0.61	B	13.6	0.62
	Weekday Evening	B	15.8	0.66	B	12.6	0.66	B	12.6	0.66	B	14.2	0.74	B	14.1	0.73
26. Seaview Avenue at I-95 Southbound Ramps	Weekday Morning	B	13.6	0.86	C	25.8	0.93	C	26.0	0.93	C	29.6	1.02	C	30.5	1.02
	Weekday Evening	B	12.5	0.90	C	28.3	1.01	C	28.0	1.01	C	31.6	1.06	C	31.0	1.06
27. Seaview Avenue at Connecticut/ Stratford Avenue (Route 130)	Weekday Morning	C	29.5	0.65	C	31.1	0.79	C	31.4	0.79	C	33.9	0.83	C	34.5	0.84
	Weekday Evening	D	35.5	0.68	E	58.6	0.96	E	67.6	1.00	E	71.4	1.01	F	91.0	1.09

Location	Peak Period	Existing Conditions			2021 No Build Conditions			2021 Build Conditions			2040 No Build Conditions			2040 Build Conditions		
		LOS ¹	Delay ²	v/c ³	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
28. Seaview Avenue at I-95 Northbound Ramps	Weekday Morning	C	34.9	0.58	D	36.1	0.77	D	36.8	0.78	D	39.6	0.82	D	39.9	0.82
	Weekday Evening	D	39.5	0.71	F	110.0	1.32	F	120.9	1.36	F	122.9	1.36	F	146.2	1.45
29. East Main Street (Route 127) at Cedar Street	Weekday Morning	B	15.2	0.43	C	28.9	0.66	C	28.9	0.66	C	30.7	0.69	C	30.7	0.69
	Weekday Evening	B	16.6	0.47	F	82.9	0.98	F	82.9	0.98	F	93.3	0.99	F	93.3	0.99

Source: Vanasse Hangen Brustlin, Inc. using Synchro 8.0 software.

1 Overall intersection level of service

2 Average vehicle delay in seconds per vehicle

3 Volume-to-capacity ratio

4.3 Unsignalized Intersection Capacity Analysis

The results of the unsignalized intersection capacity analyses are summarized in Table 4-2 and depicted on Figures 4-1 through 4-5.

The capacity analysis results indicate that all unsignalized intersections in the study area currently operate at LOS D or better during the peak traffic periods under existing conditions. All unsignalized study intersections, except for the intersection of Seaview Avenue at Crescent Avenue, are expected to continue operating at LOS D or better under future No-Build and Build conditions. Traffic operating conditions at this intersection are discussed below.

Seaview Avenue at Crescent Avenue

- This intersection currently operates at LOS D or better during the peak traffic periods under existing conditions.
- This intersection currently operates under all-way stop-control, despite significantly higher traffic volumes along Seaview Avenue. Due to the anticipated background traffic growth, the northbound and southbound Seaview Avenue approaches are expected to degrade to LOS F during the peak traffic periods under future No-Build and Build conditions.

Table 4-2 Unsignalized Intersection Capacity Analysis

Location/Movement	Existing Conditions			2021 No Build Conditions			2021 Build Conditions			2040 No Build Conditions			2040 Build Conditions		
	Dem ¹	Delay ²	LOS ³	Dem	Delay	LOS	Dem	Delay	LOS	Dem	Delay	LOS	Dem	Delay	LOS
7. Pembroke Street at Crescent Avenue and Church Street															
<u>Weekday Morning Peak Hour</u>															
- EB Crescent Avenue Approach	146	8.2	A	157	8.4	A	157	8.4	A	166	8.5	A	166	8.5	A
- WB Crescent Avenue Approach	128	7.9	A	160	8.0	A	160	8.0	A	169	8.1	A	169	8.1	A
- NB Pembroke Street Approach	78	8.0	A	80	8.2	A	80	8.2	A	86	8.3	A	86	8.3	A
<u>Weekday Evening Peak Hour</u>															
- EB Barnum Avenue Approach	99	8.0	A	132	8.3	A	132	8.3	A	139	8.4	A	139	8.4	A
- WB Barnum Avenue Approach	124	7.9	A	143	8.1	A	143	8.1	A	152	8.2	A	152	8.2	A
- NB Pembroke Street Approach	120	8.1	A	129	8.3	A	129	8.3	A	137	8.4	A	137	8.4	A
8. Barnum Avenue at Knowlton Street															
<u>Weekday Morning Peak Hour</u>															
- EB Private Driveway Approach	0	0.0	A	0	0.0	A	0	0.0	A	0	0.0	A	0	0.0	A
- WB Barnum Avenue Approach	137	12.1	B	140	12.2	B	144	12.4	B	149	12.6	B	155	13.0	B
- NB Knowlton Street Approach	183	0.0	A	186	0.0	A	203	0.0	A	199	0.0	A	231	0.0	A
- SB Knowlton Street Approach	201	0.7	A	204	0.7	A	204	0.7	A	218	0.7	A	218	0.7	A
<u>Weekday Evening Peak Hour</u>															
- EB Private Driveway Approach	1	9.4	A	1	9.5	A	1	9.5	A	1	9.5	A	1	9.5	A
- WB Barnum Avenue Approach	209	16.6	C	213	17.0	C	228	17.9	C	228	18.8	C	257	21.1	C
- NB Knowlton Street Approach	245	0.0	A	249	0.0	A	252	0.0	A	266	0.0	A	271	0.0	A
- SB Knowlton Street Approach	266	1.2	A	271	1.2	A	271	1.3	A	289	1.3	A	289	1.3	A
12. Barnum Avenue at Pembroke Street															
<u>Weekday Morning Peak Hour</u>															
- EB Barnum Avenue Approach	178	0.5	A	216	0.4	A	260	0.4	A	229	0.4	A	314	0.4	A
- WB Barnum Avenue Approach	231	0.0	A	242	0.0	A	252	0.0	A	258	0.0	A	274	0.0	A
- NB Pembroke Street Approach	111	12.0	B	114	12.6	B	114	13.3	B	121	13.1	B	121	14.6	B
- SB Pembroke Street Approach	68	12.1	B	70	12.7	B	70	13.3	B	74	13.2	B	74	14.5	B
<u>Weekday Evening Peak Hour</u>															
- EB Barnum Avenue Approach	343	0.7	A	357	0.8	A	366	0.8	A	380	0.8	A	394	0.8	A
- WB Barnum Avenue Approach	361	0.0	A	394	0.0	A	433	0.0	A	419	0.0	A	495	0.0	A
- NB Pembroke Street Approach	128	19.0	C	138	21.1	C	138	22.8	C	147	23.8	C	147	28.2	D
- SB Pembroke Street Approach	80	20.5	C	81	23.2	C	81	25.6	D	87	27.0	D	87	33.7	D
18. Arctic Street at Pembroke Street															
<u>Weekday Morning Peak Hour</u>															
- EB Arctic Street Approach	72	7.8	A	73	7.9	A	73	7.9	A	79	7.9	A	79	7.9	A
- WB Arctic Street Approach	109	8.1	A	111	8.1	A	111	8.1	A	118	8.2	A	118	8.2	A
- NB Pembroke Street Approach	73	8.0	A	75	8.0	A	75	8.0	A	80	8.1	A	80	8.1	A
- SB Pembroke Street Approach	75	7.9	A	76	7.9	A	76	7.9	A	81	8.0	A	81	8.0	A
<u>Weekday Evening Peak Hour</u>															
- EB Arctic Street Approach	138	8.7	A	140	8.7	A	140	8.7	A	150	8.9	A	150	8.9	A
- WB Arctic Street Approach	156	8.7	A	158	8.7	A	158	8.7	A	170	8.9	A	170	8.9	A
- NB Pembroke Street Approach	121	8.6	A	130	8.7	A	130	8.7	A	138	8.9	A	138	8.9	A
- SB Pembroke Street Approach	95	8.4	A	96	8.4	A	96	8.4	A	102	8.6	A	102	8.6	A
19. Arctic Street at Helen Street															
<u>Weekday Morning Peak Hour</u>															
- EB Arctic Street Approach	83	8.3	A	84	8.4	A	84	8.4	A	90	8.5	A	90	8.6	A
- WB Arctic Street Approach	172	8.6	A	175	8.7	A	175	8.8	A	187	8.9	A	187	9.0	A
- NB Helen Street Approach	86	8.2	A	90	8.3	A	93	8.4	A	97	8.4	A	101	8.6	A
- SB Helen Street Approach	151	8.8	A	155	8.9	A	171	9.1	A	165	9.1	A	195	9.5	A
<u>Weekday Evening Peak Hour</u>															
- EB Arctic Street Approach	142	8.8	A	144	8.9	A	144	9.0	A	154	9.1	A	154	9.3	A
- WB Arctic Street Approach	206	9.1	A	209	9.2	A	209	9.2	A	224	9.4	A	224	9.6	A

Location/Movement	Existing Conditions			2021 No Build Conditions			2021 Build Conditions			2040 No Build Conditions			2040 Build Conditions		
	Dem ¹	Delay ²	LOS ³	Dem	Delay	LOS	Dem	Delay	LOS	Dem	Delay	LOS	Dem	Delay	LOS
- NB Helen Street Approach	100	8.5	A	104	8.6	A	118	8.7	A	111	8.8	A	139	9.1	A
- SB Helen Street Approach	124	8.9	A	130	9.0	A	132	9.1	A	138	9.2	A	142	9.4	A
<u>20. Seaview Avenue at Grant Street and Arctic Street</u>															
<u>Weekday Morning Peak Hour</u>															
- EB Arctic Street Approach	126	10.3	B	128	9.9	A	128	9.9	A	137	10.2	B	137	10.3	B
- WB Grant Street Approach	72	9.8	A	73	9.5	A	73	9.5	A	78	9.8	A	78	9.8	A
- NB Seaview Avenue Approach	282	11.2	B	382	13.4	B	384	13.6	B	402	14.7	B	405	14.9	B
- SB Seaview Avenue Approach	428	14.2	B	480	16.1	C	487	16.5	C	510	18.5	C	523	19.6	C
<u>Weekday Evening Peak Hour</u>															
- EB Arctic Street Approach	192	11.5	B	196	10.9	B	196	10.9	B	208	11.4	B	208	11.4	B
- WB Grant Street Approach	119	10.5	B	120	10.2	B	120	10.2	B	129	10.6	B	129	10.7	B
- NB Seaview Avenue Approach	317	13.1	B	367	13.5	B	374	13.8	B	389	14.8	B	401	15.4	C
- SB Seaview Avenue Approach	335	13.2	B	438	19.5	C	440	19.8	C	462	23.0	C	464	23.5	C
<u>25. Seaview Avenue at Crescent Avenue</u>															
<u>Weekday Morning Peak Hour</u>															
- EB Crescent Avenue Approach	117	11.2	B	136	12.6	B	136	12.5	B	143	12.8	B	143	12.8	B
- WB Crescent Avenue Approach	46	10.6	B	47	11.4	B	47	11.4	B	50	11.6	B	50	11.6	B
- NB Seaview Avenue Approach	535	24.3	C	644	60.3	F	704	87.4	F	682	77.6	F	802	145.7	F
- SB Seaview Avenue Approach	537	23.4	C	636	51.7	F	640	52.8	F	674	69.4	F	680	72.1	F
<u>Weekday Evening Peak Hour</u>															
- EB Crescent Avenue Approach	187	13.8	B	199	15.1	C	199	15.1	C	211	15.7	C	211	15.7	C
- WB Crescent Avenue Approach	79	11.9	B	80	12.6	B	80	12.6	B	86	12.9	B	86	12.9	B
- NB Seaview Avenue Approach	526	34.5	D	616	73.1	F	620	75.5	F	653	100.0	F	659	103.6	F
- SB Seaview Avenue Approach	531	33.7	D	649	85.5	F	703	117.8	F	685	113.9	F	793	187.3	F

Source: Vanasse Hangen Brustlin, Inc.

1 Demand in vehicles per hour; the demand applies to only the most critical lane group

2 Average control delay in seconds per vehicle for critical movement

3 Level of Service for the critical movement

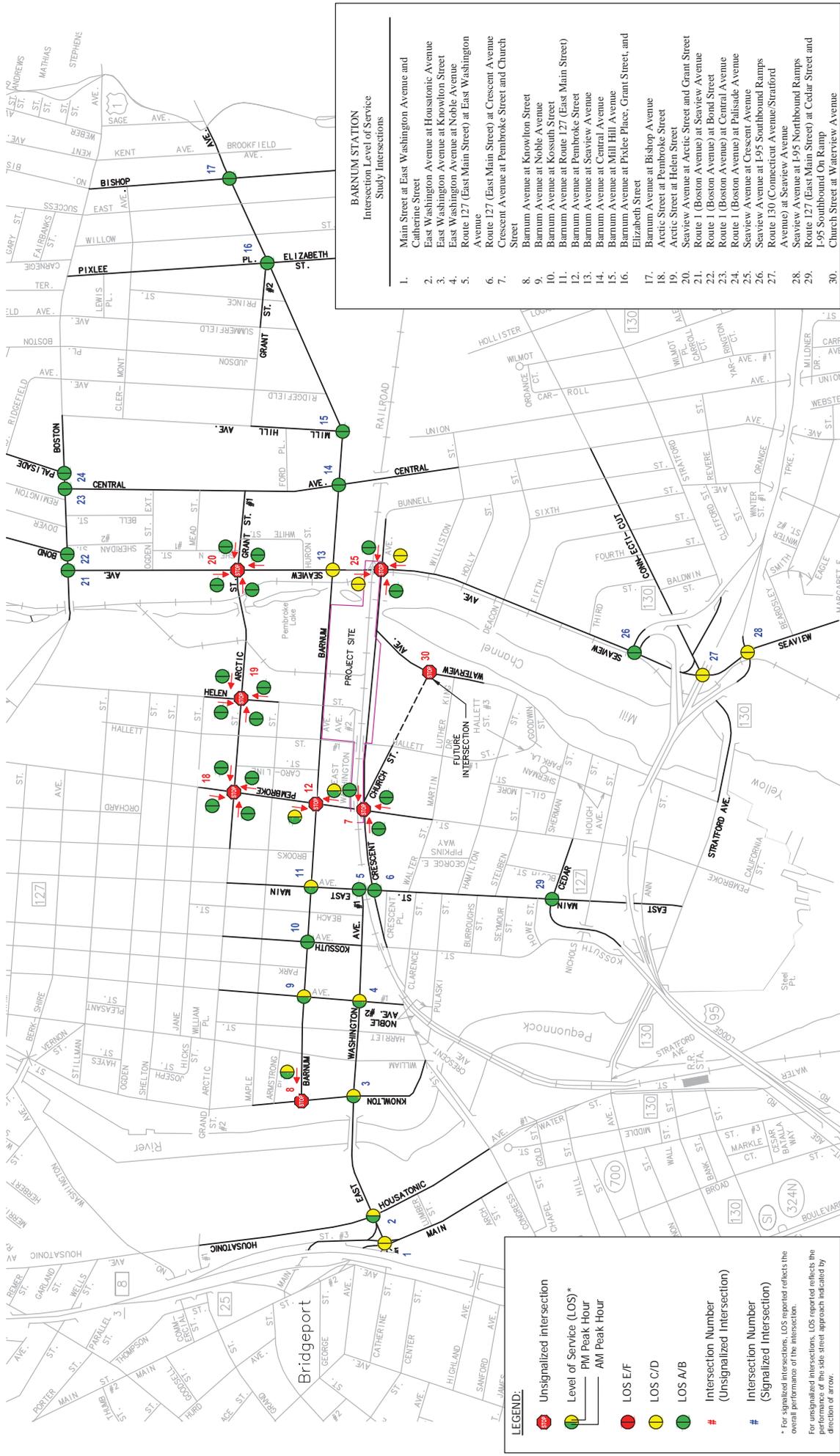


Figure 4-1

Existing Conditions LOS
 Barnum Station
 42157.00



Bridgeport, Connecticut



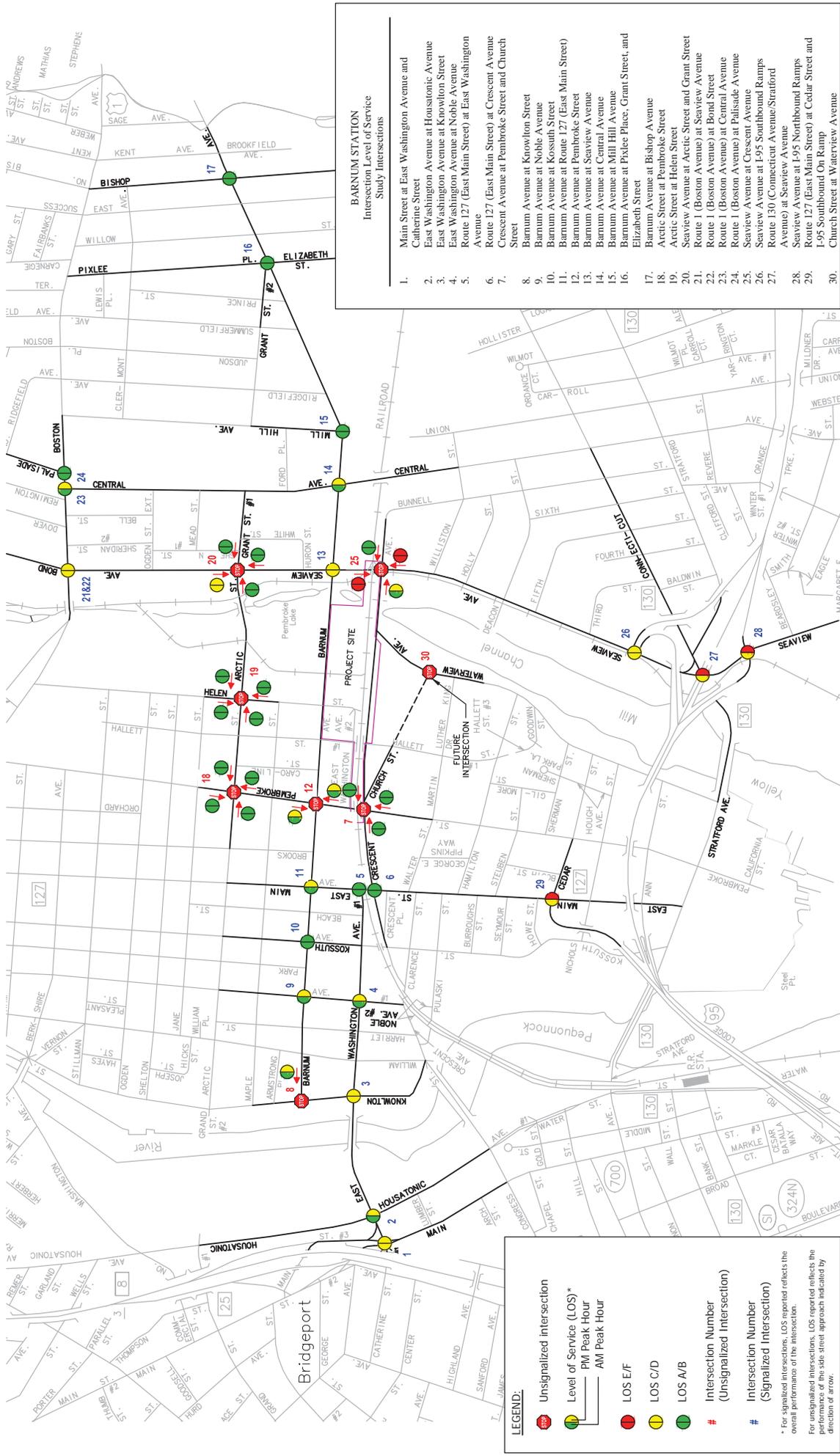


Figure 4-2

2021 No Build Conditions LOS

Barnum Station

42157.00

Bridgeport, Connecticut





BARNUM STATION
Intersection Level of Service Study Intersections

- Main Street at East Washington Avenue and Catherine Street
- East Washington Avenue at Housatonic Avenue
- East Washington Avenue at Knowlton Street
- East Washington Avenue at Noble Avenue
- Route 127 (East Main Street) at East Washington Avenue
- Route 127 (East Main Street) at Crescent Avenue
- Route 127 (East Main Street) at Pembroke Street and Church Street
- Barnum Avenue at Knowlton Street
- Barnum Avenue at Noble Avenue
- Barnum Avenue at Kossuth Street
- Barnum Avenue at Route 127 (East Main Street)
- Barnum Avenue at Pembroke Street
- Barnum Avenue at Seaview Avenue
- Barnum Avenue at Central Avenue
- Barnum Avenue at Mill Hill Avenue
- Barnum Avenue at Pixlee Place, Grant Street, and Elizabeth Street
- Barnum Avenue at Bishop Avenue
- Arctic Street at Pembroke Street
- Arctic Street at Helen Street
- Seaview Avenue at Arctic Street and Grant Street
- Route 1 (Boston Avenue) at Seaview Avenue
- Route 1 (Boston Avenue) at Bond Street
- Route 1 (Boston Avenue) at Central Avenue
- Route 1 (Boston Avenue) at Palisade Avenue
- Seaview Avenue at Crescent Avenue
- Route 130 (Connecticut Avenue)/Stratford Avenue at Seaview Avenue
- Seaview Avenue at 1-95 Northbound Ramps
- Route 127 (East Main Street) at Cedar Street and 1-95 Southbound On Ramp
- Church Street at Waterview Avenue

Figure 4-3

2021 Build Conditions LOS
Barnum Station
42157.00
Bridgeport, Connecticut





Figure 4-4

2040 No Build Conditions LOS

Barnum Station

42157.00

Bridgeport, Connecticut



Not to Scale



BARNUM STATION
Intersection Level of Service Study Intersections

- Main Street at East Washington Avenue and Catherine Street
- East Washington Avenue at Housatonic Avenue
- East Washington Avenue at Knowlton Street
- East Washington Avenue at Noble Avenue
- Route 127 (East Main Street) at East Washington Avenue
- Route 127 (East Main Street) at Crescent Avenue
- Crescent Avenue at Pembroke Street and Church Street
- Barnum Avenue at Knowlton Street
- Barnum Avenue at Noble Avenue
- Barnum Avenue at Kossuth Street
- Barnum Avenue at Route 127 (East Main Street)
- Barnum Avenue at Pembroke Street
- Barnum Avenue at Seaview Avenue
- Barnum Avenue at Central Avenue
- Barnum Avenue at Mill Hill Avenue
- Barnum Avenue at Pixlee Place, Grant Street, and Elizabeth Street
- Barnum Avenue at Bishop Avenue
- Arctic Street at Pembroke Street
- Arctic Street at Helen Street
- Seaview Avenue at Arctic Street and Grant Street
- Route 1 (Boston Avenue) at Seaview Avenue
- Route 1 (Boston Avenue) at Bond Street
- Route 1 (Boston Avenue) at Central Avenue
- Route 1 (Boston Avenue) at Palisade Avenue
- Seaview Avenue at Crescent Avenue
- Route 130 (Connecticut Avenue/Stratford Avenue) at Seaview Avenue
- Seaview Avenue at 1-95 Northbound Ramps
- Route 127 (East Main Street) at Cedar Street and 1-95 Southbound On Ramp
- Church Street at Waterview Avenue

Figure 4-5

2040 Build Conditions LOS
Barnum Station
42157.00
Bridgeport, Connecticut



5 Recommended Improvements

Based on the results of this traffic impact analysis and conversations with the City of Bridgeport, VHB recommends the following off-site transportation improvements to mitigate potential impacts of the proposed Barnum Station.

5.1 Provide Left-Turn Lanes at Proposed Driveways

Access to the proposed Barnum Station will be provided by driveways on Barnum Station and Hallett Street. VHB recommends providing left-turn lanes on Barnum Avenue and Hallett Street at each of the proposed Barnum Station driveways.

5.2 Install Wayfinding Signs and Restripe Existing Pavement to Provide Left-Turn Lanes Onto Noble Avenue

The intersection of Barnum Avenue at East Main Street is expected to operate at LOS D at v/c ratio of 0.9 under future 2040 Build conditions. A v/c ratio of 1.0 indicates an intersection operating at its capacity. Since East Main Street is expected to operate near capacity, the City of Bridgeport prefers that Barnum Station visitors travel between Barnum Avenue and East Washington Avenue via Noble Avenue. Additional capacity is expected along Noble Avenue than alternative routes under future 2040 Build conditions.

The following modifications are recommended to encourage Barnum Station visitors to travel along Noble Avenue:

- Install wayfinding signs to direct Barnum Station visitors to turn onto Noble Avenue from East Washington Avenue.
- Restripe the westbound Barnum Avenue approach at the intersection of Barnum Avenue at Noble Avenue to provide a left-turn lane onto Noble Avenue.
- Restripe the eastbound East Washington Avenue approach at the intersection of East Washington Avenue at Noble Avenue to provide a left-turn lane onto Noble Avenue.

Intersection capacity analyses were performed at the signalized intersections of East Washington Avenue at Noble Avenue and Barnum Avenue at Noble Avenue to evaluate the potential traffic impacts associated with the proposed left-turn lanes. The results of the signalized intersection capacity analyses are summarized in Table 5-1.

As indicated in the table, the lane modifications at each intersection are expected to have a minimal impact on traffic operating conditions with the currently projected traffic demand. However, the proposed modifications will likely influence additional motorists to turn left onto Noble Avenue instead of the adjacent parallel roadways. This change will increase the capacity for left-turning motorists and relieve congestion on parallel roadways.

Table 5-1 Signalized Intersection Capacity Analysis (with Improvements)

Approach/Lane	2021 No Build Conditions			2021 Build Conditions			2021 Build Conditions w/Improvements			2040 No Build Conditions			2040 Build Conditions			2040 Build Conditions w/Improvements		
	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
4. East Washington Avenue at Noble Avenue																		
<u>Weekday Morning Peak Hour</u>																		
Eastbound LT	--	--	--	--	23.5	0.75	C	25.0	0.56	C	25.0	0.56	--	--	--	C	24.4	0.58
Eastbound TH-RT *	C	24.2	0.74	C	23.5	0.75	C	25.9	0.64	C	25.9	0.64	C	22.4	0.77	C	24.7	0.65
Westbound LT-TH-RT	B	16.0	0.30	B	14.8	0.29	C	22.2	0.43	C	22.2	0.43	B	12.9	0.29	C	20.7	0.42
Northbound LT-TH-RT	A	9.4	0.04	B	10.4	0.04	A	5.9	0.03	A	5.9	0.03	B	12.1	0.05	A	6.7	0.04
Southbound LT-TH-RT	B	12.1	0.16	B	12.8	0.16	A	7.4	0.14	A	7.4	0.14	B	14.3	0.19	A	8.2	0.16
Overall	B	19.1	0.41	B	18.7	0.43	C	20.5	0.30	C	20.5	0.30	B	18.2	0.49	B	19.9	0.32
<u>Weekday Evening Peak Hour</u>																		
Eastbound LT	--	--	--	--	45.7	0.92	D	29.7	0.63	C	29.7	0.63	--	--	--	C	33.3	0.69
Eastbound TH-RT *	D	44.4	0.91	D	45.7	0.92	C	26.9	0.67	C	26.9	0.67	D	54.7	0.97	C	26.3	0.68
Westbound LT-TH-RT	B	18.9	0.45	B	18.8	0.47	C	25.0	0.60	C	25.0	0.60	B	18.2	0.50	C	25.2	0.64
Northbound LT-TH-RT	A	8.3	0.06	A	8.5	0.06	A	5.9	0.05	A	5.9	0.05	A	9.2	0.07	A	6.4	0.06
Southbound LT-TH-RT	B	14.4	0.18	B	15.5	0.18	A	6.8	0.17	A	6.8	0.17	B	17.8	0.20	A	7.7	0.19
Overall	C	28.5	0.46	C	29.1	0.47	C	21.1	0.32	C	21.1	0.32	C	33.0	0.52	C	21.6	0.35
9. Barnum Avenue at Noble Avenue																		
<u>Weekday Morning Peak Hour</u>																		
Eastbound LT-TH-RT	C	22.7	0.31	C	22.6	0.35	C	27.1	0.48	C	27.1	0.48	C	21.9	0.39	C	27.7	0.55
Westbound LT	--	--	--	--	23.7	0.66	C	26.8	0.4	C	26.8	0.4	--	--	--	C	28.1	0.47
Westbound TH-RT *	C	23.5	0.65	C	23.7	0.66	C	27.3	0.56	C	27.3	0.56	C	23.9	0.69	C	28.2	0.58
Northbound LT-TH-RT	A	3.6	0.11	A	4.4	0.12	A	1.0	0.11	A	1.0	0.11	A	4.2	0.12	A	1.3	0.13
Southbound LT-TH-RT	A	5.9	0.17	A	6.1	0.17	A	4.3	0.16	A	4.3	0.16	A	6.4	0.19	A	4.6	0.17
Overall	B	15.1	0.30	B	15.6	0.31	B	16.7	0.24	B	16.7	0.24	B	16.1	0.34	B	17.5	0.26
<u>Weekday Evening Peak Hour</u>																		
Eastbound LT-TH-RT	B	19.7	0.27	B	19.0	0.26	C	23.3	0.35	C	23.3	0.35	B	19.2	0.27	C	22.3	0.35
Westbound LT	--	--	--	--	40.5	0.80	D	31.1	0.40	C	31.1	0.40	--	--	--	C	31.1	0.43
Westbound LT-TH-RT	D	41.0	0.77	D	40.5	0.80	D	35.3	0.63	D	35.3	0.63	D	43.2	0.85	D	35.5	0.66
Northbound LT-TH-RT	A	1.2	0.16	A	1.1	0.17	A	0.8	0.16	A	0.8	0.16	A	1.5	0.18	A	1	0.18
Southbound LT-TH-RT	A	7.9	0.23	A	8.4	0.24	A	5.9	0.21	A	5.9	0.21	A	9.4	0.26	A	6.7	0.23
Overall	C	21.1	0.41	C	22.0	0.43	B	19.2	0.32	B	19.2	0.32	C	23.7	0.48	B	19.7	0.35

Source: Vanasse Hangen Brustlin, Inc. using Synchro 8.0 software.

1 Overall intersection level of service

2 Average vehicle delay in seconds per vehicle

3 Volume-to-capacity ratio; v/c ratio reported for signalized intersections only

* LT-TH-RT under No-Build and Build Conditions

5.3 Install New Traffic Control Signal at Seaview Avenue at Crescent Avenue

As noted in the previous section, the unsignalized intersection of Seaview Avenue at Crescent Avenue currently operates under all-way stop control, despite significantly higher traffic volumes along Seaview Avenue. Due to the anticipated background traffic growth, the northbound and southbound Seaview Avenue approaches are expected to operate at LOS F during the peak traffic periods under future conditions.

Based on conversations with the City of Bridgeport, VHB recommends installing a new traffic control signal to improve traffic operations at the intersection of Seaview Avenue at Crescent Avenue under future Build conditions. Capacity analyses were performed at the intersection of Seaview Avenue at Crescent Avenue to evaluate the potential traffic impacts associated with the proposed traffic control signal. The signalized intersection is expected to operate at overall LOS A during the peak traffic periods under future 2021 Build and 2040 Build conditions with the proposed traffic control signal. The northbound and southbound approaches are expected to improve to LOS A during the peak traffic periods.

The results of the intersection capacity analysis at Seaview Avenue at Crescent Avenue are summarized in Table 5-2.

Table 5-2 Signalized Intersection Capacity Analysis (with Improvements)

Approach/Lane	2021 No Build Conditions		2021 Build Conditions		2021 Build Conditions w/ Improvements		2040 No Build Conditions		2040 Build Conditions		2040 Build Conditions w/ Improvements	
	LOS	Delay v/c	LOS	Delay v/c	LOS	Delay v/c	LOS	Delay v/c	LOS	Delay v/c	LOS	Delay v/c
25. Seaview Avenue at Crescent Avenue *												
<u>Weekday Morning Peak Hour</u>												
Eastbound LT-TH-RT	B	12.6	--	--	B	12.5	--	B	12.8	--	B	19.4
Westbound LT-TH-RT	B	11.4	--	--	B	11.4	--	B	11.6	--	B	17.6
Northbound LT-TH-RT	F	60.3	--	--	F	87.4	--	F	77.6	--	F	145.7
Southbound LT-TH-RT	F	51.7	--	--	F	52.8	--	F	69.4	--	F	72.1
Overall	--	--	--	--	--	--	--	--	--	--	--	7.4
<u>Weekday Evening Peak Hour</u>												
Eastbound LT-TH-RT	C	15.1	--	--	C	15.1	--	C	15.7	--	C	18.5
Westbound LT-TH-RT	B	12.6	--	--	B	12.6	--	B	12.9	--	B	16.3
Northbound LT-TH-RT	F	73.1	--	--	F	75.5	--	F	100.0	--	F	103.6
Southbound LT-TH-RT	F	85.5	--	--	F	117.8	--	F	113.9	--	F	187.3
Overall	--	--	--	--	--	--	--	--	--	--	--	10.2

Source: Vanasse Hangen Brustlin, Inc. using Synchro 8.0 software.

1 Overall intersection level of service

2 Average vehicle delay in seconds per vehicle

3 Volume-to-capacity ratio; v/c ratio reported for signalized intersections only

* Unsignalized intersection under No-Build and Build Conditions

Appendix B – Mobile Source Air Toxics Evaluation

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Mobile Source Air Toxics (MSAT)

1.1 Overview

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants¹. The EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 2011 National Air Toxics Assessment (NATA) (<http://www.epa.gov/national-air-toxics-assessment>). These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis using EPA's MOVES2014a model, even if vehicle miles traveled (VMT) increases by 45 percent from 2010 to 2050 as forecasted, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

MSAT analyses are intended to capture the net change in emissions within an affected environment, defined as the transportation network affected by the project. The affected environment for MSATs may be different than the affected environment defined in the NEPA document for other environmental effects, such as noise or wetlands. Analyzing MSATs only within a geographically-defined "study area" will not capture the emissions effects of changes in traffic on roadways outside of that area, which is particularly important where the project creates an alternative route or diverts traffic from one roadway class to another. At the other extreme, analyzing a metropolitan area's entire roadway network will result in emissions estimates for many roadway links not affected by the project, diluting the results of the analysis.

1.1.1 Motor Vehicle Emissions Simulator

According to EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new Federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344),

¹ The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (<http://www.epa.gov/iris/>).

heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide², EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014. Using EPA's MOVES2014a model, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

1.1.2 Consideration of MSAT

The FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances. The FHWA has identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects;
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects;
or
- Qualitative analysis for projects with low potential MSAT effects.

1.1.2.1 No Analysis Requirements

No analysis is required for a project that qualifies as a categorical exclusion under 23 CFR 771.117 (c), exempt under the Clean Air Act (CAA) conformity rule under 40 CFR 93.126, or any other project with no meaningful impacts on traffic volumes or vehicle mix. This project does not have a substantial difference in traffic volumes between the No Action and Build conditions. The maximum increase in intersection volume is 207 vehicles during the morning peak period at Barnum Avenue at Seaview Avenue. The comparison between the No Action and Build conditions is presented in Table 1-1.

1.1.2.2 Quantitative Analysis Requirements

A quantitative MSAT analysis is not required for the proposed Project because it is not a project of air quality concern and does not meet FHWA's two-pronged criteria.

The proposed Project does not create or significantly alter any major intermodal freight facility that has the potential to concentrate high levels of diesel PM in a single location, involve a significant number of diesel vehicles, or accommodate a significant increase in diesel vehicles.

Additionally, the Project does not create new or add significant capacity to any roadway with an AADT in the range of 140,000 to 150,000, or greater. The Barnum Station Project does not meet any of the criteria for a quantitative analysis for MSAT.

² <https://www3.epa.gov/otaq/models/moves/documents/420b15095.pdf>

1.1.2.3 Qualitative Analysis Requirements

A qualitative MSAT analysis is required for projects that exceed the requirements set forth in the 'No Analysis Requirements' section, but do not meet the requirements set forth in the 'Quantitative Analysis Requirements' section. The proposed Project does not exceed the requirements set forth by the "Quantitative Analysis Requirements", but is not listed as excluded project. A qualitative MSAT analysis is presented to show that the steps to assess MSAT's is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of the project.

TABLE 1-1 INTERSECTION VOLUME COMPARISON (BETWEEN NO ACTION AND PROPOSED PROJECT)

Intersections	2040		
	No Action (AM/PM)	Build (AM/PM)	Difference (AM/PM)
1. Main Street at Catherine Street and East Washington Avenue	2349/2230	2450/2320	101/90
2. East Washington Avenue at Housatonic Avenue	2137/2458	2238/2548	101/90
3. East Washington Avenue at Knowlton Street	1375/1727	1476/1817	101/90
4. East Washington Avenue at Noble Avenue	657/922	720/978	63/56
5. East Main Street (Route 127) at East Washington Avenue	954/1396	993/1430	39/34
6. East Main Street (Route 127) at Crescent Avenue	951/1365	951/1365	0/0
9. Barnum Avenue at Noble Avenue	611/815	673/871	62/56
10. Barnum Avenue at Kossuth Avenue	682/828	744/884	62/56
11. Barnum Avenue at East Main Street (Route 127)	1340/1849	1441/1939	101/90
13. Barnum Avenue at Seaview Avenue	1947/2094	2154/2280	207/186
14. Barnum Avenue at Central Avenue	1658/1887	1723/1945	65/58
15. Barnum Avenue at Mill Hill Avenue	1252/1373	1317/1431	65/58
16. Barnum Avenue at Elizabeth Street, Pixlee Place, and Grant Street	907/1170	965/1222	58/52
17. Barnum Avenue At Bishop Avenue	1144/1293	1202/1345	58/52
21. Boston Avenue (Route 1) at Seaview Avenue	2530/2784	2546/2798	16/14
22. Boston Avenue (Route 1) at Bond Street	2529/2773	2545/2787	16/14
23. Boston Avenue (Route 1) at Central Avenue	1840/2313	1856/2327	16/14
24. Boston Avenue (Route 1) at Pallisade Avenue	1811/2164	1827/2178	16/14
26. Seaview Avenue at I-95 SB Ramps	2499/3102	2656/3207	157/105
27. Seaview Avenue at Connecticut/Stratford Avenue (Route 130)	3034/4527	3043/4626	9/99
28. Seaview Avenue at I-95 NB Ramps	1876/2789	1885/2888	9/99
29. East Main Street (Route 127) at Cedar Street	1139/2062	1139/2062	0/0

1.2 Qualitative MSAT Analysis

The first step in the analysis of MSAT is to determine the type of project and corresponding type of MSAT analysis required. The Barnum Station Project is a Project with Low Potential MSAT effects which includes projects that serve to improve operations of highway or transit systems without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This project will improve roadway operations by creating a mode shift, whereby drivers will choose to ride the commuter trains that service the station instead of driving their vehicles. The threshold for roadway traffic for Projects with Low Potential MSAT effects is an annual average daily traffic (AADT) of 140,000 vehicles per day. The existing maximum AADT in the study area based on

CTDOT traffic counts is 13,700 vehicles on Seaview Avenue near the I-95 interchange, well below the 140,000 vpd threshold. The project is not expected to add a substantial amount of vehicles to the local roadways. Since the station will serve commuter rail users, these additional vehicles are expected to be light-duty and not heavy-duty vehicles.

For each scenario, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. Traffic Demand Modeling has shown that the addition of Barnum Station will reduce statewide vehicle trips as drivers will opt in on rail travel rather than vehicle travel. This mode switch results in an approximate 10,962 daily VMT decrease from the No Action to Build Condition. As such, it would be expected that the amount of MSAT emitted would also decrease when comparing the Build Condition to the No Action Condition at a regional scale. Due to increasingly stringent emission standards, design year MSAT emissions of both the No Action and Build conditions are expected to be lower than the Existing Condition.

1.3 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupported assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

Because of the limitations in the methodologies for forecasting health impacts, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

1.4 MSAT Analysis Conclusion

The science of mobile source air toxics is still evolving. As the science progresses, FHWA will continue to revise and update this guidance. FHWA is working with stakeholders, EPA and others to better understand the strengths and weaknesses of developing analysis tools and the applicability on the

project level decision documentation process. In the meantime, the Barnum Station Project is not expected to cause substantial increases in MSAT.

Appendix C – Photographs of Site and Area of Potential Effect

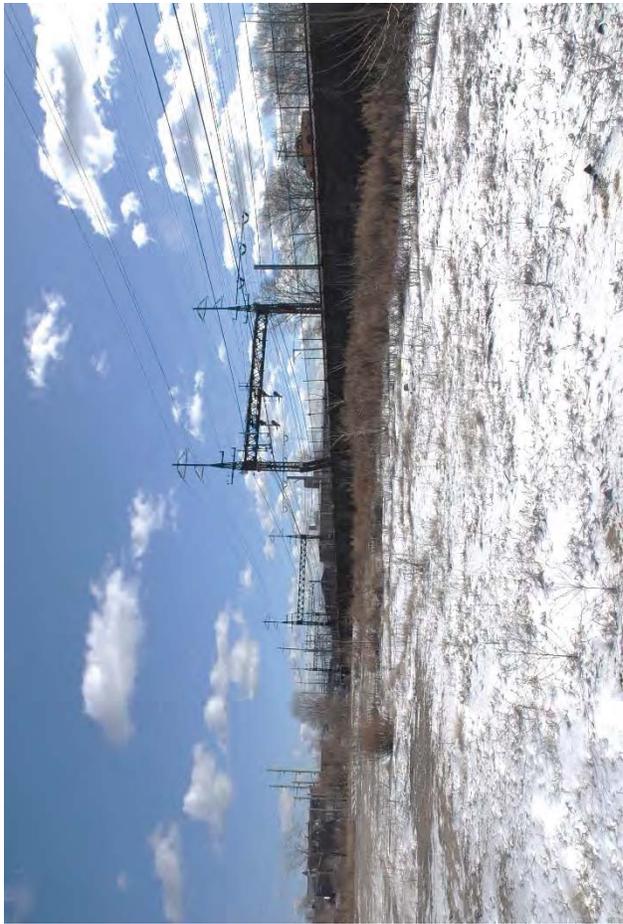
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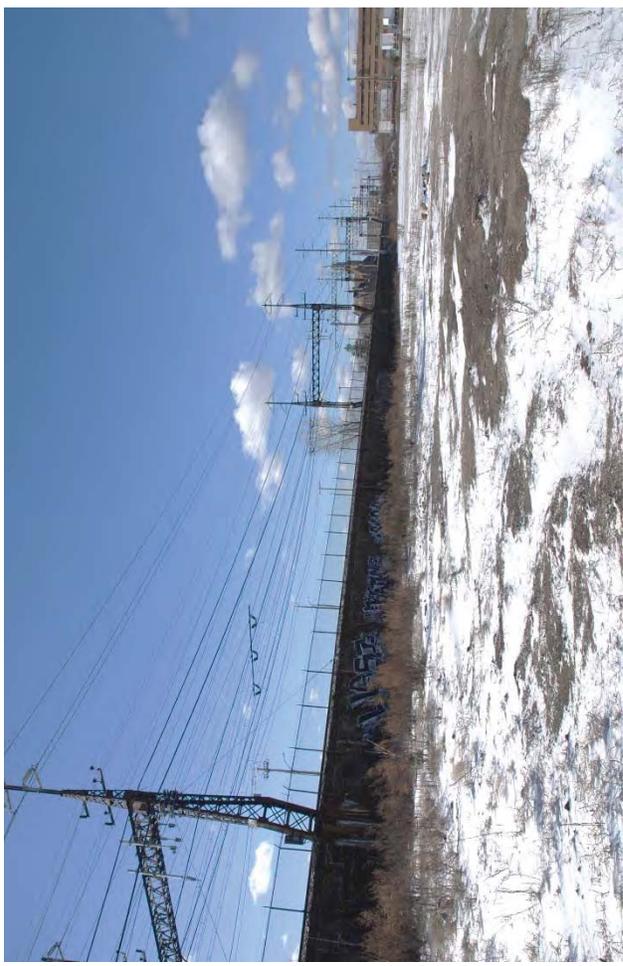
1. View across project site toward Barnum Avenue and Helen Street



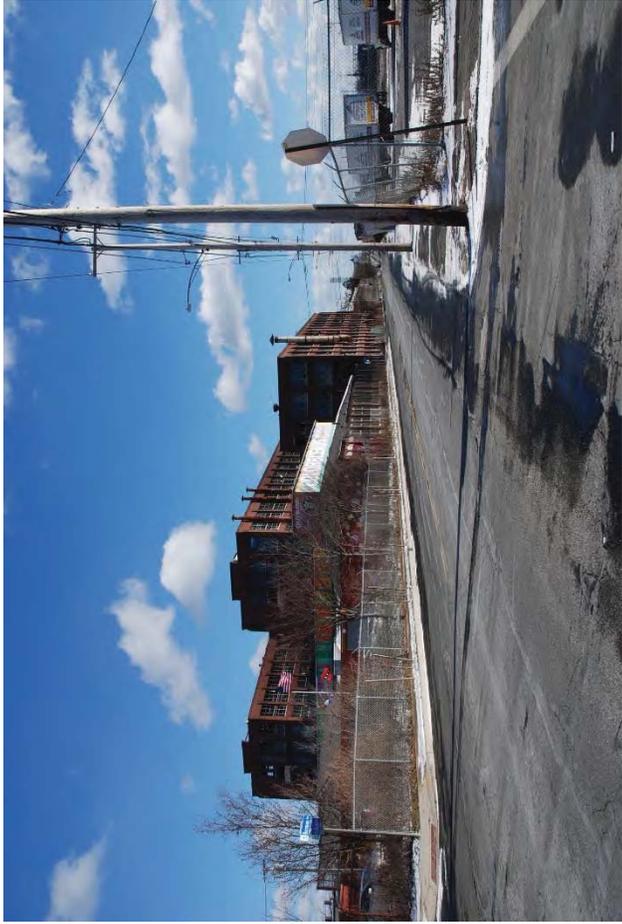
2. View across project site toward Barnum Avenue and Seaview Avenue



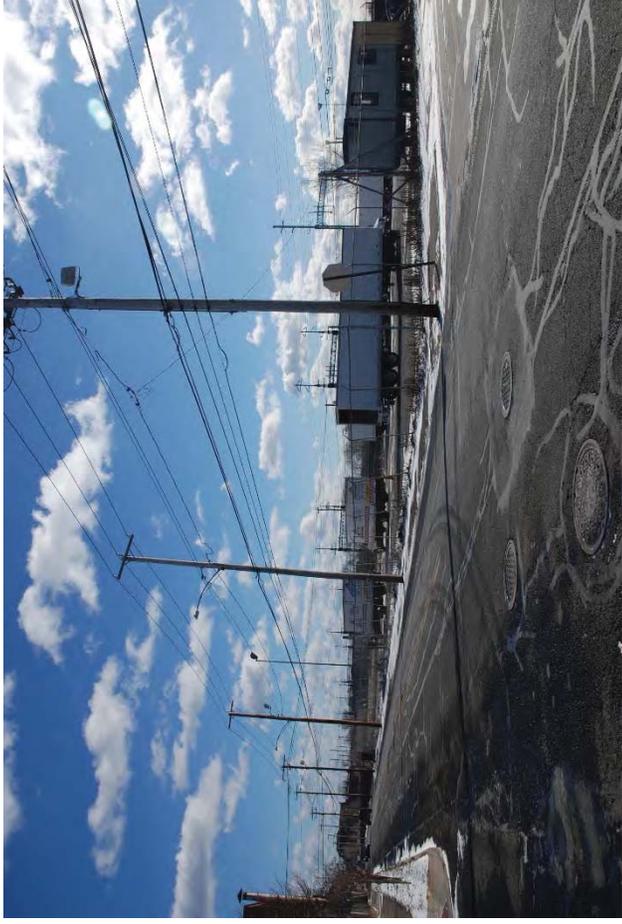
3. View along railroad ROW at east end of project site



4. View along railroad ROW toward west end of project site



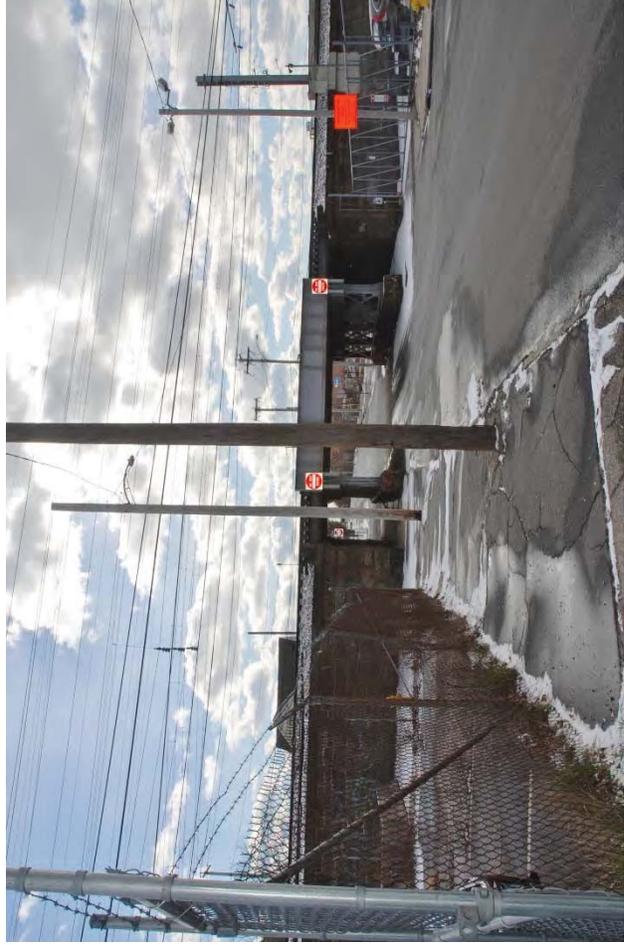
5. View east along Barnum Avenue from Hallett Street



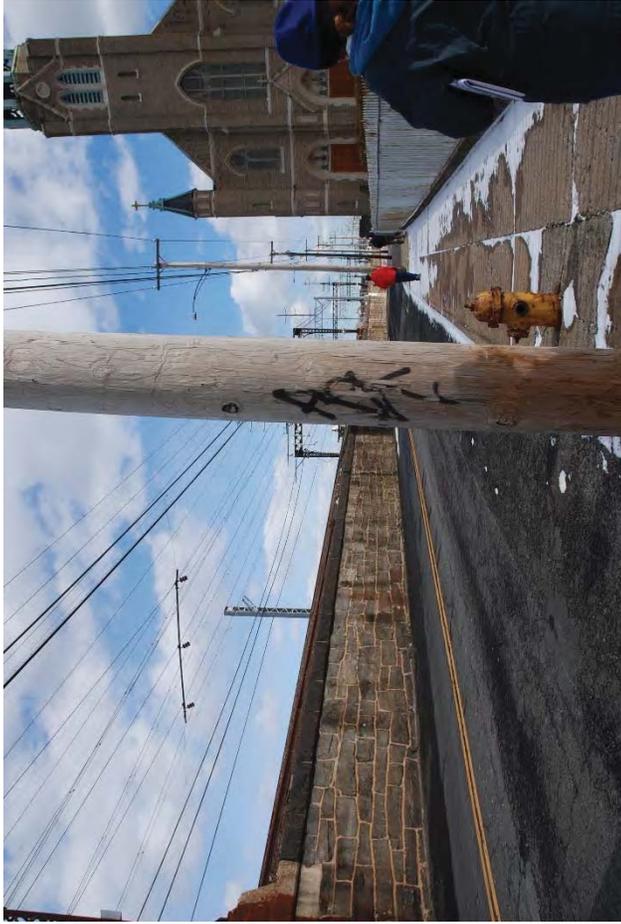
6. View of project site from Barnum Avenue and Hallett Street



7. View toward project site from Pembroke Street, north of railroad bridge



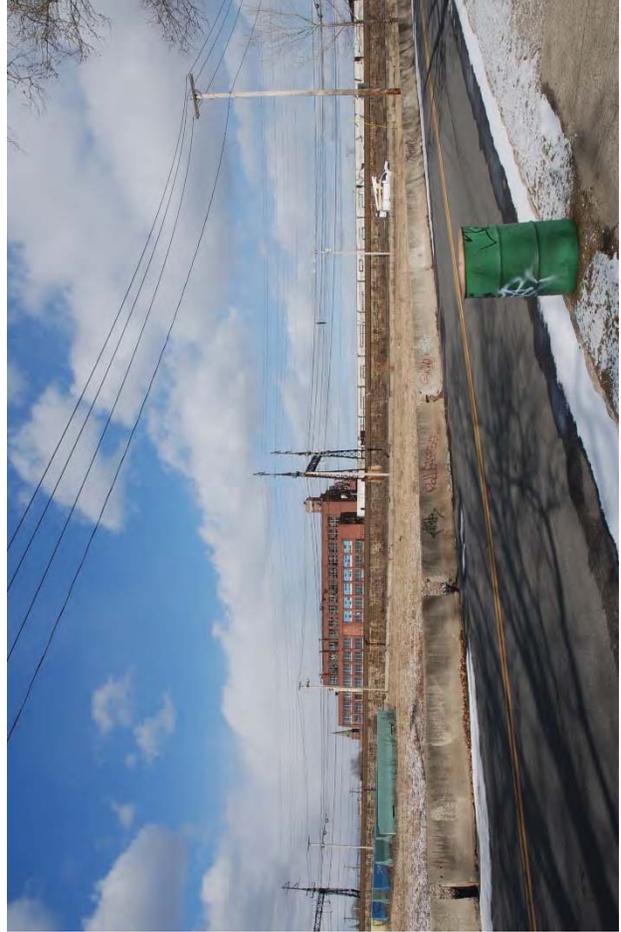
8. View toward railroad bridge on Pembroke Street



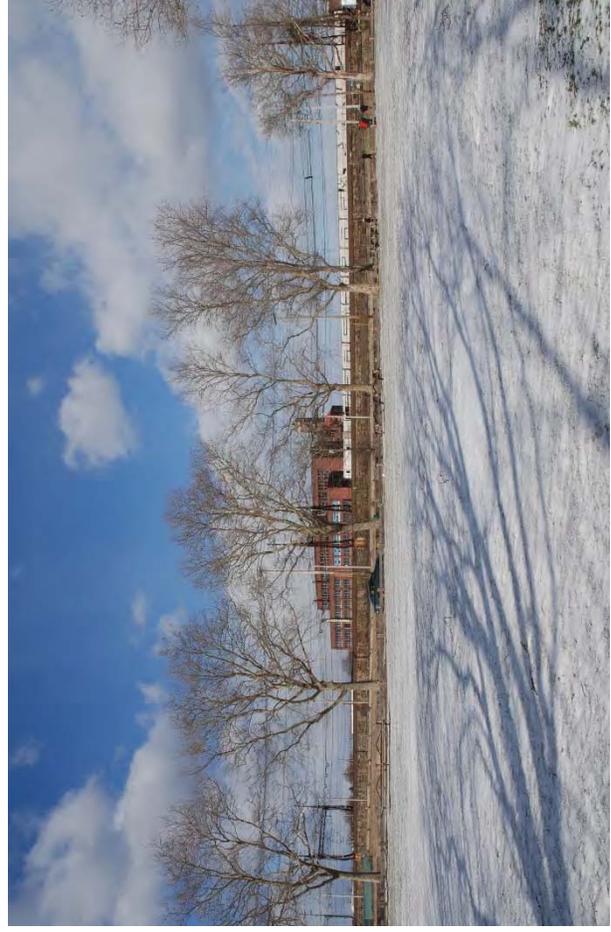
9. View along railroad ROW from Crescent Avenue and Pembroke Street



10. View north from Hallett Street and Martin Luther King Drive, showing Crescent Crossing construction in progress



11. View toward project area from Waterview Avenue near Martin Luther King Drive



12. View toward project area from Waterview Park



13. View toward project site across Yellow Mill Channel, from Seaview Avenue and Williston Street



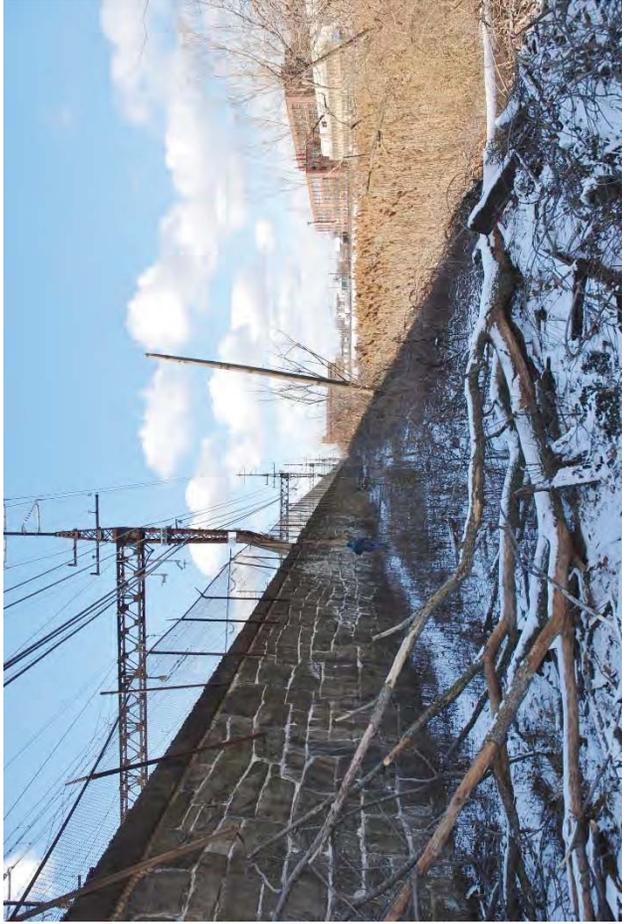
14. View along railroad ROW from Crescent Avenue and Brunnell Street



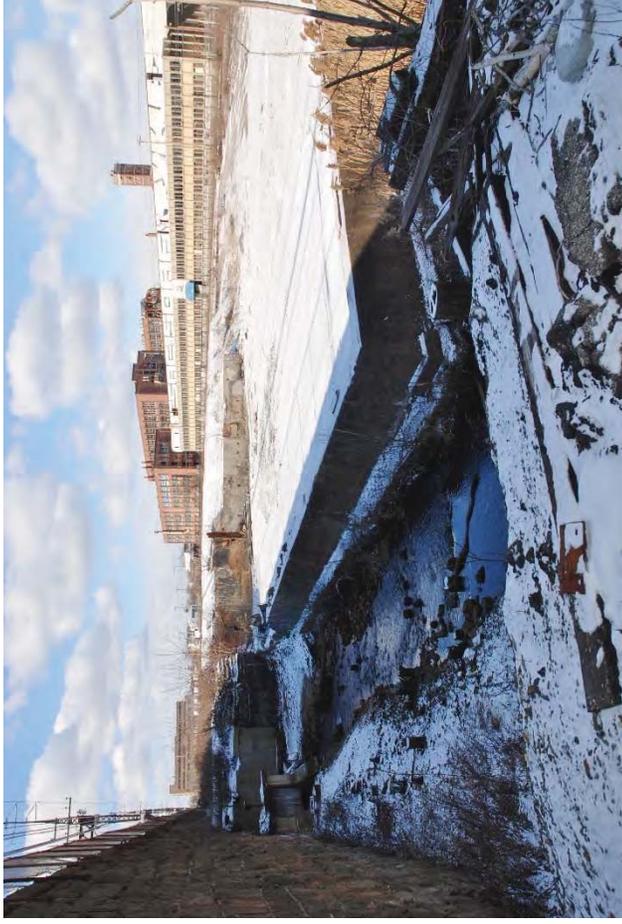
15. View along Barnum Avenue from Seaview Avenue



16. Closeup of Seaview Avenue Bridge (Bridge No. 08074R)



17. Close-up of New Haven Line retaining wall and catenary at Project site



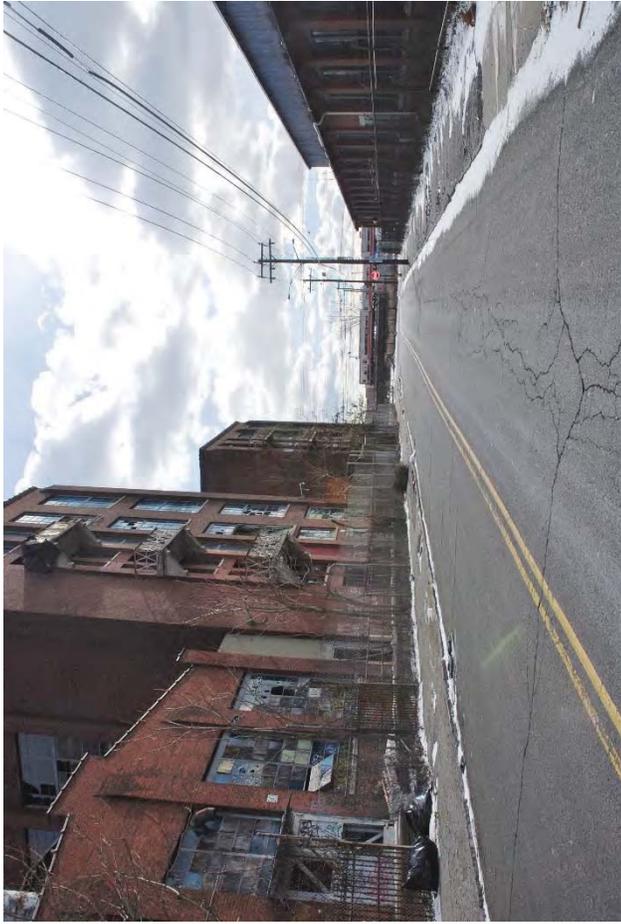
18. Former Remington Arms building foundations at unnamed stream



19. Extant Remington Arms factory buildings at Barnum Street and Helen Street



20. Remington Arms shot tower and associated buildings along Arctic Street



21. View toward project site from Helen Street and Maple Street



22. View toward project site across Yellow Mill Channel, from Seaview Avenue and Williston Street



23. Deacon's Point Historic District, northwest corner at Seaview Avenue and Holly Street

Appendix D – Historic Resources Discussion

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Historical Resources

1.1 New York, New Haven, & Hartford Railroad

1.1.1 History and Significance

The New York, New Haven & Hartford Railroad (commonly referred to as “the New Haven Line”) was formed in 1872 by the merger of two earlier regional railroads, the Hartford & New Haven Railroad and the New York & New Haven Railroad, and grew to dominate the railroad network in southern New England by the early 20th century. The cities along the corridor were becoming prominent industrial hubs, which benefitted from the proximity of railroad transportation, and daily commuter trains became increasingly important to workers in New York suburbs. The New Haven Line eventually grew to encompass more than 2,000 miles of track, actively acquiring local railroads in order to maintain its dominance, and expanding its transportation footprint to include steamship lines, and later, bus lines.

Two major construction Projects along the New Haven Line took place in the late 19th and early 20th centuries, to address safety and quality of life concerns along the route. The original two-track line was widened to four tracks following the 1872 merger, and as this required reconstructing features such as bridges and viaducts along the entire route, the New Haven Line took the opportunity to elevate the rail in major cities to eliminate at-grade crossings. Stone-walled viaducts were constructed to carry the newly-elevated tracks, as well as several new overpass bridges. In 1903, a law was passed banning steam trains in New York City by 1908, as the resultant coal pollution was deemed harmful to people in the densely-packed city. In response, the New Haven Line arranged for electrification along the entire line, completed north to Stamford by 1907, and to New Haven in 1914. The catenary system consisted of a power supply carried by bridges designed by the railroad’s engineering division and Westinghouse Electrical Company. The bridges were constructed approximately every 300 feet and composed of trusses on each side of the track set on concrete foundations, connected by two horizontal members. These intermediate bridges were interspersed with more massive anchor bridges every few miles. At the same time, an automatic block signal system was installed, which divided the line into 2,000 foot blocks in which only one train was allowed at a time (NPS, 1982).

The New Haven Line was still heavily utilized after World War II, but the company faced financial difficulty. The railroad became part of Penn Central in 1968, and was acquired by Amtrak for its Northeast Corridor (NEC) line in 1976. Today, the railroad between New Haven, CT and Mount Vernon, NY comprises the New Haven Main Line (NHML), operated jointly by CTDOT and Metro-North Railroad (MNR).

1.1.2 Resources

The segment of the NHML rail line within the Proposed Project APE has been determined eligible by the CTSHPO under Criteria A and C. Although a detailed evaluation of contributing resources to this historic linear district has not been completed, the bridges, retaining walls, and the catenary system associated with the railroad line are likely to be contributing elements. These features survive largely intact along the line, representing the large-scale solutions implemented by the New Haven Line to

correct safety issues directly related to the expansion of railroad during the late 19th and early 20th centuries. The line has been subject to previous historic recognition and documentation. The Amtrak acquisition in 1976 included a five-year plan to upgrade the line between Washington, D.C. and Boston, during which an aerial photograph reconnaissance survey of the entire line was completed in 1977 for the Historic American Engineering Record (HAER) program (HAER No. CT-11). In 1982, the automatic signalization system was the subject of HAER documentation (HAER No. CT-8). The electrification of the line, completed in 1914, was designated a National Historic Engineering Landmark by the American Society of Mechanical Engineers in 1982.

The railroad line forms the south boundary of the Project site, and features that are considered eligible as contributing resources include bridges, the catenary system, and the elevated rail bed and retaining walls. The Pembroke Street Bridge (Bridge No. 08070R), Hallett Street Bridge (Bridge No. 08071R), and Seaview Avenue Bridge (Bridge No. 08074R) carry the railroad over each street. The bridges were constructed in 1902 as part of the New Haven line's effort to eliminate at grade crossings in densely populated areas. Each bridge is a through girder type, supported by a substructure of steel piers and masonry abutments that are integrated into the retaining wall (Appendix C, Photographs of Site and Area of Potential Effect, Photos 8 and 16). Although the New Haven line utilized different bridge types over the years reflecting new technology, the availability of materials, and increasing loads, the girder type became popular in the early 20th century as an efficient replacement for aging bridges over short spans. Each bridge was rehabilitated later in the 20th century: the Pembroke Street Bridge in 1950, the Hallett Street Bridge in 1964, and the Seaview Avenue Bridge in 1948. The bridges still retain their riveted construction, girder design, and substructure systems.

Other extant features related to the elevation of the railroad line are the retaining walls that support the elevated railroad bed (Appendix C, Photographs of Site and Area of Potential Effect, Photos 14 and 17). The vertical, random ashlar walls that run through the Project site are approximately 10 to 15 feet high. The catenary system (Appendix C, Photographs of Site and Area of Potential Effect, Photos 14, 16, and 17) includes nine intermediate catenary bridges in the Project site. Although maintenance has been conducted on these features, the catenary bridges and retaining walls largely remain as originally designed.

1.2 Remington Arms Factory (Union Metallic Cartridge Company)

1.2.1 History and Significance

The Project site was long utilized as part of the Union Metallic Cartridge Company (U.M.C.) factory complex, later the Remington Arms Factory. The U.M.C. was founded in 1867 by Marcellus Hartley, in anticipation of the change from paper rifle cartridges to more reliable metal ones. By 1870, the newly-built plant in Bridgeport was turning out 120,000 cartridges per day, for both civilian and government customers. Hartley purchased New York arms manufacturer E. Remington and Son in 1888, creating Remington-U.M.C. The divisions largely operated separately, and the Bridgeport location, associated with Remington Arms, was one of the largest arms manufacturing plants in the world. Much of the factory complex that was extant during the early 21st century was constructed between 1914 and 1916, when the plant increased production to support the Allied forces during WWI. The complex expanded from 143 buildings to 313 buildings over 40 acres, located north and south of Barnum Avenue, and included several factory buildings, a boiler house, and a shot tower. A separate manufacturing facility dedicated to the production of arms for the Russian Allied forces was

constructed further north, off Boston Avenue. After WWI, sales declined and the Barnum Avenue plant became a DuPont subsidiary, continuing to produce ammunitions into the late 20th century. The plant is currently vacant, and a large portion of it has been demolished.

1.2.2 Resources

The Remington Arms Factory complex has not been previously evaluated for National Register eligibility. The complex at Barnum Avenue was recorded as part of a HAER inventory in 1980, in association with a Society for Industrial Archeology inventory of industrial sites in Connecticut (Roth, 1981) sponsored by HAER and the CTSHPO. In 1984, an inventory of historic industrial sites in Bridgeport sponsored by the City and CTSHPO recommended the complex as potentially eligible for the National Register (Clouette and Roth, 1984a). More recently, demolition within the complex has occurred on a larger scale.

The most distinctive building in the complex is the shot tower, located north of the APE at the intersection of Arctic Street and Helen Street (Appendix C, Photographs of Site and Area of Potential Effect, Photo 20). This brick building rises 10 stories, and at the time of its construction in 1909 was the tallest building in the city. The design of shot towers, patented in the late 18th century, allows for the large-scale production of consistent, spherical shot. Molten lead is dripped through a sieve at the top of the tower, creating round balls that solidify during the long fall down to a water tank at the bottom where they harden. The Remington Arms shot tower utilized two kettles at the top, and a 133 foot drop into the water tanks below. After cooling, a conveyor belt system was used to sort the balls by size, polish them, and coat them with graphite. The Remington Arms shot tower is a relatively late example, demonstrating the design's continuing relevance nearly 150 years after being patented, and fewer than ten examples are known to be extant in the United States. It was most recently used as a storage facility.

The extant balance of the complex currently consists of mostly non-contiguous buildings and building remnants, the result of demolition following extensive vandalism and increasing vacancy. The first major wave of demolition in the complex occurred c. 1960 (NETR, 2016). Several of the buildings located in the complex south of Barnum Avenue, comprising much of the Project site, were demolished and paved for use as surface parking lots. North of Barnum Avenue, several new buildings along the street and in the center of the block were constructed, replacing earlier factory buildings associated with Remington Arms. One of the largest extant c. 1960 buildings is a two-story concrete building located along Barnum Avenue across from the Project site.

The second major demolition episode occurred c. 2010, removing a number of WWI-era large brick pier buildings constructed on both side of Barnum Avenue. These buildings extended from the railroad tracks north to the shot tower; currently only a three-wing section is extant, located across Barnum Avenue from the Project site at the corner of Helen Street (Appendix C, Photographs of Site and Area of Potential Effect, Photos 19 and 21). A number of the c. 1960 buildings located in the complex north of Barnum Avenue were also removed, though their concrete foundations are largely extant. A boiler house located at the southeast corner of the property along an unnamed adjacent stream was also recently removed, leaving concrete, stone, and wood foundations, and a small concrete gate that appears to have been utilized to control the water flow from the stream (Appendix C, Photographs of Site and Area of Potential Effect, Photo 18).

The extensive demolition of the Remington Arms Factory complex on Barnum Avenue has severely impacted the integrity of this resource as a whole. Only a handful of the original buildings are extant,

including one that post-dates the Remington Arms operation that proved so significant to the industrial development of Bridgeport. The shot tower at the northwest corner of the complex is a notable exception. Although it appears to be in fair to poor condition, it is one of the few extant examples of this resource type in the country, and remains a distinctive and recognizable feature. It anchors a small concentration of extant brick and concrete buildings, including a chimney stack, representing the most intact portion of the complex. While the rest of the former Remington Arms Factory no longer retains the integrity needed to convey the historical significance and scale of the complex, the shot tower and its associated buildings at the Arctic Street intersection are successful in preserving this story, and appear to be eligible for the National Register under Criteria A and C, and potentially D.

1.3 East Main Street Historic District (NR #85000306)

1.3.1 History and Significance

The southwest boundary of the APE overlaps the East Main Street Historic District, which includes most of East Main Street between Crescent Avenue and I 95. East Main Street developed as a secondary commercial center in the mid-19th century, as a result of the growth associated with the establishment of East Bridgeport as an industrial hub. The rapid development of factories and employee housing in this area supported the growth of a local commercial corridor that was more convenient than the downtown commercial district on the other side of the Pequonnock River. East Main Street became a concentrated streetscape of commercial buildings and mixed-use residential buildings with first floor storefronts, and, in the early 20th century, apartment blocks and factory buildings. Business owners on the street reflected the emerging immigrant populations of East Bridgeport, and the businesses sometimes constituted a second job and source of income. The district was listed in the National Register in 1985, under Criterion A for its important role in the historical development of East Bridgeport, and Criterion C for the architectural quality displayed by its resources (Clouette and Roth, 1984b).

1.3.2 Resources

The district consists of a concentration of buildings that reflect a high degree of stylistic ornament, constructed between 1855 and 1920. Most of the buildings are between two and four stories, set adjacent to the sidewalk, with both brick and wood frame construction represented. Nearly all of the buildings originally contained retail businesses on the first floor.

The Italianate style is used most prominently in the district, with buildings featuring bracketed cornices, carved window hoods, segmental brick arches, brick corbeling, and quoins. Other styles present in the district are Gothic Revival, Queen Anne, and Classical Revival. Vernacular buildings in the district also utilize some architectural ornamentation to fit into the prevailing streetscape (Clouette and Roth, 1984b).

When the district was listed in the National Register, the north boundary included the north side of Walter Street to encompass the entirety of the Bridgeport Brass Company factory at 774 East Main Street; the portion of the district extending along Walter Street is located within the APE. This three story, brick pier industrial building was constructed c. 1900, with soldier courses and corbeling decorating the façade along East Main Street. The Walter Street elevation had a horizontally-oriented composition formed by continuous bands of windows. Since the nomination form was prepared, the

portion of the factory along Walter Street has been razed and the parcel is undeveloped. The removal of this resource appears to be the largest of the few examples of demolition in the district since 1985.

1.4 Deacon's Point Historic District (NR #85000306)

1.4.1 History, Significance, and Resources

The district consists of more than 70 houses and a small set of commercial blocks, in a roughly rectangular grid of streets. As a whole, the houses are more modest in scale and design than other Victorian-era neighborhoods in Bridgeport, though as the century progressed the neighborhood grew to represent a full spectrum of housing from small cottages to 2 ½-story Queen Anne-style homes. Construction in the neighborhood became models for similar housing, including a Palliser, Palliser & Co. house on Seaview Avenue, the plans for which were distributed nationally as the "Model Towered Cottage." A set of Queen Anne-style duplexes designed by Harrison G. Lamson became popular throughout the city, and similar designs by Lamson were promoted in a trade journal of the period. The neighborhood was largely in place by 1900, with few additions occurring after the turn of the century.

The northwest corner of the district extends into the APE, at the intersection of Seaview Avenue and Williston Street. At the time of listing, this included three multi-family houses, including several Lamson duplexes, and a mixed-use commercial building (Brilvitch, 1992). These buildings have since been razed and the lots are currently vacant or utilized for parking; the current extent of buildings associated with the district is the south side of the intersection outside of the APE (Appendix C, Photographs of Site and Area of Potential Effect, Photos 22 and 23).

1.5 Historic Resources in the Vicinity of the Project Site

The National Register-listed East Bridgeport Historic District (NR (#79002659, listed 1979) is located in close proximity to the APE, north of the railroad between East Main Street and the Pequonnock River (Brilvitch, 1978). Field observation confirmed that given its distance from the Project site and its location outside the APE, this district is not anticipated to be directly or indirectly impacted by the Project.

Appendix E – 2016 Phase I Environmental Site Assessment (ESA) Summary

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December 7, 2016
File No. 90580.00

Ms. Theresa Carr
Senior Project Manager
Vanasse Hangen Brustlin, Inc.
99 High Street, 10th Floor
Boston, MA 02110

**Re: Transmittal of Phase I Environmental Site Assessment/
Existing Conditions Evaluation
Proposed Barnum Station
812 Barnum Avenue and 965 East Washington Avenue
Bridgeport, Connecticut**

Dear Ms. Carr:

Nobis Engineering, Inc. (Nobis) completed a Phase I Environmental Site Assessment (ESA) of the properties at 812 Barnum Avenue and 965 East Washington Avenue in Bridgeport, Connecticut (Site). These parcels are currently vacant and being considered for redevelopment into a new passenger rail station (Barnum Station) supporting the Metro-North Railroad tracks, which border the Site to the south. Both properties have a history of industrial use: 812 Barnum Avenue is a portion of the Former Remington Arms Site, a former manufacturer of ammunition, and 965 East Washington Avenue was formerly occupied by a sewing machine manufacturer and a knife manufacturer.

The Phase I ESA Report is included as an attachment to this letter. The objectives and conclusions of this report are summarized in this cover letter, along with some discussion about potential soil and groundwater remediation that will be necessary to facilitate redevelopment of the Site, as well as the management of contaminated soil encountered during construction activities.

OBJECTIVE OF THE PHASE I

This Phase I ESA was conducted to support the 15 percent design of the proposed Barnum Station, which is being performed by VHB on behalf of the City of Bridgeport. The Phase I ESA is intended to document the existing environmental conditions within the project footprint in order to identify potential impacts to the design and construction of the project due to environmental contamination.

The Phase I ESA identifies several Recognized Environmental Conditions (RECs) associated with the historical use of the subject properties. RECs are defined by the American Society for Testing and Materials (ASTM) as:

“The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.”

It is important to note that RECs do not necessarily indicate oil or hazardous materials (OHM) have been released to the environment at the Site, but only that there is a potential that OHM has been released to the environment. Determination of the presence or absence of a release, and delineation of the vertical and horizontal extent of contamination, can only be accomplished after the collection of field data, which is beyond the scope of a Phase I ESA.

RECOGNIZED ENVIRONMENTAL CONDITIONS

Due to its history of industrial operations, several previous environmental investigations have been conducted on the 812 Barnum Avenue parcel. These investigations were completed to satisfy the requirements of the Connecticut Property Transfer Act. These historical investigations have identified several AOCs associated with former Site operations. An AOC is defined in the Connecticut Department of Energy and the Environment’s (CTDEEP’s) Site Characterization Guidance Document (SCGD) as: “Locations or areas at a site where hazardous waste and or hazardous substances (including petroleum products) have been or may have been used, stored, treated, handled, disposed, spilled, and/or released to the environment”.

Previous subsurface investigation completed by DuPont and its consultant have confirmed that each of these AOCs has resulted in the release of contamination to the environment. Nobis’ limited review of historical reports and associated environmental data has identified the following RECs associated with the historical use, storage, handling, and release of OHM at the Site. The locations of each REC are depicted on Figure 2 of the Phase I ESA Report.

REC-1 Former Power House: Building 80, the former Power House and associated aboveground storage tanks, was previously identified by URS (consultant for DuPont) as AOC4-2. Historical soil sampling in this area has identified a release of petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and heavy metals to the environment. Petroleum hydrocarbons, PAHs, and metals are present in soil at concentrations considered unsuitable for reuse in a commercial or industrial scenario. Groundwater in this vicinity has been impacted by metals above the RSR Surface Water Protection Criteria (SWPC).

REC-2 Former Union Metallic Cartridge Company and Fuel Pump House: The former Union Metallic Cartridge Company and Building 831 (the former Fuel Pump House) were previously identified by URS as AOC4-3. Historical soil sampling in this area has identified a release of petroleum hydrocarbons, PAHs, and heavy metals to the environment. Asbestos was also detected in soil samples collected from this AOC. Groundwater in this vicinity has been impacted by metals above the SWPC, and light non-aqueous phase liquid (LNAPL) has been identified on

the water table associated with a historical release from three 20,000-gallon USTs formerly located in this area. Post-excavation soil samples collected during the removal of these tanks in 2015 indicate that residual contaminant levels exceed levels that are considered suitable for a commercial/industrial reuse scenario.

REC-3 Former Buildings 245 and 247: The former Building 245 and 247 loading docks were previously identified by URS as AOC7-1. Historical soil sampling in this area has identified a release of petroleum hydrocarbons, volatile organic compounds (VOCs), and heavy metals to the environment. Petroleum hydrocarbons are present in soil at concentrations considered unsuitable for reuse in a commercial or industrial scenario. Groundwater in this vicinity has been impacted by metals above the SWPC.

REC-4 Former Buildings 244 and 246: The former Building 244 loading dock and Building 246 transformer were previously identified as AOC7-2 by URS. Historical soil sampling in this area has identified a release of petroleum hydrocarbons, PCBs, and heavy metals to the environment. Petroleum hydrocarbons are present in soil at concentrations considered unsuitable for reuse in a commercial or industrial scenario. Groundwater in this vicinity has been impacted by metals above the SWPC.

REC-5 Former Building 243: The former Building 243 railcar loading platform was previously identified as AOC7-3 by URS and the Building 243 aboveground storage tank was previously identified as AOC7-4 by URS. For the purposes of this Phase I, both AOCs have been combined into a single REC. Historical soil sampling in this area has identified a release of petroleum hydrocarbons and heavy metals to the environment. Petroleum hydrocarbons are present in soil at concentrations considered unsuitable for reuse in a commercial or industrial scenario. Groundwater in this vicinity has been impacted by metals above the SWPC.

REC-6 Historical Operations: Both parcels, 812 Barnum Avenue and 965 East Washington Avenue, have previously been used for industrial manufacturing operations. Due to the lack of known environmental investigations at 965 East Washington Avenue, any of the former on-Site activities may have resulted in site-wide impacts to soil and groundwater. If the soil on the 965 East Washington parcel is expected to be disturbed during construction, a Phase II ESA would be useful to evaluate soil management/soil remediation needs in order to protect construction workers and the general public from exposure to contamination. At present, there is no environmental sampling data available for the 965 East Washington Avenue parcel.

For each of the above-mentioned RECs, Phase II investigations are recommended to delineate the vertical and horizontal extent of contamination so that remediation measures and/or soil management procedures can be developed for the project.

PHASE II SITE ASSESSMENT

Based on the findings of this Phase I ESA, it is our opinion that a Phase II ESA consisting of the collection of soil and groundwater samples is warranted. As discussed in the prior section, there are several AOCs on the 812 Barnum Avenue parcel with known releases of contamination that have not been completely delineated. Also, the environmental conditions on the 965 East Washington Avenue parcel are unknown. In order to determine the extent to which contaminated environmental media will be encountered during redevelopment of the Site, the nature and extent of contamination needs to be established. Once the nature and extent of contamination is defined, the impacts to construction can be estimated by overlaying the redevelopment plan onto the environmental conditions map. The determination of areas and volumes of environmental media that will be impacted during construction will in turn enable the development of remediation costs.

The discussion in the previous paragraph focuses on remediation/removal of environmental media that is necessary to accommodate the construction of permanent structures associated with the rail station redevelopment project. The project team should also consider remedial measures that must be taken in other areas of the Site in order to bring it into compliance with the Connecticut RSRs. Redevelopment of the Site into a passenger rail station will create increased public access to the Site and potentially additional uses that have not yet been contemplated. Given the environmental conditions at the Site, remedial measures will be necessary to mitigate potential risks associated with soil or groundwater contamination even in the portions of the Site that lie beyond the footprint of the rail station redevelopment. Additional Phase II subsurface investigation will also help to identify environmental remediation needs in these areas.

Based on the number of AOCs identified at the Site, and the likely scope of subsurface investigations needed to characterize the nature and extent of contamination, Phase II site assessment costs are likely to be in the range of \$20,000 to \$75,000. The cost of investigations will be impacted by the depth of contamination and the extent to which soil contamination has leached into groundwater. At the lower end of this cost range is an investigation focused primarily on shallow soils with only limited groundwater investigation (fewer than three additional water table wells). At the higher end of this cost range is an investigation consisting of soil borings advanced into deeper soils with a larger groundwater investigation component.

ENVIRONMENTAL REMEDIATION

In 2000, the City of Bridgeport and Sporting Goods Properties, Inc. entered into a Memorandum of Understanding (MOU) outlining the expectations for the assessment and remediation of environmental contamination to facilitate redevelopment of the Site. The MOU specified that the City will pursue industrial and/or commercial redevelopment of the property, and minimize the cost of environmental remediation by leaving contamination in place and employing institutional controls to limit exposure. In return, Sporting Goods Properties agreed to pay for the Phase II Site Assessment and negotiate a remediation agreement if necessary to support reuse of the property.

Considering the agreement established in the MOU, the preferred remedial strategy to mitigate risks associated with soil contamination is assumed to be limited removal/off-site disposal with containment and institutional controls. The remedial strategy that “minimizes” the cost of environmental remediation would include excavation and off-site disposal of only the soils that are “in the way” of the proposed development, with placement of an “engineered control” over soils contaminated above the Direct Exposure Criteria (DEC) published in Appendix A of the Connecticut Remediation Standard Regulations (RSRs).

An engineered control is a physical barrier that permanently renders contamination in soil “environmentally isolated” or “inaccessible” when combined with a long-term maintenance and monitoring program. Environmentally isolated soil is contaminated soil located beneath a building or other permanent structure. Inaccessible soil is contaminated soil located more than 4 feet below an unpaved ground surface or more than 2 feet below a paved surface. While there are other criteria not mentioned that must be achieved in order to implement an engineered control, the definitions provided above provide the general framework for an engineered control that permits redevelopment of the Site as a passenger rail station while leaving contaminated soil in place. In this case, a combination of permanent structures, paved surface, and vegetated surfaces would make up the engineered control provided that certain requirements are met with respect to the thickness of clean materials overlying contaminated soil.

The engineered control would need to be accompanied by an Environmental Land Use Restriction (ELUR) to be compliant with the RSRs. The conditions of the ELUR must prohibit residential use of the property and limit excavation, demolition, or other activities that might result in exposure to contaminated soils present below the barrier. Long-term maintenance and monitoring of the engineered control would be required to ensure its integrity.

The incremental cost of this remedial strategy is likely to be in the range of \$100,000 to \$1,000,000. At the lower end of the range, there would be limited soil removal/disposal to accommodate the construction of buildings or infrastructure improvements, and the engineered barrier would consist primarily of features that are already part of the design of the station (i.e. buildings and paved structures would serve a dual role as station infrastructure as well as physical barrier over contaminated soil). At the higher end of this range, there would be a larger volume of soil requiring removal to meet the engineered control thickness requirements, significant soil and LNAPL removal requirements around Building 831, and potentially groundwater remediation or vapor mitigation to protect against exposure to volatile contaminants in the indoor air of future buildings.

It should be noted that while the up-front costs of capping versus excavation/off-site disposal may be lower, leaving contaminated soil in place creates an obligation for the property owner to manage the Site in perpetuity to ensure that the cap integrity is maintained, and the land-use restrictions are effectively preventing exposure to contamination. This could be a \$5,000 to \$10,000 annual commitment, with greater expenditures in certain years if all or portions of the cap need to be repaired or replaced. With respect to groundwater, long-term monitoring of

groundwater may be required to evaluate the impacts to Lower Pembroke Lake from metals contamination. This could be an additional \$5,000 to \$10,000 per year, depending upon how robust of a monitoring network is considered necessary to verify protection of the environment.

Beyond the remediation considerations outlined above, given the fact that contaminated soils are known to be present on the project site, any soil that is displaced or disturbed to accommodate building foundations or other permanent structures should be pre-characterized so that it can be stockpiled and managed in a way that prevents exposure to contaminants by construction workers and the public. Pre-characterization of soils known or potentially expected to be disturbed by construction activities could be included in the scope of Phase II investigations. Based on the pre-characterization of soil, a Soil Management Plan should be developed to establish requirements for soil stockpiling, erosion control, dust control, off-site reuse/disposal, personal protective equipment, and other measures that will be required to protect human health and the environment during construction activities.

In summary, the historical use of the Site properties for industrial purposes has resulted in the release of contamination on the 812 Barnum Avenue parcel and the potential release of contamination on the 965 East Washington Avenue parcel. Nobis recommends additional study by the design team to establish the nature and extent of contamination so that areas and volumes of soil warranting remediation can be determined, the volume of soil to be displaced by engineered control barriers can be estimated, and cost estimates for remediation can be refined. Once the extent of contamination has been adequately delineated, the design team should overlay the construction plan onto the soil characterization map to identify areas where soils will need to be displaced or removed to accommodate redevelopment. At the completion of this analysis, the parties to the MOU will have the information necessary to negotiate a good faith agreement for site remediation so that redevelopment may ensue.

If you have any questions on the content of this letter or the attached Phase I ESA report, please do not hesitate to contact me at (978) 703-6029 or by email at svetere@nobiseng.com.

Very truly yours,
Nobis Engineering, Inc.

A handwritten signature in black ink, appearing to read "Alyssa N. Epstein".

Alyssa N. Epstein
Environmental Scientist

A handwritten signature in black ink, appearing to read "Stephen Vetere".

Stephen Vetere, PE, LEP
Senior Project Manager

Attachments: Phase I Environmental Site Assessment, Proposed Barnum Station

Appendix F – Site Cleanup Agreement Confirmation Letter, Dupont

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Sporting Goods Properties, Inc.
615 Asylum Street
Bridgeport, CT 06610
203-576-1829 Tel 203-330-0000 Fax

October 28, 2016

Ms. Lynn Haig
Director of Planning
City of Bridgeport
999 Broad Street
2nd Floor, Planning Office
Bridgeport, CT 06604

Dear Lynn,

As the Vice President of Environmental Affairs for Sporting Goods Properties, Incorporated (SGPI), a wholly-owned subsidiary of DuPont, I can confirm that SGPI has a long-standing agreement with the City of Bridgeport for the cleanup of the property on Barnum Avenue which will be the site of the new train station. SGPI has been working cooperatively with the city for many years towards the successful redevelopment of this parcel. We support the siting of a new train station on this parcel as a long-lasting benefit to the citizens of the city and neighboring region.

SGPI has been working for many years on the clean-up of soil and groundwater and related impacts from pre-1986 releases, and the City has been addressing the building demolition and related work. We will continue to work in conjunction with the City as the train station design moves forward and we will integrate the station design into our Remedial Action Work Plan which will cover the soil and groundwater cleanup.

Sincerely,

Thomas E. Stilley, PE
Sporting Goods Properties Inc.
Vice President, Environmental Affairs

TES/t

