State Project No. 0301-0176

ENVIRONMENTAL ASSESSMENT/SECTION 4(f) EVALUATION
ENVIRONMENTAL IMPACT EVALUATION

WALK BRIDGE REPLACEMENT PROJECT
Bridge No. 04288R Norwalk, Connecticut

Volume 1

Federal Transit Administration
U.S. Department of Transportation

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August 2016

HNTB Corporation

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Prepared pursuant to:

42 USC 4321 et seq. and 23 CFR 771
49 USC 303 and 23 CFR 774
Connecticut General Statutes 22a-1a to 1h and
Regulations of Connecticut State Agencies 22a-1a-1 through 12

Mary Beth Mello — 8/26/16

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Regional Administrator
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Date of Approval

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Date of Approval

August 2016

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Executive Summary

ES-1 Introduction

The Federal Transit Administration (FTA) and the Connecticut Department of Transportation (CTDOT) are preparing a combined Environmental Assessment (EA), Section 4(f) Evaluation, and Environmental Impact Evaluation (EIE) to evaluate proposed improvements to the New Haven Line railroad bridge over the Norwalk River (the Walk Bridge – Bridge No. 04288R) in Norwalk, Connecticut. Figure ES-1 shows the location of the Walk Bridge and approximate project limits.

This document has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), Title 42 of the United States Code (USC) Section 4321 et seq.; the Connecticut Environmental Policy Act (CEPA), Sections 22a-1a through 22a-1h of the Connecticut General Statutes (CGS); the joint Federal Highway Administration/FTA Environmental Impact and Related Procedures, 23 Code of Federal Regulations (CFR) 771; and Section 22a-1a-1 through 22a-1a-12 of the Regulations of Connecticut State Agencies (RCSA). This document also complies with the requirements of Title 49 USC Section 303 (referred to as Section 4(f) of the U.S. Department of Transportation Act of 1966), and other federal and state directives, policies, and regulations.

ES-2 Background

Walk Bridge is a four-span swing bridge that spans 564 feet over the Norwalk River, a navigable waterway used for both recreational and commercial marine traffic. Walk Bridge was built in 1896 by the Pennsylvania Steel Company's Bridge and Construction Department as part of the four-tracking and elevation of the New Haven Line. Walk Bridge carries four tracks of the New Haven Line (NHL) of Metro-North Railroad commuter service. The NHL is one of three main lines of Metro-North, which had a total of 85.2 million riders in 2014, the highest in the railroad's history. The NHL also is used for intercity and high-speed passenger service by the National Railroad Passenger Corporation (Amtrak) on the Northeast Corridor (NEC), and for freight service by the Providence & Worcester Railroad. The NHL's right-of-way and physical infrastructure within Connecticut, including Walk Bridge, are owned by the State of Connecticut and maintained by CTDOT.

The deteriorating condition of Walk Bridge has been extensively documented over the years.[1] A detailed fatigue analysis was completed in 2005, and it indicated that major portions of the bridge have exceeded their fatigue life and require replacement. Cumulative fatigue damage (damage due to repetitive train loadings) of the main load carrying elements of the bridge has occurred. The electrical systems are generally obsolete. Existing and projected deterioration and wear of mechanical systems are key elements which affect the reliability of the bridge. CTDOT performs maintenance and repairs on a regular basis; however, without action to rehabilitate or replace the bridge, failures are expected to increase.

[1] Documentation of the deteriorating condition of Walk Bridge includes the Transportation Strategy Board, "Strategic Framework for Investing in Connecticut's Transportation Infrastructure: Economic Growth – Infrastructure Preservation – Sustainable Communities," January 2011; CTDOT, Accelerated Bridge Construction Study, March 2014 (draft).

ES-3 Project Purpose and Need

CTDOT and FTA have determined that the project purpose and need is to restore or replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service; offer operational flexibility and ease of maintenance; and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/ Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River. Upgrades to the Walk Bridge, through rehabilitation or replacement, are needed to increase bridge reliability, incorporate bridge redundancy, and provide a sustainable bridge for significant weather events, thereby accommodating current and future rail and marine traffic.

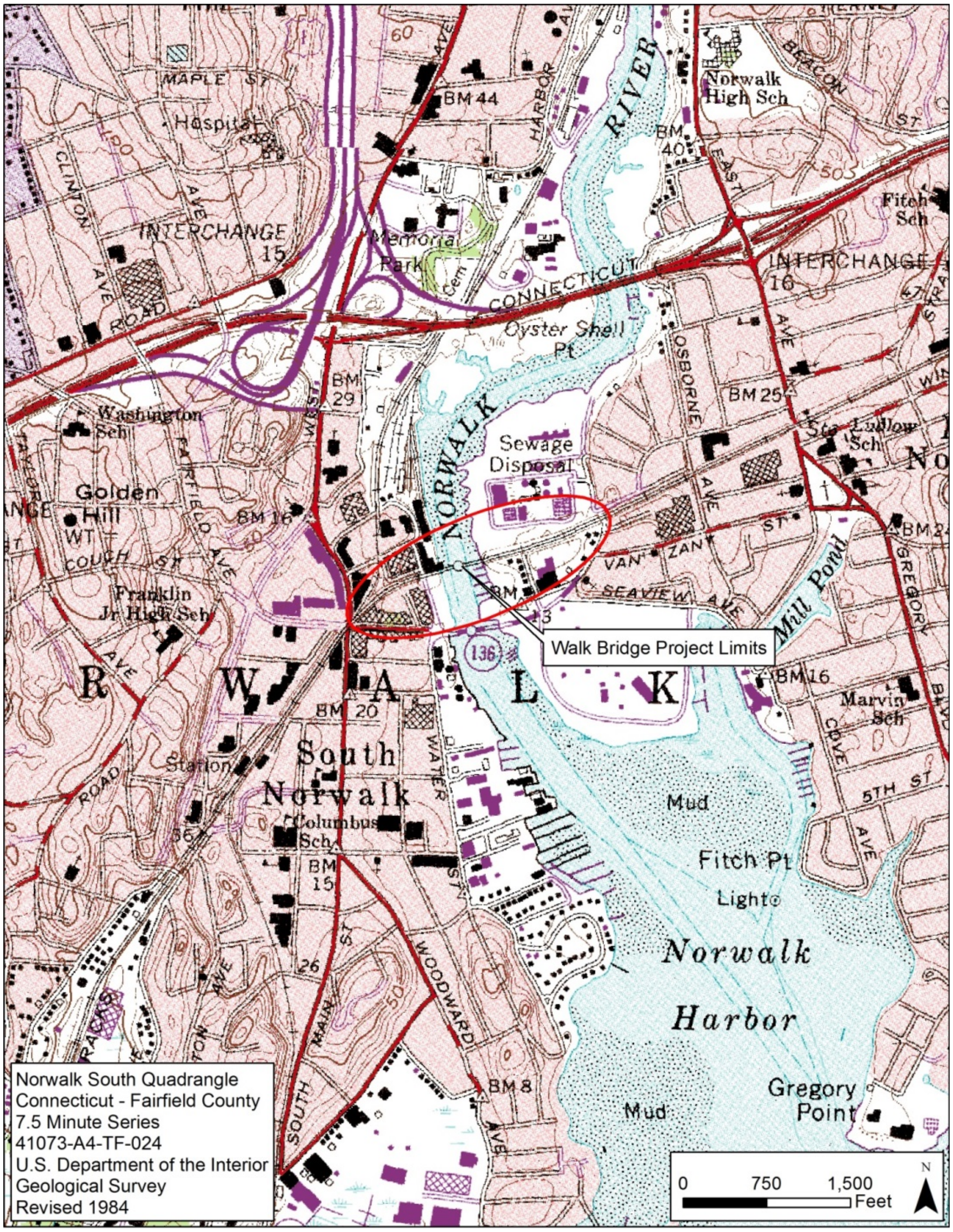

Figure ES-1—Project Location

ES-4 Project Alternatives Considered

CTDOT's design strategy for the Walk Bridge Replacement Project focused upon meeting the project purpose and need: providing a resilient bridge structure to enhance the safety and reliability of rail service, offering operational flexibility and ease of maintenance, and providing for increased capacity and efficiencies of rail transportation, while maintaining or improving navigational capacity. An important overall design objective was therefore predicated upon providing ***system resiliency*** and ***operational redundancy***, as mandated by FTA in its funding appropriation.

Alternatives Development and Screening

CTDOT identified a range of alternatives and grouped them into four general categories:

1. **No Build (No Action) Alternative**: continuing the existing operations and maintenance of the historic swing (movable) bridge;

2. **Rehabilitation Alternative**: rehabilitating the existing bridge to extend its useful life by 100 years, a timeframe comparable to the useful life of a new bridge;

3. **Replacement Alternative – Movable Bridge**: constructing a new movable bridge, of either the bascule type or vertical lift type, on the same general alignment, and demolishing the existing bridge;

4. **Replacement Alternative – Fixed Bridge**: constructing a new fixed (non-movable) bridge on the same or a different general alignment and demolishing the existing bridge.

The parameters considered in the development and evaluation of alternatives and design options included:

- Horizontal and vertical navigation clearances
- Track spacing for center tracks
- Span length
- Counterweight locations
- Pier locations
- Mechanical systems
- Electrical systems
- Bridge aesthetics, including historic considerations
- Environmental considerations
- Resiliency
- Redundancy
- Constructability
- Rail, marine, and local impacts during construction
- Cost, including initial costs and life cycle costs

More than 70 different design variations within the four groups of alternatives were initially investigated to identify representative options that consider these parameters and meet the project purpose and need. CTDOT identified and developed concepts to replace the existing Walk Bridge with dual, double-track movable spans in accordance with the design objectives for resiliency and redundancy. For a bascule movable bridge, design options included deck girder, through girder and through truss bascule bridges of both the trunnion and rolling lift genre.[2] For a vertical lift movable bridge, design options included deck girder, through girder, or through truss vertical lift bridges with span-drive or tower-drive lift span operating systems.[3]

CTDOT held multiple meetings with public agencies and project stakeholders, including the U.S. Army Corps of Engineers (USACE), the U.S. Coast Guard (USCG), the City of Norwalk, Metro-North, property owners, and waterway users to ascertain concerns and requirements for the replacement bridge design and

[2] See Chapter 11, Acronyms and Glossary of Terms, for descriptions.
[3] Ibid.

to obtain public and agency input. CTDOT also held a public scoping meeting on February 24, 2015, an agency scoping meeting on March 5, 2015, and a public information meeting on May 11, 2016. With input from those meetings, CTDOT concluded that the evaluation of alternatives would focus on replacement of the bridge and would include consideration of a bascule movable bridge type, a through truss vertical lift movable bridge type; as well as a fixed bridge (non-movable) type with three design options of varied vertical clearances over the Norwalk River: a low-level, a mid-level, and a high-level bridge.

Alternatives Not Advanced for Further Evaluation

Of the four alternative groups which were evaluated, the No Build Alternative, the Rehabilitation Alternative, and the Replacement Alternative – Fixed Bridge (all options) were dismissed from further evaluation for a number of reasons: they would not meet the project purpose and need; they would be inferior to other alternatives in meeting project purpose and need; they would result in higher initial or long-term costs; or they would have a higher potential for adverse environmental impact.

While it would not meet the project purpose and need, the No Build Alternative is carried forward in the EA/EIE as a baseline condition for comparison purposes; it represents the transportation conditions if no actions other than normal maintenance of the bridge were conducted.

Alternatives Retained for Further Evaluation

In addition to the No Build Alternative, CTDOT retained and advanced a Build Alternative for further evaluation in this EA/EIE: the Replacement Alternative – Movable Bridge. Two types of replacement movable bridges were considered for the Build Alternative: a rolling lift bascule bridge was advanced, and a through truss vertical lift bridge was advanced. A variation of the vertical lift bridge type with a longer span also was advanced.

No Build Alternative

In the No Build Alternative, CTDOT would retain the existing bridge and provide for normal maintenance activities during the life of the bridge. The No Build Alternative would not extend the useful life of the existing bridge. There would not be any major rehabilitation or replacement of structural elements, foundation elements, mechanical components, or electrical systems. The existing high towers would be retained and undergo normal maintenance. There would be no changes to the existing track configuration in South Norwalk and East Norwalk.

Build Alternative: Replacement Alternative – Movable Bridge

CTDOT has determined that Replacement Alternative – Movable Bridge is the Build Alternative. Three options of the Build Alternative are presented in the EA/EIE: Bascule Bridge (Option 4S), short span Vertical Lift Bridge (Option 8A), and long span Vertical Lift Bridge (Option 11C). These options are representative of the bascule and vertical lift bridge types as a balance of user needs, engineering, environmental, cost, and constructability needs and constraints. As design progresses on a bridge type, design refinements such as modifying final span lengths and other dimensional attributes are possible.

ES-5 Build Alternative

ES-5.1 Bascule Bridge Option (Option 4S)

The Bascule Bridge option (as shown in Figure ES-2 and Figure ES-3) would provide two side by side single-leaf rolling lift bascule spans across the Norwalk River, each with separate mechanical and electrical equipment and controls so that each span can work independently of the other, or in unison with the other. It would provide a vertical clearance of approximately 27 feet above mean high water (MHW) when the movable span is in the closed position, and a vertical clearance of at least 60 feet when the movable span is in the opened position, as shown in the elevation view of the Bascule Bridge, Figure ES-4. When closed, the vertical clearance of the Bascule Bridge is increased by approximately 11 feet over the existing vertical clearance of 16 feet due to the design of the structure. However, the top of rail elevations on the new bridge would be approximately the same as the top of rail elevations on the existing bridge. A horizontal clearance of at least 120 feet would be provided for navigation, and the alignment of the navigation channel under the new bridge with the alignment of the navigation channel under the Stroffolino Bridge would be improved.

Figure ES-2—Rendering of Bascule Bridge in the Closed Position (Option 4S)

The rolling bascule spans would be comprised of 170-foot movable truss spans with overhead counterweights. As the span moves, the structure would be supported by curved segmental girders that are connected to the bascule span and the counterweight. As the span rotates during movements, it would also translate, or roll, horizontally, with the movements guided by the curved segmental girder. The overhead counterweights would be configured to permit the counterweights to pass to the outside of the adjacent fixed approach spans. The drive machinery, electrical components, and controls for operating the span would be located above track level, improving the resiliency of the systems by offering protection from high water events.


Figure ES-3—Rendering of Bascule Bridge in the Open Position (Option 4S)

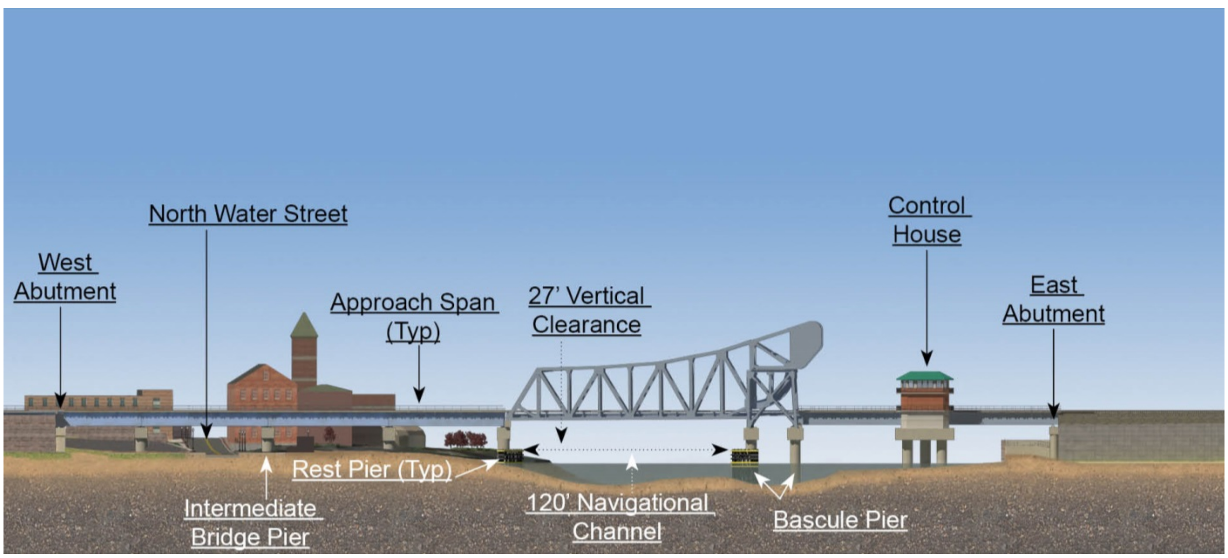

Figure ES-4—Elevation View of the Bascule Bridge (Option 4S)

The new movable spans would each carry two tracks: Tracks 1 and 3 on the northern span and Tracks 2 and 4 on the southern span. The tracks would be on a non-parallel alignment with adequate spacing between the two center tracks (Tracks 1 and 2) to accommodate structural and mechanical clearances. With this non-parallel alignment, the total width of the two bridge structures would vary from approximately 50 feet at the western abutment to 95 feet at the eastern abutment. The movable spans would be flanked by four spans on the western side and two spans on the eastern side. These approach spans would be fixed spans and would not move. Including the approach spans, the total length of Walk Bridge would be approximately 650 feet from bridge abutment to bridge abutment.

The Bascule Bridge would be supported by new abutments at each end and by six intermediate bridge piers, including the bascule pier and the bascule rest pier. The foundations for the bascule piers, rest pier, and intermediate pier supporting the control house would all be located in the Norwalk River and would be comprised of drilled shafts installed into bedrock with a cap beam connecting the drilled shafts. The construction of the piers in the river would be contained using sheet pile marine enclosures or oversized pipe enclosures. The western bridge abutment would be located approximately 100 feet further west than the existing abutment to avoid construction conflicts with the existing abutment, high tower foundations, and retaining walls. Although not the intent of the abutment relocation, this action would result in a more open environment on the west side of North Water Street under the bridge. A new control house would be located on the southern end of the intermediate pier.

The bascule pier would consist of two adjacent, open piers that support the rolling bascule span structural elements. Drilled shafts with cap beams would make up the bascule pier foundations. The open nature of the substructure would promote hydraulic flow through the limits of the bridge.

A new fender system would be constructed approximately 10 feet from the new bascule and rest piers to protect them, providing at least 120 feet of horizontal clearance in the navigation channel. The fenders would be supported by concrete or steel piles. Navigational lighting in accordance with USCG standards would be installed.

The probable construction cost of the Bascule Bridge (Option 4S) is estimated to range between $330 and $365 million in year 2020 dollars, which is the anticipated mid-point of construction. Life cycle costs, equalized to present worth of 100 year life, are estimated to range between $3.4 and $3.9 million per year.

ES-5.2 Vertical Lift Bridge Option (Option 8A – Short Span)

The short span Vertical Lift Bridge option (Figure ES-5 and Figure ES-6) would provide two side by side vertical lift spans across the Norwalk River, each with separate mechanical and electrical equipment and controls so that each span can work independently of the other, or in unison with the other. A span-drive Vertical Lift Bridge with a 170-foot open-deck through-truss lift span would provide a minimum of 120 feet of horizontal navigational clearance and 60 feet of vertical clearance when the span is fully raised. There would be two separate lift spans, one through-truss for Tracks 1 and 3 and one through-truss for Tracks 2 and 4, providing system redundancy. The tracks would be on a parallel alignment across the Norwalk River, resulting in the two movable spans being parallel with one another. Track spacing between Tracks 1 and 2 would be 25 feet to allow for structural and mechanical clearance between the lift spans. The alignment of Tracks 1 and 3 would remain close to the current alignment, while the alignment of Tracks 2 and 4 would be shifted to the south to accommodate the increase in center track spacing. The total width of the bridge would be approximately 70 feet. As shown in Figure ES-7, the lift span would provide approximately 27 feet of vertical clearance in the closed position, which would be approximately 11 feet more than the vertical clearance of the existing swing span. To achieve 60 feet of vertical clearance at MHW, the lift span would be raised 35 feet above the profile of the existing bridge. The bridge tower heights would be determined during final design and would range between approximately 100 and 150 feet above the top of the support piers (the taller tower heights are shown).

The movable spans would be flanked by four spans on the western side and two spans on the eastern side. These approach spans would be fixed spans and would not move. Including the approach spans, the total length of Walk Bridge would be approximately 690 feet from bridge abutment to bridge abutment.

Figure ES-5—Rendering of the Short Span Vertical Lift Bridge in the Closed Position (Option 8A)

Figure ES-6—Rendering of the Short Span Vertical Lift Bridge in the Open Position (Option 8A)

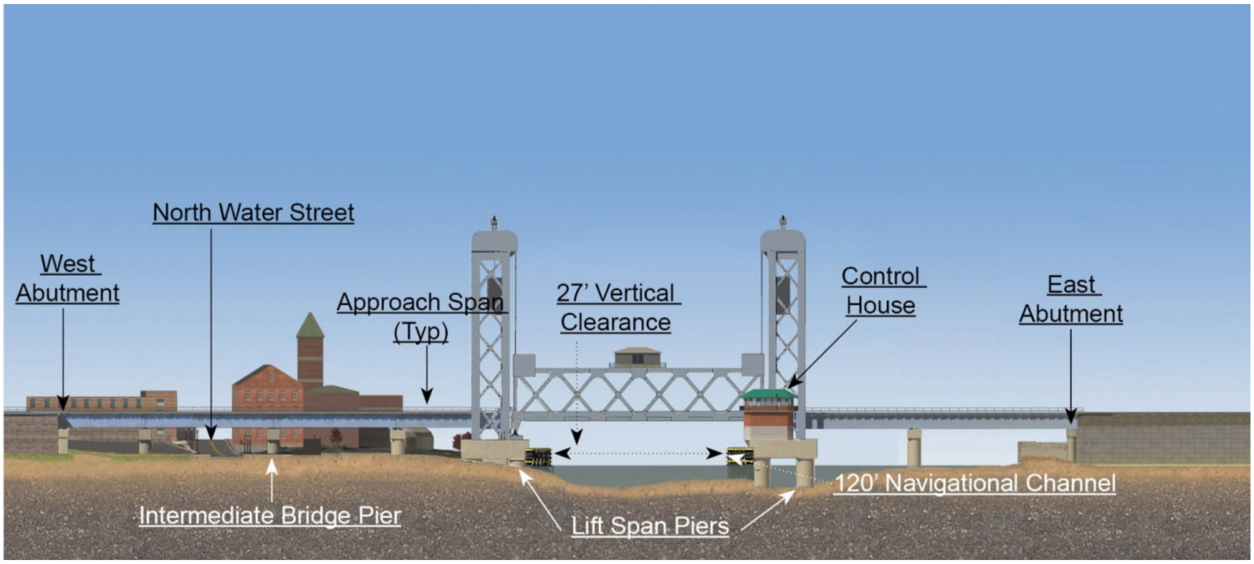

Figure ES-7—Elevation View of the Short Span Vertical Lift Bridge (Option 8A)

The bridge would be supported by new abutments at each end and by six intermediate bridge piers, including the vertical lift bridge piers. The foundations for the vertical lift span piers and one intermediate pier would all be located in the Norwalk River and would be comprised of drilled shafts installed into bedrock, with a cap beam connecting the drilled shafts. The construction of the piers in the river would be contained using sheet pile marine enclosures or oversized pipe enclosures. The western bridge abutment would be located approximately 100 feet further west than the existing abutment to avoid construction conflicts with the existing abutment, high tower foundations, and retaining walls. Although not the intent of the abutment relocation, this action would result in a more open environment on the west side of North Water Street under the bridge. A new control house would be located on the southern end of the east vertical lift span pier.

A new fender system would be constructed approximately 10 feet from the new vertical lift span piers to protect them, providing at least 120 feet of horizontal clearance in the navigation channel. The fenders would be supported by concrete or steel piles. Navigational lighting in accordance with USCG standards would be installed.

The initial program cost of the short span Vertical Lift Bridge (Option 8A) is estimated to range between $380 and $415 million in year 2020 dollars, which is the anticipated mid-point of construction. Life cycle costs, equalized to present worth of 100 year life, are estimated to range between $3.4 and $3.9 million per year.

ES-5.3 Vertical Lift Bridge Option (Option 11C - Long Span)

Like the short span vertical lift bridge option, the long span Vertical Lift Bridge option (Figure ES-8 and Figure ES-9) would provide two side-by-side vertical lift spans across the Norwalk River, each with separate mechanical and electrical equipment and controls so that each span can work independently of the other, or in unison with the other. A vertical lift bridge with a 240-foot open-deck through-truss lift span would provide a minimum of 200 feet of horizontal navigational clearance and 60 feet of vertical clearance when the span is fully raised. There would be two separate lift spans, one through-truss for Tracks 1 and 3 and one through-truss for Tracks 2 and 4, providing system redundancy. The tracks would be on a parallel alignment across the Norwalk River, resulting in the two movable spans being parallel with one another. Track spacing between Tracks 1 and 2 would be 25 feet to allow for structural and mechanical clearance between the lift spans. The alignment of Tracks 1 and 3 would remain close to the current alignment, while the alignment of Tracks 2 and 4 would be shifted to the south to accommodate the increase in center track spacing. The total width of the bridge would be approximately 70 feet. As shown in Figure ES-10, the lift span would provide approximately 27 feet of vertical clearance in the closed position, which would be approximately 11 feet more than the vertical clearance of the existing swing span. To achieve 60 feet of vertical clearance at mean high water, the lift span would be raised 35 feet above the profile of the existing bridge. Like the short span vertical lift bridge, Option 11C's bridge tower heights would be determined during final design and would range between approximately 100 and 150 feet above the top of the support piers (the taller tower heights are shown).

Figure ES-8—Rendering of the Long Span Vertical Lift Bridge in the Closed Position (Option 11C)

The movable spans would be flanked by four spans on the western side and one span on the eastern side. These approach spans would be fixed spans and would not move. Including the approach spans, the total length of Walk Bridge would be approximately 690 feet from bridge abutment to bridge abutment.

The differences between the short span (Option 8A) and long span (Option 11C) options lie in the pier placement and span length between the east and west bridge abutments of Walk Bridge. In Option 11C, the bridge would be supported by new abutments at each end and by five intermediate bridge piers, including the vertical lift bridge piers. The eastern pier in Option 11C would be located further east than the eastern pier for the short span vertical lift bridge (Option 8A), thus increasing the span length and the horizontal clearance between the vertical lift bridge piers. Both piers supporting the vertical lift span towers would be placed outside of the limits of the existing swing span, with no new foundation construction occurring in either the west or east navigation channels, as currently defined by the existing swing span. The foundations for the vertical lift span piers would be located in the Norwalk River and would be comprised of drilled shafts installed into bedrock, with a cap beam connecting the drilled shafts. The construction of the piers in the river would be contained using sheet pile marine enclosures or oversized pipe enclosures. The western bridge abutment would be located approximately 100 feet further west than the existing abutment to avoid construction conflicts with the existing abutment, high tower foundations, and retaining walls. Although not the intent of the abutment relocation, this action would result in a more open environment on the west side of North Water Street under the bridge. A new control house would be located on the southern end of the east vertical lift span pier.

Figure ES-9—Rendering of the Long Span Vertical Lift Bridge in the Open Position (Option 11C)

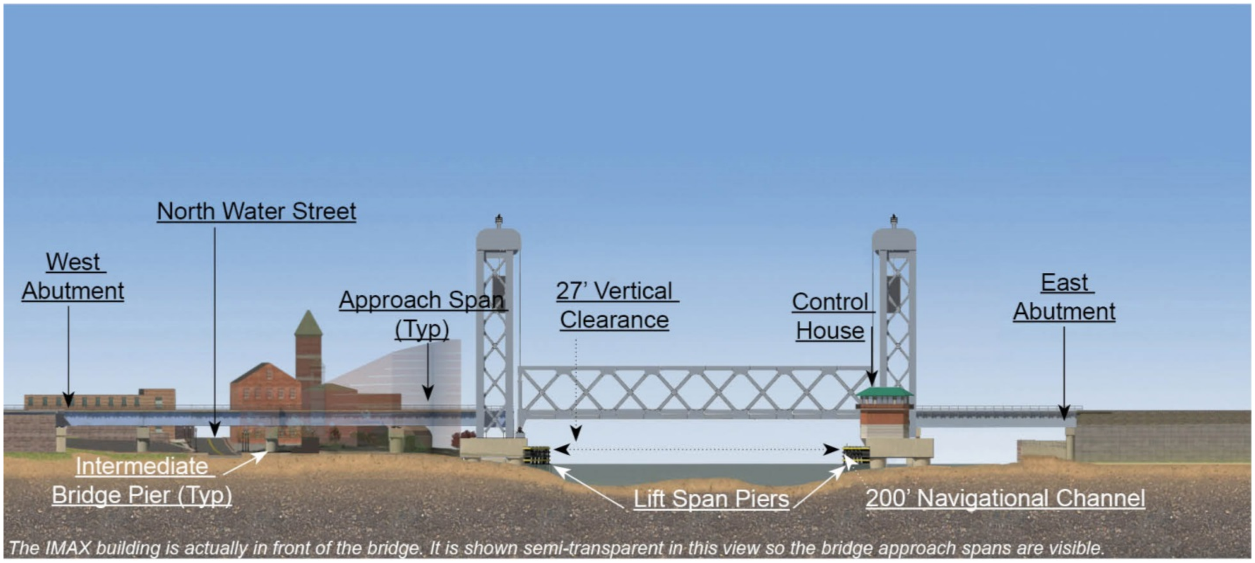

Figure ES-10—Elevation View of the Long Span Vertical Lift Bridge (Option 11C)

A new fender system would be constructed approximately 10 feet from the new vertical lift span piers to protect them, providing at least 200 feet of horizontal clearance in the navigation channel. The fenders would be supported by concrete, steel, or composite material piles. Navigational lighting in accordance with USCG standards would be installed.

The probable construction cost of the long span Vertical Lift Bridge (Option 11C) is estimated to range between $425 and $460 million in year 2020 dollars, which is the anticipated mid-point of construction.

Life cycle costs, equalized to present worth of 100 year life, were estimated to range between $3.7 and $4.2 million per year.

ES-5.4 Other Build Alternative Components

The Build Alternative will include other project improvements, which would be applicable to the Bascule Bridge (Option 4S) and the two Vertical Lift Bridge options (Option 8A and Option 11C).

Track, Catenary, and Signal Work

Track, catenary, and signal work will be performed in addition to the work to replace Walk Bridge. All approach track, catenary and signal work for the project will be accomplished within the existing state right-of-way (ROW). Track work will include replacing about one-half-mile of tracks and ballast, from approximately the Washington Street Bridge in South Norwalk to approximately 300 feet east of the Fort Point Street Bridge in East Norwalk. Overhead catenary and supports also will be replaced within the limits of the project.

Existing Bridge Removal – Pedestrian/Bicycle Connection

The existing Walk Bridge and fender system will be dismantled and removed. This will include removal of the foundations and fender supports in the river to a depth to be determined in consultation with USACE and USCG. The existing western bridge abutment will be removed in its entirety, while the eastern abutment will be retained and partially lowered so that the remaining portions of the abutment can be used as a retaining wall to support an extension of the pedestrian/bicycle trail north of the bridge to areas south of the bridge.

Fort Point Street Bridge Replacement

The railroad bridge over Fort Point Street will be replaced as part of the project. The Fort Point Street Bridge abutments may be constructed in the same general location as the existing bridge abutments, or may be pulled back to accommodate a wider Fort Point Street below. CTDOT will continue to work with the City of Norwalk as design progresses to determine the abutment locations and span length of this bridge.

Removal of High Towers

The project will require the removal of the two existing high towers which carry Eversource Energy high voltage power and Metro-North Railroad communications over the Norwalk River. These towers do not meet current structural design standards and conflict with the replacement bridge and associated track alignments. Several options for replacement of the high tower functions are under consideration from engineering, cost, environmental, and historical perspectives. Metro-North communication functions will potentially be carried on the bridge and then under the Norwalk River. Eversource Energy will be responsible for relocating its lines and the associated environmental evaluations and permits. CTDOT will be responsible for removing the existing high towers as part of the Walk Bridge Replacement Project.

Dredging for a Wider Navigation Channel

Because the existing bridge's support piers will be removed, including the swing span's pivot pier and rest piers, and protective fenders, the Build Alternative will provide for a wider navigational opening. Portions of the Norwalk River under the bridge that are not maintained as part of the federal navigation channel will be dredged to match the federal channel depth of ten feet and tie into the existing 125-foot navigation channel that exists upstream of the bridge. Approximately 4,100 cubic yards (cy) of sediment would be dredged in the Bascule Bridge (Option 4S) and short span Vertical Lift Bridge (Option 8A), and approximately 4,900 cy of sediment would be dredged in the long span Vertical Lift Bridge (Option 11C). Channel dredging will be conducted using a hydraulic clamshell bucket during the approved in-water work months, typically November through January where containment is not required.

ES-6 Preferred Alternative

CTDOT considered the project purpose and need, engineering, constructability, potential impacts to rail and navigation traffic, estimated costs, and potential environmental impacts of the alternatives and options. With public input, CTDOT has determined that the Build Alternative, specifically the Replacement Alternative – Movable Bridge, Long Span Vertical Lift Bridge (Option 11C), is the preferred alternative. The Build Alternative is the only alternative that satisfies purpose and need. Each of the three design options for the Build Alternative would have similar environmental impacts. However, construction requirements and the associated impact to rail and navigation traffic, as well as the costs of the three design options, would be different.

The existing bridge, in whole or in part, is expected to remain in service throughout a significant portion of the construction duration. Maintaining the integrity of the existing bridge, in particular the foundations, is imperative to minimizing disruptions to rail and navigation traffic. Therefore, bridge replacement options requiring activities that limit proximity exposure of the existing bridge during construction are viewed favorably. For example, designs with foundations located in close proximity to the existing supports, specifically the pivot pier, exhibit more risk than other designs. Option 11C is the only alternative for which all foundations are located beyond the limits of the existing swing span.

Superstructure erection for all options will require a two-track outage. However, the amount of substructure work that can be completed without service disruptions (from a four-track operation to a two-track operation) would vary among the Build Alternative options. The design concept that allows for conducting the largest portion of substructure work in advance of an outage, along with the shortest period of superstructure construction, is expected to require the shortest overall construction duration. The shortest construction duration generally corresponds with the least disruptions to rail, maritime, and other users. Option 11C offers the greatest opportunity for maximum substructure construction prior to imposing a two-track outage, thereby minimizing the remaining duration of construction once the outage takes effect.

Designs that present fewer challenges during scheduled outages will have less risk of extending those outages and prolonging the disruptions to commuters and waterway users. The east movable span foundations for Option 4S and Option 8A would be located in the existing east navigation channel. Equipment access for float-in installation of the new lift spans is, therefore, obstructed by the existing pivot pier and limited to the west channel unless the pier is removed in advance of the span installation, indicating that additional temporary support is required for the tracks remaining in service. Option 4S also exhibits a highly asymmetric and unbalanced lift span configuration, further complicating a float-in installation. Symmetry and balance are favorable characteristics of Option 8A and Option 11C. Additionally, access to both channels would mitigate the pivot pier obstruction, presenting a potential advantage for Option 11C over Option 8A.

Work in the river is inherently riskier than work that is not in the water. For Option 11C, the elimination of the eastern intermediate approach span pier and the location of the east lift span tower foundation closer to shore, outside the navigation channel, and in shallower water (compared to Option 4S and Option 8A) introduce clear advantages regarding risks associated with in-water construction.

Option 11C exhibits navigation advantages over Option 4S and Option 8A by not blocking the east channel and thereby delaying immobilization of the swing span. Construction equipment can be operated on one side of the existing pivot pier while maintaining safe vessel transit through the bridge on the opposite side. Since the swing span would be operational until it is removed, over-height vessels could pass through the bridge, albeit on a restricted schedule that balances construction efficiency with the reasonable needs of safe, efficient navigation. Based on the configuration of the new movable spans and the associated track alignment, Option 11C does not require the use of a temporary runaround alignment during construction.

Option 8A introduces a vertical navigation restriction prior to completion of the lift span towers due to locking down the swing span for partial demolition or replacement with a non-movable temporary span. Option 4S requires removal of the existing bridge in the east channel to install the bascule pier foundations, thereby imposing a vertical restriction with temporary spans for drilled shaft installation, which is earlier in the construction sequence than Option 8A.

Figure ES-11 illustrates the estimated construction durations for each of the three design options. At approximately 40 months, the long span Vertical Lift Bridge (Option 11C) would require the shortest overall time from the start of Walk Bridge construction to restoration of four-track service and full operation capability for marine traffic. This compares to 44 months for the short span Vertical Lift Bridge (Option 8A) and 47 months for the Bascule Bridge (Option 4S). Figure ES-11 shows that more construction activities can be undertaken while the existing swing span is operational with Option 11C, thereby reducing the vertical navigation restrictions during construction by up to 14 months compared to the other two options. A two-track rail operation with Option 11C would be four months shorter than Option 8A and seven months shorter than Option 4S, thus minimizing the duration of rail restrictions during construction. Construction of Option 11 C would result in less disruption to rail service and navigational traffic during construction.

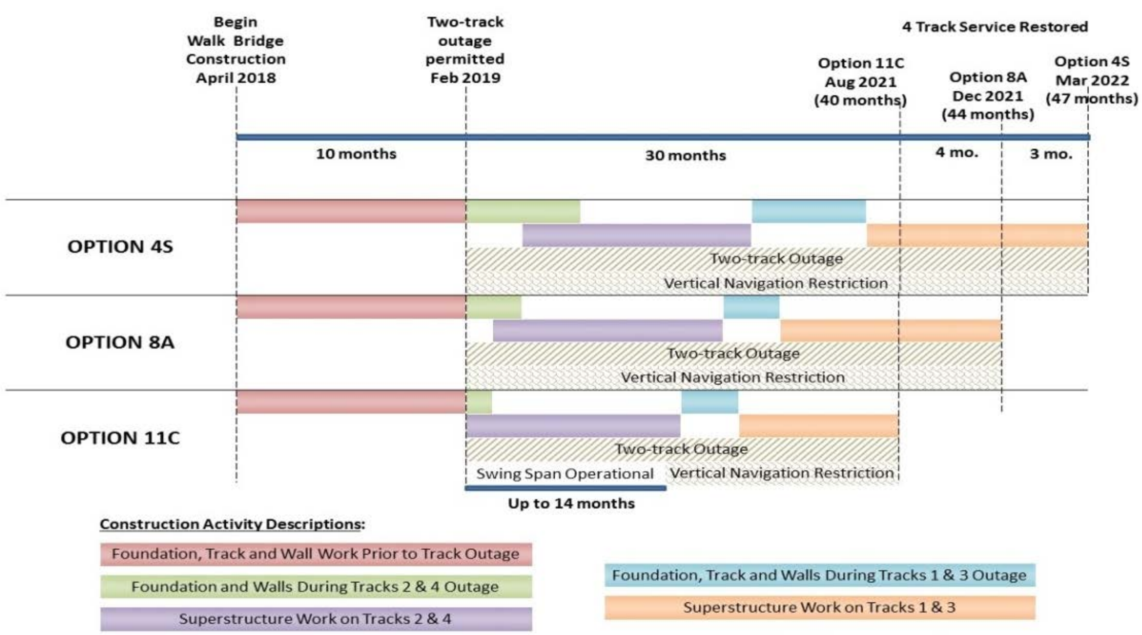

Figure ES-11—Construction Schedule - Comparison of Bridge Options

Temporary track outages, temporary channel restrictions or closures, and temporary street detours will potentially affect businesses in the area of construction as well as water-dependent businesses upstream from Walk Bridge. Option 11C would minimize this temporary disruption by minimizing the duration of construction activities, restrictions, or closures. As a result, Option 11C corresponds with the least social and economic risks and impacts to the city of Norwalk and the larger region.

The anticipated environmental impacts of the three design options are comparable. All options would require that the historic Walk Bridge and high towers be demolished. Fort Point Street Bridge also would be replaced in all options. In general, all other environmental impacts would be similar. The Bascule Bridge option (Option 4S) would require a wider bridge and project footprint on the east side of the Norwalk River than would the two Vertical Lift Bridge options. The footprint impacts of the three options to natural resources would be comparable; however, the impacts of the Bascule Bridge option to tidal wetlands, freshwater wetlands and subtidal habitat would be slightly higher than the footprint impacts of the Vertical Lift Bridge options. When the impacts associated with a temporary runaround alignment are considered, some impacts are further increased. In all cases, the long span Vertical Lift Bridge Option (Option 11C) would have the same or slightly less impact to natural resources than the short span Vertical Lift Bridge Option (Option 8A).

The existing high towers present prominent vertical elements at the site and they contribute to the overall historic character of the project area. As previously noted, these latticed high towers must be removed. A potential advantage of the Vertical Lift Bridge options (Options 8A and 11C) is that these options would reintroduce a prominent vertical element to the site and would offer flexibility, as the design advances, to retain this vertical element and continue to contribute to the character of the project area.

The estimated costs of Option 11C are higher than the other two design options. At an estimated construction cost between $365 million and $415 million, Option 11C would cost about 12 percent more than Option 8A ($325 million -$375 million) and about 10 percent more than Option 4S ($330 million - $380 million). Life cycle costs also are highest for Option 11C at between $3.7 million and $4.2 million per year. This compares to annual life cycle costs ranging from $3.4 million to $3.9 million for Option 4S and $3.4 million to $3.9 million for Option 8A. CTDOT has determined that the benefits of Option 11C - shorter construction duration, reduced disruption to rail traffic along the NEC and navigation traffic on the Norwalk River, and less environmental impacts - outweigh the additional costs of Option11C.

ES-7 Project Benefits

The replacement of Walk Bridge with a new resilient bridge structure will provide substantial long-term functional benefits to rail transportation along the NHL and the NEC, as well as to marine transportation in Norwalk Harbor. The project is consistent with the long-term policies and goals of multiple regional and state documents, including: the Long Range Transportation Plan (LRTP) for the South Western Region; the *Connecticut State Rail Plan: 2012 – 2016;* and *TransformCT*, the State's most recent strategic planning program for improving Connecticut's transportation infrastructure. Walk Bridge is listed on both the South Western Region 2015-2018 Transportation Improvement Program (TIP) and the 2015-2018 Connecticut Statewide TIP as a federally- and state-funded project proposed for construction in 2017 and 2018.[4,5] Replacement or repair of Walk Bridge is cited as a critical investment needed on the NEC by the Northeast Corridor Infrastructure and Advisory Commission (NEC Commission). Maintaining the viability

[4] SWRMPO, South Western Region 2015-2018 Transportation Improvement Program (TIP), Region 1, FA Code 5337, Project Number 0301-0040, AQCd X6, Route/System NHL-ML (pages 1/6 and 2/6), 3/17/16. Appendix 3 includes the TIP pages identifying Walk Bridge.
[5] CTDOT, 2015 Statewide Transportation Improvement Program (STIP), Region 1, FA Code 5337, Project Number 0301-0040, AQCd X6, Route/System NHL-ML (page 1). Appendix 3 includes the STIP page identifying Walk Bridge.

of infrastructure in Norwalk Harbor to promote marine-based development is a goal of the Norwalk Harbor Management Commission and the State's Maritime Commission.

Table ES-1 presents a summary of the benefits of the Build Alternative relative to addressing the project needs, or deficiencies of the existing bridge. These benefits would be realized in all of the Build Alternative options.

Table ES-1 - Summary of Operational Benefits of the Walk Bridge Replacement Project

Existing Deficiencies/ Project Needs	Project Benefits
Structure age and deterioration	The project will fully replace the existing bridge with a new structure with an estimated 100-year life span.
Decreasing reliability	The project will replace all mechanical and electrical components, providing for a reliable bridge structure.
Lack of resiliency	The project will substantially improve the bridge's resistance to severe weather events. The replacement bridge will be located above the required elevation for critical actions (mechanical systems). Key structural elements of the replacement bridge will withstand inundation levels of a Category 3 and Category 4 hurricane, in comparison to the existing bridge's ability to withstand inundation levels of a Category 1 and Category 2 hurricane. The replacement bridge will allow storms to flow through the bridge without inundating or impacting the bridge's main span, including beams, deck, ballast, and rails. In all category storm events, storms will not impact critical mechanical and electrical elements in the control house or machine room.
Safety standards	The project will be designed to current design standards. The existing bridge does not meet current design standards which reflect improved safety aspects compared to when the bridge was originally designed and built. Minimum requirements (loading, safety margins, etc.) for the design of railroad bridges have evolved throughout the twentieth century to reflect increases in demands on the infrastructure and advances in materials, methods, and technology. The project will incorporate a number of safety and security measures, including a CCTV system, exterior lighting located along the bridge structure, and navigation lighting to meet USCG requirements. The CCTV system will provide for increased security relative to operations (bridge, navigation channel, and boat traffic) and surveillance (pedestrian and vehicular activity, control house and exit and entrance points, and anchorage and pier points).
Lack of redundancy	The project will provide operational redundancy through the construction of two independent bridge spans, each with separate mechanical and electrical equipment and controls, which will minimize the potential for rail operation disruptions.
Limited operational flexibility	The project will maximize operational flexibility through construction of two independent bridge spans. Dual mechanical and electrical systems will be provided for each movable span, so that if the selected main drive system is inoperable, the alternative system can be used.
Difficulty of maintenance	The project will facilitate ease of regular maintenance, including in-water maintenance, by allowing for a closure of one span while the second span remains available for rail traffic operations.
Reduced rail capacity and efficiency	The project will correct existing deficiencies which directly impact Metro-North and Amtrak daily train service, particularly on-time performance (OTP). Combined with the CTDOT's planned improvements to the New Haven Line, the project will increase rail efficiencies, contribute to Metro-North's and Amtrak's passenger ridership and OTP goals, and accommodate Providence and Worcester Railroad Company's freight service needs, including weight standards.
Reduced dependability and capacity for marine traffic	The project's increased vertical clearance will reduce the frequency of bridge openings, which will benefit commercial and recreational marine users. The

Existing Deficiencies/ Project Needs	Project Benefits
	additional horizontal clearance will facilitate easier barge and tow operations. The required dredging will enhance the federal navigation channel by straightening the alignment between Walk Bridge and the Stroffolino Bridge and improving the navigability of the river between and through the two bridges.
Lack of sustainability	The project will incorporate sustainable materials to provide protection from accelerated corrosion due to condensation, cold weather conditions, and the marine environment. Project elements will be located to facilitate access and ease of maintenance.

ES-8 Summary of Project Construction

Construction of the Build Alternative is expected to occur over approximately three and one-half to four years, depending upon the Build option. The construction period for the project with a short span Vertical Lift Bridge may take several months less time than construction with a Bascule Bridge, and construction of a long span Vertical Lift Bridge is expected to take several fewer months than the short span.

The project will involve typical bridge and railroad construction activities, including work in and over water. Activities will include: construction of retaining walls along railroad; dredging within the waterway; bridge construction, including drilling foundation shafts, installing and removing sheeting and coffer dams, and erecting structural elements; demolition of existing bridge and support structures; installation of electrical and mechanical equipment; construction of control house; replacement of existing railroad track, signal systems and overhead contact (catenary) system (OCS) in South Norwalk and East Norwalk in proximity to the bridge; and contractor required staging, including installation of in-water trestle work platforms and the use of barges during construction. Initial and ongoing activities through the duration of the project will include implementation of mitigation measures and installation and maintenance of erosion and sedimentation controls.

Construction of the project will occur in multiple stages over the construction period with the objective of accommodating both railroad and marine traffic to the greatest extent possible. In all three Build Alternative options, relocation of the Eversource Energy wires will occur before bridge construction commences. Metro-North wires will be transferred to an underground duct bank and submarine cable early in construction. Construction sequencing and staging of the Build options is conceptual at this preliminary level of design, and will be refined as design progresses in future phases of project development.

Modifying the temporary trestles, backfilling earth excavations and behind retaining walls and abutments, installing drilled shaft foundation, pier caps and high tower (if used) foundations, and modifying OCS will occur as needed at various times during construction.

ES-8.1 Construction Sequencing with the Bascule Bridge (Option 4S)

The Bascule Bridge option could be constructed using a temporary run-around structure or it could be constructed “online.” A run-around consists of a temporary two-track bridge structure placed on an alignment north of Walk Bridge. Once the run-around becomes functional, train operations shift from the existing bridge to the runaround; replacement of Walk Bridge then proceeds while rail service is accommodated on the run-around. The run-around is removed once rail service on the replacement bridge is fully operational.

Construction of the Bascule Bridge option would generally proceed in the following sequence with the use of a temporary run-around structure:

- Implement mitigation measures;
- Build temporary trestles and temporary gravel access platform on the west bank under the bridge;
- Build retaining walls on the east side;
- Build run-around structure (if used) and switch rail traffic to Tracks 1 and 3 on runaround structure and close Tracks 2 and 4;
- Float out existing swing span;
- Demolish existing piers and fenders within sheet pile marine enclosures;
- Build retaining wall on west side;
- Build new approach spans;
- Demolish existing high towers;
- Install new control house;
- Float in new south bascule span and complete control house, counterweight, mechanical, and OCS systems for both spans;
- Finish track and OCS for Tracks 2 and 4 and open them to rail traffic;
- Float in new north bascule span;
- Finish work on north bascule if needed; install Tracks 1 and 3 and OCS and open them to rail traffic;
- Remove any remaining trestles;
- Complete on-site mitigation measures; and
- Stabilize construction sites following removal of all construction-related equipment.

Construction sequencing would be similar under the “online” construction approach, which does not build run-around tracks. Instead of using temporary run-around tracks, rail traffic would operate on the existing northern tracks (Tracks 1 and 3) while the southern portion of the bridge and approaches are first demolished, and the new bridge and tracks are then built (Tracks 2 and 4). Once the southern side is finished and Tracks 2 and 4 are operational, rail traffic is shifted to these new tracks from Tracks 1 and 3, and the northern portion of the bridge and approaches is first demolished, and new Tracks 1 and 3 and approaches are then built.

ES-8.2 Construction Sequencing with the Vertical Lift Bridge Short Span Option (Option 8A)

Construction of the short span Vertical Lift option would generally proceed in the following sequence:

- Implement mitigation measures;
- Build temporary trestles and temporary gravel access platform on the west bank under the bridge;
- Relocate existing control house;
- Build east retaining wall on the south side;
- Close Tracks 2 and 4;
- Remove existing approach spans for Tracks 2 and 4;
- Partially remove existing swing span;
- Demolish existing high towers;
- Erect lift span towers on south side;
- Build south approach spans;
- Build west retaining wall on south side;
- Build new approach spans;
- Float in new south lift span, counterweight, mechanical, and OCS systems, and testing;
- Install new control house;
- demolish pivot pier;
- Finish track and OCS for Tracks 2 and 4 and open them to rail traffic;

- Remove approach spans on north side;
- Build west retaining wall on north side;
- Build north approach spans;
- Erect towers on north side;
- Float in new north lift span; install counterweight, mechanical, OCS systems, and testing;
- Install Tracks 1 and 3 and OCS and open them to rail traffic;
- Remove any remaining trestles; and
- Stabilize construction sites following removal of all construction-related equipment.

ES-8.3 Construction Sequencing with the Vertical Lift Bridge Long Span Option (Option 11C)

Construction of the long span Vertical Lift option would generally proceed in the following sequence:

- Implement mitigation measures;
- Build temporary trestles and temporary gravel access platform on the west bank under the bridge;
- Relocate existing control house;
- Build new lift span foundations;
- Demolish existing high towers;
- Build lift span piers;
- Remove Track 2 and 4 superstructure;
- Build west approach substructure and walls;
- Build east abutment and retaining walls;
- Place new Track 2 and 4 superstructure;
- Build west approach;
- Build east approach;
- Erect lift span towers on south side;
- Remove existing swing span;
- Demolish pivot pier;
- Float in new vertical lift span for Tracks 2 and 4; install counterweight, mechanical, OCS system, and testing;
- Open Tracks 2 and 4; Lift span operational;
- Remove existing fender system and piers;
- Remove Track 1 and 3 superstructure;
- Build west approach substructure and walls;
- Build east abutment;
- Place new Track 1 and 3 superstructure;
- Build west approach;
- Prepare east approach;
- Erect lift span towers on north side;
- Float in new vertical lift span for Tracks 1 and 3; install counterweight, mechanical, OCS system, and testing;
- Open Tracks 1 and 3; Lift span operational;
- Open channel to navigation;
- Remove any remaining trestles; and
- Stabilize construction sites following removal of all construction-related equipment.

ES-9 Summary of Project Environmental Benefits

Table ES-2 summarizes the potential permanent benefits of the Walk Bridge Replacement Project. These permanent benefits will be realized with all three Build Alternative options. Where applicable to the environmental resource, temporary benefits of the project also are listed.

Table ES-2 - Summary of Walk Bridge Replacement Project Environmental Benefits

Environmental Resource	Project Benefit
Rail Transportation	The project will improve bridge operation and reliability, resulting in improved NHL operations.
Marine Transportation	The project will increase the bridge's vertical clearance by approximately16 feet.
	The project will increase the bridge's horizontal clearance by at least 62 feet.
	The project will improve the navigational channel alignment and bridge reliability.
Pedestrian and Bicycle Facilities	The project will provide a new north-south pedestrian and bicycle connection to the Norwalk Harbor Loop Trail at the existing bridge's eastern abutment, which will extend the Norwalk River Valley Trail (NRVT)/Harbor Loop Trail on the Norwalk River's eastern shorefront.
Consistency with Planning	The project is consistent with local, regional, state plans of conservation and development; the regional and statewide Transportation Improvement Program (TIP), and regional, state, and multi-state transportation plans and policies.
Socioeconomics	The project will create construction period jobs, which are estimated in job-years and include direct on-site jobs, indirect jobs in supplier industries, and jobs that are induced in consumer goods and service industries as workers with direct and indirect jobs spend their incomes. Estimated job-years generated each year during project construction are: • Option 4S: 1,100 - 1,200 job-years • Option 8A: 1,300 – 1,500 job-years • Option 11C: 1,600 – 1,700 job-years
	The project will increase the reliability of rail service on the NEC and improve the reliability of the bridge for commercial navigation, resulting in long-term benefits to the local and regional economy.
Water Quality	The project will include new water quality protections. The land-based rail approach grades will be constructed on retained fill and sheet flow runoff will be directed to side slopes by the rail bed and ballast drainage system and away from the river. Drainage swales may be used in locations where drainage requires conveyance. Where applicable, the closed deck approach span sections of the bridge will include drainage methods to direct water away from the river.
Floodplains	The project will decrease hydraulic constraints and reduce upstream flooding due to the increased hydraulic opening.
	The project will increase the flood storage volume of the Norwalk River due to removal of the existing large granite pivot pier and rest piers.
Consistency with CT Coastal Management Act	The project will enhance coastal resources and coastal uses, by improving conditions in the Norwalk River for commercial and recreational boaters and enhancing the federal navigation channel and Norwalk Harbor. The project will expand coastal recreation and coastal access by providing opportunities to link to the Norwalk Harbor Loop Trail on the east side of the Norwalk River.
Water Dependent Uses	The project will improve navigation along the Norwalk River and will benefit water-dependent uses, particularly upriver commercial marine users and vessels with restricted maneuverability.
Parklands, Public Recreation and Community Facilities	The project will provide a north-south connection with the Norwalk Harbor Loop Trail on the east side of the Norwalk River at the existing bridge's eastern abutment; it will provide opportunities for additional pedestrian/bicycle path extensions connections in East Norwalk; and it will contribute to the city's open space and water views.

Environmental Resource	Project Benefit
Visual Resources	The project will improve the landscape of Norwalk River shore due to saltmarsh restoration.
Air Quality	The project will provide a resilient bridge that will not lead to diversion to other travel modes during bridge opening failures, such as automobiles or additional bus trips.
Safety and Security	The project will be designed to current design standards, including the minimum requirements for loading and safety margins. The project will improve safety and security measures at the bridge site.
Secondary and Cumulative Impacts	The project will provide regional secondary economic benefits on a temporary basis due to increased construction spending.
	The project will provide cumulative benefits on a permanent basis through improved NHL performance and reliability, improved marine conditions in Norwalk Harbor, and an expanded NRVT network in Norwalk.

ES-10 Summary of Project Environmental Impacts

Table ES-3 summarizes potential permanent and temporary construction-related environmental impacts of the Build Alternative. Where applicable to the environmental resource, Table ES-3 distinguishes between construction-related and permanent impacts of the three Build Alternative options.

Table ES-3 - Summary of Walk Bridge Replacement Project Impacts

Environmental Resource	Potential Impacts		
	Bascule Bridge (Option 4S)	Vertical Lift Bridge (Option 8A-Short Span)	Vertical Lift Bridge (Option 11C-Long Span)
Rail Transportation	**Temporary two-track outage** would be needed for up to 37 months. Limited four-track outages would be required for specific construction activities and would be limited to several days per outage.	**Temporary two-track outage** would be needed for up to 34 months. Limited four-track outages would be required for specific construction activities and would be limited to several days per outage.	**Temporary two-track outage** would be needed for up to 30 months. Limited four-track outages would be required for specific construction activities and would be limited to several days per outage.
Marine Transportation	**Temporary navigation restrictions** would occur. Restrictions would occur at the start of the two-track outage. Vertical restrictions would occur for about 37 months without the temporary run-around and for about 40 months with the temporary run-around. Horizontal restrictions and a limited number of full channel closures would be needed for specific construction activities and construction equipment.	**Temporary navigation restrictions** would occur. Restrictions would occur at the start of the two-track outage. Vertical restrictions would occur for about 34 months. Horizontal restrictions and a limited number of full channel closures would be needed for specific construction activities and construction equipment.	**Temporary navigation restrictions** would occur. The swing span would remain operational for up to 14 months after the start of the two-track outage. Vertical restrictions would occur for as few as 16 months. A limited number of full channel closures would be needed for specific construction activities. The contractor would have more flexibility to work on either side of the river, allowing one channel to remain open for traffic, thereby limiting horizontal restrictions.
Traffic, Transit and Parking	**Temporary impacts** to local roadways would include full closure to public access of a portion of Goldstein Place;	**Temporary impacts** to local roadways would include full closure to public access of a portion of Goldstein Place;	**Temporary impacts** to local roadways would include full closure to public access of a portion of Goldstein Place;

Environmental Resource	Potential Impacts		
	Bascule Bridge (Option 4S)	**Vertical Lift Bridge (Option 8A-Short Span)**	**Vertical Lift Bridge (Option 11C-Long Span)**
	periodic partial lane closures and full street closures of North Water Street; and partial lane closures of Fort Point Street of about a month and occasional full street closures. Road closures may affect existing routing to parking facilities.	periodic partial lane closures and full street closures of North Water Street; and partial lane closures of Fort Point Street of about a month and occasional full street closures. Road closures may affect existing routing to parking facilities.	periodic partial lane closures and full street closures of North Water Street; and partial lane closures of Fort Point Street of about a month and occasional full street closures. Road closures may affect existing routing to parking facilities.
	Temporary impacts (including closure) of the NPA North Water Street parking lot could occur due to a construction easement on the parcel.	**Temporary impacts** (including closure) of the NPA North Water Street parking lot could occur due to a construction easement on the parcel.	**Temporary impacts** (including closure) of the NPA North Water Street parking lot could occur due to a construction easement on the parcel.
	No permanent impacts.	**No permanent impacts.**	**No permanent impacts.**
Pedestrian and Bicycle Facilities	**Temporary disruptions** to pedestrian and bicycle circulation may occur due to easements on the east and west sides of the Norwalk River. **Temporary closure** of a portion of the NRVT could occur due to the construction easement at the NPA facility.	**Temporary disruptions** to pedestrian and bicycle circulation may occur due to easements on the east and west sides of the Norwalk River. **Temporary closure** of a portion of the NRVT could occur due to the construction easement at the NPA facility.	**Temporary disruptions** to pedestrian and bicycle circulation may occur due to easements on the east and west sides of the Norwalk River. **Temporary closure** of a portion of the NRVT could occur due to the construction easement at the NPA facility.
	No permanent impacts.	**No permanent impacts.**	**No permanent impacts.**
Land Use and Zoning	**No permanent impact** to the land use pattern or zoning would occur due to limited parcel-specific land use changes from parcel acquisitions and permanent easements.	**No permanent impact** to the land use pattern or zoning would occur due to limited parcel-specific land use changes from parcel acquisitions and permanent easements.	**No permanent impact** to the land use pattern or zoning would occur due to limited parcel-specific land use changes from parcel acquisitions and permanent easements.
Property Acquisitions, Displacement, and Relocation	**Temporary easements on 12 parcels** would be needed, consisting of 11 new easements and expansion of one existing easement. Displaced uses would include private and public parking in South Norwalk; some Maritime Aquarium facilities and operations; and a warehouse.	**Temporary easements on 12 parcels** would be needed, consisting of 11 new easements and expansion of one existing easement. Displaced uses would include private and public parking in South Norwalk; some Maritime Aquarium facilities and operations; and a warehouse.	**Temporary easements on 12 parcels** would be needed, consisting of 11 new easements and expansion of one existing easement. Displaced uses would include private and public parking in South Norwalk; some Maritime Aquarium facilities and operations; and a warehouse.
	Nine parcel acquisitions would be needed, displacing four businesses, including a water-dependent use, and up to six residences on three parcels.	**Nine parcel acquisitions** would be needed, displacing four businesses, including a water-dependent use, and up to six residences on three parcels.	**Nine parcel acquisitions** would be needed, displacing four businesses, including a water-dependent use, and up to six residences on three parcels.
	Permanent easements on three parcels (two	**Permanent easements on three parcels** (two	**Permanent easements on three parcels** (two

Environmental Resource	Potential Impacts		
	Bascule Bridge (Option 4S)	**Vertical Lift Bridge (Option 8A-Short Span)**	**Vertical Lift Bridge (Option 11C-Long Span)**
	properties) would be needed for access to and maintenance of the replacement bridge on both sides of the river.	properties) would be needed for access to and maintenance of the replacement bridge on both sides of the river.	properties) would be needed for access to and maintenance of the replacement bridge on both sides of the river.
Socioeconomics	**Temporary access impacts** would occur to land-based businesses proximate to Walk Bridge and water-based businesses upriver from Walk Bridge over an approximate 47-month construction period.	**Temporary access impacts** would occur to land-based businesses proximate to Walk Bridge and water-based businesses upriver from Walk Bridge over an approximate 44-month construction period.	**Temporary access impacts** would occur to land-based businesses proximate to Walk Bridge and water-based businesses upriver from Walk Bridge over an approximate 40-month construction period.
	Temporary construction easements would adversely impact public and private parking facilities and some facilities and operations of the Maritime Aquarium. Evaluations are ongoing.	**Temporary construction easements** would adversely impact public and private parking facilities and some facilities and operations of the Maritime Aquarium. Evaluations are ongoing.	**Temporary construction easements** would adversely impact public and private parking facilities and some facilities and operations of the Maritime Aquarium. Evaluations are ongoing.
	Loss of property tax revenue of approximately $91,000 per year over the 4-year construction period would result from parcel acquisitions.	**Loss of property tax revenue** of approximately $91,000 per year over the 4-year construction period would result from parcel acquisitions.	**Loss of property tax revenue** of approximately $91,000 per year over the 4-year construction period would result from parcel acquisitions.
Water Quality	**Temporary impacts** would include sediment disturbance due to waterway work and soil exposure due to land-based work.	**Temporary impacts** would include sediment disturbance due to waterway work and soil exposure due to land-based work.	**Temporary impacts** would include sediment disturbance due to waterway work and soil exposure due to land-based work.
	No permanent impacts.	**No permanent impacts.**	**No permanent impacts.**
Tidal Wetlands	**Indirect temporary impacts** would occur to approximately 2,700 sf of vegetated tidal wetlands.	**Indirect temporary impacts** would occur to approximately 2,400 sf of vegetated tidal wetlands.	**Indirect temporary impacts** would occur to approximately 2,400 sf of vegetated tidal wetlands.
	Permanent impacts would occur to approximately 3,100 sf of vegetated tidal wetlands.	**Permanent Impacts** would occur to approximately 2,500 sf of vegetated tidal wetlands.	**Permanent Impacts** would occur to approximately 2,500 sf of vegetated tidal wetlands.
Freshwater Wetlands	**Permanent loss** of 600-sf wetland would occur.	**Permanent loss** of 600-sf wetland would occur.	**Permanent loss** of 600-sf wetland would occur.
Floodplains	**Temporary impacts** would occur to 230,000 feet of 100-year floodplain due primarily to construction staging and access to the railroad ROW.	**Temporary impacts** would occur to 230,000 feet of 100-year floodplain due primarily to construction staging and access to the railroad ROW.	**Temporary impacts** would occur to 230,000 feet of 100-year floodplain due primarily to construction staging and access to the railroad ROW.
	Permanent impacts would occur to approximately 15,000 sf of 100-year floodplain.	**Permanent impacts** would occur to approximately 19,500 sf of 100-year floodplain.	**Permanent impacts** would occur to approximately 19,500 sf of 100-year floodplain.
Terrestrial Resources,	**Temporary impacts** would occur to terrestrial species	**Temporary impacts** would occur to terrestrial species	**Temporary impacts** would occur to terrestrial species

Environmental Resource	Potential Impacts		
	Bascule Bridge (Option 4S)	**Vertical Lift Bridge (Option 8A-Short Span)**	**Vertical Lift Bridge (Option 11C-Long Span)**
Species and Critical Habitats	due to loss of herbaceous coverage.	due to loss of herbaceous coverage.	due to loss of herbaceous coverage.
	Minor permanent impacts would occur due to loss of narrow upland habitat patch.	**Minor permanent impacts** would occur due to loss of narrow upland habitat patch	**Minor permanent impacts** would occur due to loss of narrow upland habitat patch
Aquatic Resources, Species and Critical Habitats	**Temporary impacts** would occur to approximately 7,750 sf of intertidal habitat and 10,250 sf of subtidal habitat.	**Temporary impacts** would occur to approximately 7,700 sf of intertidal habitat and 8,400 sf of subtidal habitat.	**Temporary impacts** would occur to approximately 7,700 sf of intertidal habitat and 8,400 sf of subtidal habitat.
	Conversion of approximately 300 sf of intertidal habitat to subtidal habitat and increased depth of subtidal areas would occur due to dredging.	**Conversion** of approximately 300 sf of intertidal habitat to subtidal habitat and increased depth of subtidal areas would occur due to dredging.	**Conversion** of approximately 300 sf of intertidal habitat to subtidal habitat and increased depth of subtidal areas would occur due to dredging.
	Permanent impacts would occur to approximately 900 sf of intertidal habitat and 27,000 sf of subtidal habitat.	**Permanent impacts** would occur to approximately 900 sf of intertidal habitat and 26,800 sf of subtidal habitat.	**Permanent impacts** would occur to approximately 900 sf of intertidal habitat and 26,600 sf of subtidal habitat.
Endangered and Threatened Species	**Potential temporary disruption** of foraging activities would occur due to work in the water and vegetation clearing.	**Potential temporary disruption** of foraging activities would occur due to work in the water and vegetation clearing.	**Potential temporary disruption** of foraging activities would occur due to work in the water and vegetation clearing.
	No permanent impacts.	**No permanent impacts.**	**No permanent impacts.**
Consistency with CT Coastal Management Act	**Unavoidable temporary and permanent impacts** would occur to tidal wetlands, intertidal and subtidal habitat, coastal access, water-dependent uses, and historic resources.	**Unavoidable temporary and permanent impacts** would occur to tidal wetlands, intertidal and subtidal habitat, coastal access, water-dependent uses, and historic resources.	**Unavoidable temporary and permanent impacts** would occur to tidal wetlands, intertidal and subtidal habitat, coastal access, water-dependent uses, and historic resources.
Water-Dependent Uses	**Temporary impacts** would occur to upstream uses and uses in immediate proximity to the bridge due to navigation restrictions for about 37 to 40 months.	**Temporary impacts** would occur to upstream uses and uses in immediate proximity to the bridge due to navigation restrictions for about 34 months.	**Temporary impacts** would occur to upstream uses and uses in immediate proximity to the bridge due to navigation restrictions for about 16 months.
	Temporary relocation of the Sheffield Ferry and Maritime Aquarium vessel operations would be required.	**Temporary relocation** of the Sheffield Ferry and Maritime Aquarium vessel operations would be required.	**Temporary relocation** of the Sheffield Ferry and Maritime Aquarium vessel operations would be required.
	Permanent impact would occur through parcel acquisition of private marina.	**Permanent impact** would occur through parcel acquisition of private marina.	**Permanent impact** would occur through parcel acquisition of private marina.
Parklands, Public Recreation and Community Facilities	**Temporary impacts** would occur due to construction easements and would include the Wastewater Treatment Plant property, NRVT on both sides of the river, and some of the Maritime Aquarium's facilities and	**Temporary impacts** would occur due to construction easements and would include the Wastewater Treatment Plant property, NRVT on both sides of the river, and some of the Maritime Aquarium's facilities and	**Temporary impacts** would occur due to construction easements and would include the Wastewater Treatment Plant property, NRVT on both sides of the river, and some of the Maritime Aquarium's facilities and

Environmental Resource	Potential Impacts		
	Bascule Bridge (Option 4S)	**Vertical Lift Bridge (Option 8A-Short Span)**	**Vertical Lift Bridge (Option 11C-Long Span)**
	operations. Evaluations are ongoing.	operations. Evaluations are ongoing.	operations. Evaluations are ongoing.
	No permanent impacts would occur on the east side of the river. **Potential impacts** on the west side of the river would involve a permanent relocation of the Aquarium's emergency egress.	**No permanent impacts** would occur on the east side of the river. **Potential impacts** on the west side of the river would involve a permanent relocation of the Aquarium's emergency egress.	**No permanent impacts** would occur on the east side of the river. **Potential impacts** on the west side of the river would involve a permanent relocation of the Aquarium's emergency egress.
Visual Resources	**Temporary impacts** would occur due to construction staging, including use of temporary trestles and barges in the water, and the temporary run-around in the river on the north side of the bridge, if this option is employed.	**Temporary impacts** would occur due to construction staging, including use of temporary trestles and barges in the water.	**Temporary impacts** would occur due to construction staging, including use of temporary trestles and barges in the water.
	Permanent altered visual setting would occur due to loss of historic resources, and potential altered visual effect could occur due to new bridge in an historic setting.	**Permanent altered visual setting** would occur due to loss of historic resources, and potential altered visual effect could occur due to new bridge in an historic setting.	**Permanent altered visual setting** would occur due to loss of historic resources, and potential altered visual effect could occur due to new bridge in an historic setting.
Air Quality	**Temporary minor impacts** would occur from diesel equipment, fugitive dust.	**Temporary minor impacts** would occur from diesel equipment, fugitive dust.	**Temporary minor impacts** would occur from diesel equipment, fugitive dust.
	No permanent impacts.	**No permanent impacts.**	**No permanent impacts.**
Noise and Vibration	**Temporary impacts** would occur due to daytime and night-time noise proximate to the project site.	**Temporary impacts** would occur due to daytime and night-time noise proximate to the project site.	**Temporary impacts** would occur due to daytime and night-time noise proximate to the project site.
	Potential temporary impacts of ground-borne vibration to affect nearby buildings, including the Maritime Aquarium and historic structures that may not have the same physical resistance to vibration as modern buildings.	**Potential temporary impacts of ground-borne vibration** to affect nearby buildings, including the Maritime Aquarium and historic structures that may not have the same physical resistance to vibration as modern buildings.	**Potential temporary impacts of ground-borne vibration** to affect nearby buildings, including the Maritime Aquarium and historic structures that may not have the same physical resistance to vibration as modern buildings.
	No permanent impacts.	**No permanent impacts.**	**No permanent impacts.**
Cultural Resources	**No adverse effect** would occur to historic buildings and settings due to temporary construction staging/access areas or permanent access areas, provided no physical damage occurs to the historic buildings.	**No adverse effect** would occur to historic buildings and settings due to temporary construction staging/access areas or permanent access areas, provided no physical damage occurs to the historic buildings.	**No adverse effect** would occur to historic buildings and settings due to temporary construction staging/access areas or permanent access areas, provided no physical damage occurs to the historic buildings.
	Adverse effects would occur due to demolition of National	**Adverse effects** would occur due to demolition of National	**Adverse effects** would occur due to demolition of National

Environmental Resource	Potential Impacts		
	Bascule Bridge (Option 4S)	**Vertical Lift Bridge (Option 8A-Short Span)**	**Vertical Lift Bridge (Option 11C-Long Span)**
	Register-listed Walk Bridge and Fort Point Street Bridge; and historic stone abutment retaining walls, high towers, and catenary support structures.	Register-listed Walk Bridge and Fort Point Street Bridge; and historic stone abutment retaining walls, high towers, and catenary support structures.	Register-listed Walk Bridge and Fort Point Street Bridge; and historic stone abutment retaining walls, high towers. and catenary support structures.
	Potential archaeological sensitivity for pre-colonial/contact and historic periods exists on many of the construction parcels, requiring subsurface testing and/or monitoring.	**Potential archaeological sensitivity for pre-colonial/contact and historic periods** exists on many of the construction parcels, requiring subsurface testing and/or monitoring.	**Potential archaeological sensitivity for pre-colonial/contact and historic periods** exists on many of the construction parcels, requiring subsurface testing and/or monitoring.
	Potential underwater archaeological sensitivity exists within the project footprint, requiring subsurface testing.	**Potential underwater archaeological sensitivity** exists within the project footprint, requiring subsurface testing.	**Potential underwater archaeological sensitivity** exists within the project footprint, requiring subsurface testing.
Hazardous and Contaminated Materials/ Environmental Risk Sites	**Potential exposure** to hazardous materials could occur due to removal of existing bridge structures, rail and ties, ballast, and soil.	**Potential exposure** to hazardous materials could occur due to removal of existing bridge structures, rail and ties, ballast, and soil.	**Potential exposure** to hazardous materials could occur due to removal of existing bridge structures, rail and ties, ballast, and soil.
	Permanent impacts would occur due to disposal of approximately 15,100 cy of dredged sediment.	**Permanent impacts** would occur due to disposal of approximately 16,700 cy of dredged sediment.	**Permanent impacts** would occur due to disposal of approximately 16,700 cy of dredged sediment.
Safety & Security	**No temporary or permanent impacts.**	**No temporary or permanent impacts.**	**No temporary or permanent impacts.**
Public Utilities and Service	**No temporary or permanent impacts.**	**No temporary or permanent impacts.**	**No temporary or permanent impacts.**
Title VI and Environmental Justice	**No disproportionate temporary or permanent impacts.**	**No disproportionate temporary or permanent impacts.**	**No disproportionate temporary or permanent impacts.**
Secondary and Cumulative Impacts	**Secondary impacts** would occur due to relocation of the Eversource power, currently on high towers abutting the existing bridge.	**Secondary impacts** would occur due to relocation of the Eversource power, currently on high towers abutting the existing bridge.	**Secondary impacts** would occur due to relocation of the Eversource power, currently on high towers abutting the existing bridge.
	Cumulative impacts would occur due to loss of a tangible example of historic movable bridge technology in Connecticut, and a bridge on the NRHP-listed Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource.	**Cumulative impacts** would occur due to loss of a tangible example of historic movable bridge technology in Connecticut, and a bridge on the NRHP-listed Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource.	**Cumulative impacts** would occur due to loss of a tangible example of historic movable bridge technology in Connecticut, and a bridge on the NRHP-listed Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource.

ES-11 Summary of Mitigation and Commitments

Table ES-4 provides a summary of project mitigation and commitments of the project.

Table ES-4 - Summary of Proposed Mitigation and CTDOT Commitments

Environmental Resource	Mitigation and Commitments
Rail Transportation	CTDOT will maintain weekday passenger train service by keeping at least two tracks in service throughout nearly all of the construction period. CTDOT will schedule limited four-track outages required during construction time during an off-peak and/or weekend period, to the extent possible.
	CTDOT will complete planned independent NHL-improvement projects on the main line and Danbury Branch prior to implementing the long-term, two-track outages; these projects will facilitate considerable train movement flexibility on the NHL main line and minimize schedule adjustments associated with long-term two-track outages.
	CTDOT will minimize temporary impacts to rail traffic by coordinating the construction of the project with the East Avenue Railroad Bridge Project (Bridge No. 42.14) and the Osborne Avenue Railroad Bridge Project (Bridge No. 41.96).
	CTDOT will work with Metro-North, Amtrak, and freight service providers to ensure that train operations proceed in a manner that maintains service, facilitates passenger boarding and alighting at East Norwalk and South Norwalk Stations, and prioritizes the overall safety of the railroad corridor.
Marine Transportation	CTDOT will coordinate channel closures with the City of Norwalk, USCG, USACE, and waterway uses to the maximum extent possible.
	CTDOT will work with commercial and recreational marine users to develop mitigation strategies to address impacts to marine users during the project construction period, coordinating with USCG, USACE, the City of Norwalk, and the Norwalk Harbor Management Commission.
Traffic, Transit and Parking	CTDOT will maintain pedestrian and vehicular access to adjacent buildings and parking during periods of partial and full closures of streets during construction. However, if it becomes necessary to temporarily close the North Water Street parking lot during construction, ample replacement parking is available nearby.
	CTDOT will coordinate with the City of Norwalk and local businesses in developing traffic detour and mitigation plans in the vicinity of the Fort Point Street Bridge in East Norwalk and North Water Street in South Norwalk.
Pedestrian and Bicycle Facilities	CTDOT will explore opportunities for bicycle connections in South Norwalk in cooperation with the City of Norwalk and stakeholders.
Property Acquisition and Displacement	CTDOT will provide monetary and other relocation assistance to displaced property owners in accordance with the procedures outlined in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Connecticut's Uniform Relocation Assistance Act. Relocation assistance could include relocation services, moving payments, replacement housing payments, and other payments related to commercial and residential moving costs and displacement.
	CTDOT will manage the properties acquired for the project, including their sale or lease following completion of construction.
	CTDOT will work with affected property owners to provide replacement parking. There is adequate parking available to provide replacement parking, with City parking lots and other parking garages located in close proximity to affected property owners.
Socioeconomics	CTDOT will coordinate with the City of Norwalk and stakeholders to minimize adverse effects of the project construction upon local land-based and water-based businesses, including developing a business coordination plan.

Environmental Resource	Mitigation and Commitments
Water Quality	CTDOT will employ Best Management Practices (BMPs) while conducting all work within the water to minimize releases of sediment to the water; measures could include cofferdams, sheet pile marine enclosures, or oversized pipe enclosures, or other containment measures such as turbidity curtains, sheeting, and geotextile encapsulation.
	CTDOT will prepare a site-specific Stormwater Pollution Prevention Plan (SWPPP), which will identify potential pollutant source areas and describe BMPs to be used for erosion and sedimentation control, temporary stormwater management, dust control, and site stabilization. All land-based activities will use erosion and sedimentation control BMPs to limit debris and runoff from entering the watercourse or offsite areas.
Tidal Wetlands	CTDOT will provide compensatory mitigation for temporary direct impacts to intertidal and subtidal habitats, and for indirect shading impacts to tidal vegetated wetlands, consisting of in-place restoration or enhancement of temporary impact areas, and restoration of tidal marsh areas that may be temporarily impacted from trestle platform shading.
	CTDOT will provide compensatory mitigation for permanent impacts to vegetated tidal wetlands through restoration/enhancement of wetlands along the Norwalk River dominated by invasive species.
Freshwater Wetlands	CTDOT will provide compensatory mitigation for the loss of a state-regulated freshwater wetland through restoration or replacement in-kind; out-of-kind wetland creation; invasive species removal; or any combination of these methods.
Floodplains	CTDOT will analyze both the temporary and permanent conditions to assess floodplain effects in compliance with Connecticut and FEMA floodplain management standards and criteria; if needed, CTDOT will take steps to mitigate effects.
Terrestrial Resources, Species, and Critical Habitats	CTDOT will implement BMPs, use construction phasing or sequencing, and comply with seasonal restrictions to avoid impacts to terrestrial resources and habitats.
Aquatic Resources, Species and Critical Habitats	CTDOT will minimize impacts to finfish, shellfish, and other aquatic resources through the use of protective measures, including managing turbid water generated inside casing, sheet piles, or cofferdam containments; replacing contaminated native materials cut from the submarine conduits with clean material matching grain size of removed sediments; mechanically removing select existing bridge components; separating and removing sediment-laden water from containment areas; and avoiding construction blasting.
	CTDOT will provide compensatory mitigation for habitat displacement due to the construction phase temporary direct impacts to intertidal and subtidal habitats, and for indirect shading impacts to tidal vegetated wetlands, in coordination with the USACE and CTDEEP.
Endangered and Threatened Species	CTDOT will consult with USFWS, USACE, USEPA, NMFS, and CTDEEP during the permitting process to avoid and /or minimize impacts to endangered and threatened species.
	CTDOT will conduct vegetation clearing during the off-season for protected bird species and will monitor the area for the presence of protected bird species during construction.
	CTDOT will incorporate a construction period BMP into the construction specifications to address the potential presence of the state-listed Peregrine Falcon nesting within the project area.
Consistency with CT Coastal Management Act	CTDOT will incorporate mitigation measures for unavoidable impacts and refine the design to minimize impacts to be consistent with the CT Coastal Management Act's policies for the protection of coastal resources and policies on development of those resources.
Water-Dependent Uses	CTDOT will explore mitigation opportunities for addressing temporary impacts to marina users, rowers, and other water-dependent users, working in coordination with the City of Norwalk, the Norwalk Harbor Management Commission, the Maritime Aquarium, the Norwalk Seaport Association, and local rowing groups, among others.

Environmental Resource	Mitigation and Commitments
Parklands, Public Recreation, and Community Facilities	CTDOT will continue coordination with the City of Norwalk regarding the temporary use of City-owned property, including parks or trails, during construction.
Visual Resources	CTDOT will coordinate with CTSHPO, the City of Norwalk's Design Review Committee, and other stakeholders as design of the bridge, abutments, and other elements advances.
Air Quality	CTDOT will consider implementing the following measures on a voluntary or mandatory basis during the construction period: reducing idling, properly maintaining equipment, using cleaner fuel, and retrofitting diesel engines with diesel-emission control devices.
Noise and Vibration	CTDOT will continue ongoing discussions with the Maritime Aquarium so that construction vibration will not affect the fish and mammals at the aquarium.
	CTDOT will coordinate the need for vibration mitigation measures with the National Marine Fisheries Service (NMFS), including addressing potential vibration impacts on fish living/migrating in the Norwalk River.
	CTDOT will investigate mitigation measures to prevent vibration damage to buildings in the area, and will consider the following mitigation measures during construction: locating temporary noise barriers between noise-sensitive receptors and noisy stationary equipment; locating stationary equipment as far from residential areas as possible; establishing dedicated truck routes to keep construction trucks from residential areas; scheduling noisy operations to be performed simultaneously, so that the slightly louder noise levels will be offset by less exposure to the public; and including appropriate noise control devices on construction equipment.
	CTDOT will keep the public informed of proposed construction schedules, noisy activities and nighttime work. CTDOT will work with adjacent properties and facilities to address construction noise and vibration, work hours, and possible mitigation.
Cultural Resources	CTDOT will sponsor design charrettes with historic stakeholders during project design to develop mitigation measures.
	CTDOT will coordinate with adjacent property owners of historic structures to establish protocols for conducting pre-construction and construction survey and monitoring activities, as required.
	CTDOT will conduct subsurface testing in areas with potential archaeological sensitivity and will develop mitigation measures for impacts to archaeological resources once the types and significance of archaeological resources are known and following further design.
	CTDOT and FTA will document agreed mitigation in a Memorandum of Agreement (MOA) among CTDOT, FTA, CTSHPO, and local stakeholders, the draft of which is included in Appendix 1. Stipulations in the MOA regarding historic properties include the implementation of an Archaeological Treatment Plan that will account for project impacts to archaeological resources.
Hazardous and Contaminated Materials/ Environmental Risk Sites	CTDOT will conduct its due diligence relative to contaminated material investigations on the nine parcels to be acquired for the project. As a part of this, sampling of soil, sediment, groundwater and other media anticipated to be impacted by project construction will be completed during the design phase of the project.
	CTDOT will manage dredged sediments on-site and dispose of materials off-site at an approved location.
	CTDOT will survey and evaluate structures for asbestos containing material, lead-based paint, and potential polychlorinated biphenyl (PCB)-containing equipment prior to dismantling/demolishing the existing bridge, control tower, overhead catenary system (OCS), and high towers.
	CTDOT will locate any storage fuels, chemicals, and/or hazardous materials within contained, secure facilities at elevations above the 500-year floodplain.

Environmental Resource	Mitigation and Commitments
Safety and Security	CTDOT will develop a site-specific Safety and Health Plan, in conformance with Occupational Safety and Health Administration (OSHA) regulations. The Plan will include protocols to be followed during project construction based on contamination detected during subsurface investigations conducted during the design phase of the project.
	CTDOT will require the contractor to develop an overall site safety plan addressing construction worker and site safety, site security, and public safety, including safety of adjacent properties.
Title VI and Environmental Justice	CTDOT will coordinate with the City of Norwalk to identify community organizations representing EJ communities and methods for outreach to EJ and LEP groups, which could include: translating communications materials in appropriate languages; advertising in multi-language publications; and conducting grassroots outreach by establishing partnerships in low-income neighborhoods, including community organizations, neighborhood groups, and small neighborhood businesses. CTDOT is developing an EJ and Title VI Outreach Plan to ensure that EJ and Title VI populations have equal access to information about the project, including the public comment period.
Secondary & Cumulative Impacts	CTDOT will coordinate with other non-rail infrastructure and construction projects in the vicinity of Walk Bridge to reduce public impacts.

ES-12 Required Permits and Approvals

CTDOT will be responsible for applying for and obtaining federal and state agency approvals for the construction and operation of Walk Bridge. Throughout the preparation of the EA/EIE, CTDOT has conducted coordination efforts with federal, state, and local agencies to identify issues and concerns associated with the bridge replacement. CTDOT will apply to federal and state agencies for project permits and authorizations at the project's 60 percent design phase.

Table ES-5 lists federal and state requirements for the construction and operation of Walk Bridge, consisting of project coordination, reviews, permits, and notices.

Table ES-5 - Federal and State Requirements for the Walk Bridge Replacement Project

Federal/State Regulation	Review/Approval/Permit
National Environmental Policy Act (42 USC 4321 et seq)	Review and Finding
Connecticut Environmental Policy Act (CGS Section 22a-1-22a-1h)	Record of Decision
Section 4(f), U.S. Department of Transportation Act (49 USC 303)	Individual Evaluation and Finding for potential use of Section 4(f) properties
Executive Order 11988, Floodplain Protection, as amended by Executive Order 13690, Federal Flood Risk Management	Review for impact to floodplain
Executive Order 11990, Wetlands Protection	Review for impact to wetlands
Executive Order 12898, Environmental Justice	Review for assessment of impact to EJ communities
Title VI Program/FTA Circular 4702.1B of October 1, 2012	Environmental Equity Review
Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (42 USC 4601 et seq); Uniform Relocation Assistance Act (CGS Section 8-266 et seq)	Review/relocation assistance
Clean Air Act (42 USC 7401 et seq)	Conformity Determination
Section 106, National Historic Preservation Act (36 CFR 800)	Memorandum of Agreement

Federal/State Regulation	Review/Approval/Permit
Section 7, Endangered Species Act (16 USC 1531 et seq)	Biological Evaluation
Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq)	Essential Fish Habitat Assessment
Coastal Zone Management Act/Connecticut Coastal Management Act (16 USC 1451 et seq)	Consistency Review
Section 9 of the Rivers and Harbors Act (33 USC 491)	Permit for construction of new bridge
Section 10 of the Rivers and Harbors Act (33 USC 403)	Permit for dredging and filling in navigable waters/ impacts to waters and wetlands of the U.S.
Section 404 of the Clean Water Act (33 USC 1344)	
Section 14 of the Rivers and Harbors Act (33 USC 408)	Permit for impact to federal navigation channel
Section 401 of the Clean Water Act (33 USC 1341); Connecticut Surface Water Quality Standards (CGS Section 221-426)	Water Quality Certification
Section 402 of the Clean Water Act (33 USC 1342); General Conditions Applicable to Water Discharge Permits and Procedures and Criteria for Issuing Water Discharge Permits (CGS Section 22a-430b)	General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activity
49 CFR 77; Safe, Efficient Use and Preservation of the Navigable Airspace	Notice of Proposed Construction or Alteration (pending siting of bridge-related utilities)
Connecticut Endangered Species Act (CGS Section 26-303)	Natural Diversity Database Review
Connecticut Coastal Management Act; and Tidal Wetlands Regulations (CGS Section 22a-30-1)	Structures, Dredge and Fill, and Tidal Wetlands Permit
Connecticut Flood Management Program (CGS Sections 25-68b - 25-68h)	Flood Management Certification
CGS Section 22a-36-45a	Inland Wetlands General Permit
CGS Section 22a-134, et seq., Hazardous Materials	Review of potential for hazardous material impacts, high-risk sites, site investigations, and environmental audits
CGS Section 22a-133z and 22a-208a	General Permit for Contaminated Soil and/or Sediment Management
CGS Chapter 446d and 446k, RCSA Sections 22a-208a-1, 22a-209-1, and 22a-209-8	Authorization for Disposal of Special Waste
CGS Section 22a-430(b)	General Permit for the Discharge of Groundwater Remediation Wastewater

ES-13 Public Involvement and Agency Coordination

CTDOT has developed a public outreach and agency coordination plan, which details requirements for public and agency involvement through the receipt of project permits. In accordance with NEPA and CEPA requirements, Section 106 consultation procedures, and FTA's *Environmental Review Process Guidance* (draft),[6] CTDOT provided extensive public involvement and agency coordination opportunities in the preparation and review of the EA/EIE.

[6] The Environmental Review Process Guidance (proposed revised guidance for public comment, 3/12/2015) was developed by FTA and the Federal Highway Administration.

CTDOT conducted the CEPA public scoping session on February 24, 2015 at Norwalk City Hall. Per CEPA requirements, the scoping session was noticed in the Environmental Monitor on February 3, 2015. CTDOT notified approximately 160 stakeholders and property owners of the public scoping session through a direct mailing invitation. Additionally, press releases were disseminated to news outlets to advertise the public scoping session. Approximately 160 people attended the public scoping session. The following is a summary of general requests from the public scoping session:

- Balance the interests of all water uses in and around the bridge, including barge traffic, boating, and rowing, including coordinating with the Stroffolino Bridge openings;
- Avoid negatively affecting local business owners by taking properties or affecting access to them during project construction;
- Preserve or echo, to the extent possible, the iconic look and historical features of the bridge, while also improving the bridge's operations; and
- Accomplish other transportation needs such as completing missing bike path/trail links under the bridge on both sides of the river and providing other local road network connections.

CTDOT held a public information meeting on May 11, 2016, to update the public of the project, identify concerns and address questions. The meeting, held in the Community Room of Norwalk City Hall, was conducted in two sessions, from 4:30 to 6:30 pm, and from 7:00 to 9:00 pm, to solicit a wide audience. Each session included a presentation on the Walk Bridge Replacement Project; a question and answer period; and an open house during which displays were available for viewing and project team members were available for informal discussion. The public information meeting also provided an update on the design of the new bridge and related projects, environmental reviews, and construction schedule. CTDOT held an open house on August 16, 2016 from 6:30 to 8:00 pm in the lobby of the IMAX Theater at the Maritime Aquarium, 10 North Water Street, Norwalk. This was an informal open house where the public was able to speak one-on-one with CTDOT staff, ask questions and view informational graphics about the project.

FTA is the Lead Federal Agency for the environmental review of the Walk Bridge Replacement Project, and is responsible for NEPA compliance and issuing its finding of the project relative to anticipated environmental impacts.

CTDOT is the Sponsoring Agency for the Walk Bridge Replacement Project. CTDOT is responsible for preparing the environmental review document in compliance with NEPA and CEPA and other federal and state regulations and policies. In addition to coordinating with FTA regarding compliance with NEPA, CTDOT is coordinating with the Connecticut Office of Policy and Management (OPM) regarding compliance with CEPA, including preparing the Record of Decision document for OPM's review and approval.

CTDOT invited four federal agencies to participate in the development of the EA/EIE as Cooperating Agencies: USCG, USACE, the U.S. Environmental Protection Agency (USEPA), and the Federal Railroad Administration (FRA). USCG agreed to be a Cooperating Agency; and was responsible for reviewing the EA/EIE, including the level of detail required in the alternatives analysis, the project's purpose and need, and goals and objectives.

Four agencies agreed to participate in the development of the EA/EIE as Participating Agencies: the National Marine Fisheries Service/ Greater Atlantic Regional Fisheries Office (NMFS/GARFO), the CT Department of Energy and Environmental Protection (CTDEEP), the City of Norwalk, and the Western Connecticut Council of Governments (WCCOG). As Participating Agencies, they reviewed the project's anticipated impacts and proposed mitigation.

CTDOT's ongoing coordination activities with the City of Norwalk include meetings with the Norwalk Harbor Management Commission and its Walk Bridge subcommittee, the Norwalk Harbormaster, the Mayor, the Norwalk Historical Commission, the Norwalk Board of Selectmen, and various City departments and agencies to provide project updates and solicit municipal information.

The Connecticut State Historic Preservation Office (CTSHPO), four local historical associations, and two Tribal Nations are participating in the review of the project. At the initiation of the project, CTDOT met with representatives from CTSHPO and project stakeholders to ascertain project issues. CTDOT has continued to apprise local historic stakeholders of the project as design advances, and CTDOT anticipates that its outreach and consultation activities with CTSHPO and local stakeholders will continue through project completion.

1. Project Purpose and Need

1.1. Introduction

The Federal Transit Administration (FTA) and the Connecticut Department of Transportation (CTDOT) are preparing a combined Environmental Assessment (EA), Section 4(f) Evaluation, and Environmental Impact Evaluation (EIE) to evaluate proposed improvements to the New Haven Line railroad bridge over the Norwalk River (the Walk Bridge – Bridge No. 04288R) in Norwalk, Connecticut. Figure 1-1 shows the location of the Walk Bridge and approximate project limits. This document has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), Title 42 of the United States Code (USC) Section 4321 et seq. and the Connecticut Environmental Policy Act (CEPA), Sections 22a-1a through 22a-1h of the Connecticut General Statutes (CGS), along with the joint Federal Highway Administration/FTA Environmental Impact and Related Procedures (23 Code of Federal Regulations [CFR] 771), and Section 22a-1a-1 through 22a-1a-12 of the Regulations of Connecticut State Agencies (RCSA). This document also complies with the requirements of Title 49 USC Section 303 (referred to as Section 4(f) of the U.S. Department of Transportation Act of 1966).

This chapter describes the existing bridge and its use, as well as the purpose of the project and the deficiencies, or needs, which the project will address.

1.2. Project Background

Walk Bridge, constructed in 1896, is a four-span swing bridge that spans 564 feet over the Norwalk River. Walk Bridge consists of a deck truss swing span and three fixed approach spans; two fixed approach spans to the west of the swing span and one fixed approach span to the east of the swing span, as shown in Figure 1-2, a photograph of the existing bridge.

The fixed spans consist of eight 15-feet deep Warren trusses, two per track; and the swing span consists of three planes of double intersection Warren trusses with stringers and floor beams. Power for the trains is supplied by an overhead contact system (OCS). High towers are located on both sides of the Norwalk River. These towers support overhead power transmission lines owned by Eversource Energy and Metro-North Railroad (Metro-North) power and communication lines.

Walk Bridge carries four tracks of the New Haven Line (NHL) of Metro-North commuter service and also is used for intercity and high-speed passenger service by Amtrak[1] on the Northeast Corridor (NEC). Walk Bridge also is used for freight service by the Providence & Worcester Railroad. Currently, Metro-North operates 113 daily trains over Walk Bridge between East Norwalk and Grand Central Terminal in New York City. Amtrak operates 42 intercity trains (21 round trips) over Walk Bridge via the NHL. According to a 2013 report, the NHL, one of three main lines of Metro-North, was the busiest single commuter rail line in the United States.[2] In 2014, the NHL had 39.61 million riders, an increase of 1.6 percent from 2013.[3] Over the 30 year period from 1984 to 2014, total NHL ridership has increased by more than 72 percent.[4]

[1] National Railroad Passenger Corporation
[2] Northeast Corridor Infrastructure and Operations Advisory Commission, *Critical Infrastructure Needs on the Northeast Corridor*, January 2013.
[3] Metropolitan Transportation Authority, "2014 Ridership Report, Metro North Railroad Executive Summary," excerpt from Joint Metro-North and Long Island Committees, April 2015.
[4] Ibid.

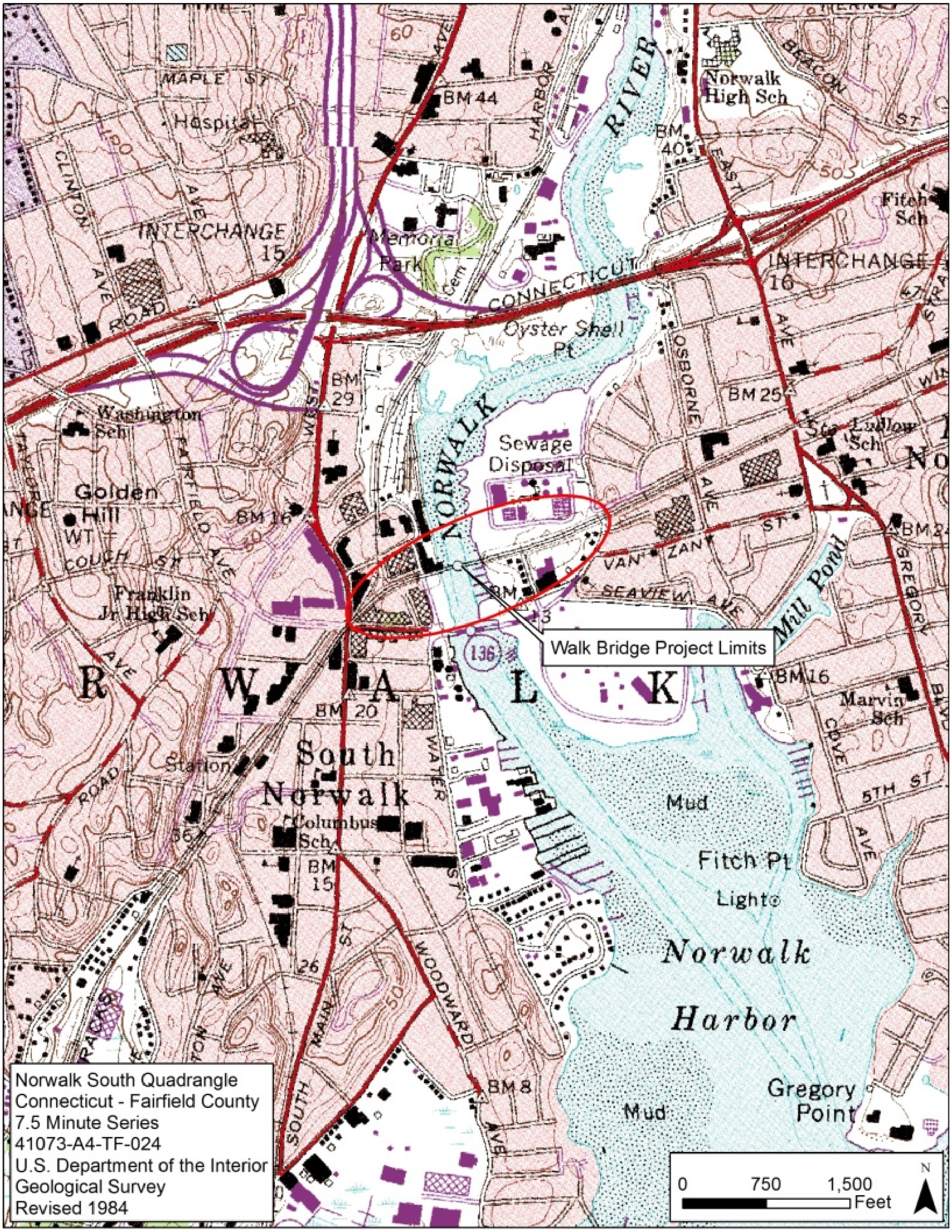

Figure 1-1—Project Location

Walk Bridge is located over the Norwalk River, which is a navigable waterway used for both recreational and commercial marine traffic. It is the northern boundary of the Norwalk Harbor. As designated by the U.S. Army Corps of Engineers (USACE), Norwalk Harbor is a recreational and small commercial harbor, with a federal channel of varying width and access to industrial and recreational facilities located north of Walk Bridge. There are over 1,800 berthing spaces and over 500 mooring locations in the Norwalk Harbor. The Norwalk Harbor Management Commission estimates that there are between 2,000 and 3,000 commercial vessel trips per year to and from Norwalk Harbor's port facilities.[5]

The deteriorating condition of Walk Bridge has been extensively documented over the years.[6] A detailed fatigue analysis was completed in 2005, and it indicated that major portions of the bridge have exceeded their fatigue life and require replacement. CTDOT performs maintenance and repairs on the bridge's structural, mechanical, and electrical systems on regular basis.

Figure 1-2—View of Walk Bridge, looking northeast

In response to recent bridge movement failures in May and June 2014, CTDOT established a Short Term Action Team (STAT) to determine the cause of operation failures and determine repairs to improve the system's reliability. The STAT determined that the failures of the Walk Bridge were due to a combination of factors: the operating system being close to its maximum limit, the age of the structure, the age of the operating system components, the existing condition of the structure, and the attempt to use existing worn operating systems with new rail joint systems.[7] In an emergency action in July 2014, the United States Coast Guard (USCG) issued a temporary deviation from the Walk Bridge operating schedule to allow the

[5] Norwalk Harbor Management Commission, *Norwalk Management Plan, 2009 Plan Amendments*, adopted August 11, 2009.
[6] Documentation of the deteriorating condition of Walk Bridge includes the Transportation Strategy Board, "Strategic Framework for Investing in Connecticut's Transportation Infrastructure: Economic Growth – Infrastructure Preservation – Sustainable Communities," January 2011; CTDOT, Accelerated Bridge Construction Study, March 2014 (draft).
[7] Connecticut Department of Transportation (CTDOT) Short Team Action Team, *Emergency Repair and Reliability Report*, CTDOT Br. No. 04288R, July 17, 2014 (Final).

bridge to open only after an eight-hour advance notice under a revised operating schedule.[8] The USCG subsequently changed this schedule in January 2015 to reduce the advanced notice time required to two hours. Also in July 2014, the Commissioner of CTDOT issued an Emergency Declaration for the Walk Bridge.[9]

CTDOT plans to implement a permanent solution to these growing problems and, along with FTA, will consider the findings of this document, public reviews, and other evaluations in reaching its project decision.

1.3. Project Purpose

The purpose of the Walk Bridge Project is to restore or replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service, offer operational flexibility and ease of maintenance, and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/ Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River**.** Upgrades to the Walk Bridge, through rehabilitation or replacement, are needed to increase bridge reliability, incorporate bridge redundancy, and provide a sustainable bridge for significant weather events, thereby accommodating current and future rail and marine traffic.

1.4. Project Needs

CTDOT and FTA are undertaking the project to address the following needs, or deficiencies, of the existing Walk Bridge.

1.4.1. Structure Age and Deterioration

The existing bridge is approximately 120 years old and has deteriorated. Section loss (loss of original structural material) due to corrosion has been observed in some locations and to varying extents and indicates that the structure is nearing the limit of its design life. Cumulative fatigue damage (damage due to repetitive train loadings) of the main load carrying elements of the bridge has occurred. The electrical systems are generally obsolete. Existing and projected deterioration and wear of mechanical systems are key elements which affect the reliability of the bridge.

1.4.2. Decreasing Reliability

In 2011, Walk Bridge failed 12 times out of 138 openings, and in 2013, the bridge failed 16 times out of 271 openings. Failure means that the bridge fails to open or close properly in a timely manner. Failures have occurred in both the opened and closed positions. When failure occurs in the opened position, train traffic cannot cross the bridge until the bridge is completely closed and locked. If the bridge fails in the closed position, marine traffic taller than the vertical clearance under the bridge cannot pass under the bridge. When the bridge fails by only partially opening or closing, both train and marine traffic are stopped. Without action to rehabilitate or replace the bridge, failures are expected to increase.

Closing the bridge after a failure can take up to two hours. In May and June 2014, in two separate but similar incidents within a two-week time span, Walk Bridge failed to properly close. The failures prevented trains from crossing the bridge for extended periods of time, and impacted thousands of passengers.

[8] 79 Federal Register 41644 (July 17, 2014).
[9] CTDOT, *Emergency Declaration Railroad Swing Bridge No. 04288R, Norwalk, Connecticut*, July 8, 2014.

1.4.3. Lack of Resiliency

System resiliency for Walk Bridge is described as the ability to return the bridge to use, either partially or completely, in a relatively short period of time in the aftermath of a compromising event. It also refers to minimizing the vulnerability of critical elements of the bridge to facilitate its return to use.

The existing bridge is not designed to current standards for flooding events or storm events. In its current condition, the bridge is highly vulnerable to damage from a storm surge or high wind event, and it is also at risk for malfunction due to extreme temperatures.[10] The bridge also does not meet current standards with regard to its ability to withstand the magnitude of seismic forces and frequency of seismic events for this geographic area.

1.4.4. Safety Standards

The existing bridge does not meet current design standards which reflect improved safety aspects compared to when the bridge was originally designed and built. Minimum requirements (loading, safety margins, etc.) for the design of railroad bridges have evolved throughout the twentieth century to reflect increases in demands on the infrastructure and advances in materials, methods, and technology. Current train loads used for design are commonly-accepted loads representing modern-day freight rail traffic in the United States. These design loads are significantly heavier than design loads used over a hundred years ago. As a result, structures designed to pre-1900 standards do not typically provide the same margin of safety as bridges designed in accordance with current practice.

1.4.5. Lack of Redundancy

Operational redundancy for Walk Bridge is described as the ability to maintain train service on a limited number of tracks following an event that would have otherwise rendered all tracks inoperable. A failure of the existing bridge results in all four tracks being out of service, affecting train traffic in both directions and with far reaching effects on the NEC.

1.4.6. Limited Operational Flexibility

Existing operational constraints include the curvature of the track on the west end, narrow track centers, and miter rails on the movable span, all of which force trains traversing Walk Bridge to reduce their speed.

1.4.7. Difficulty of Maintenance

Some maintenance activities require opening the structure, and therefore require the bridge to be closed and all four tracks be taken out of service which presents logistical challenges for both maintenance and rail mobility.

1.4.8. Reduced Rail Capacity and Efficiency

Failures of the bridge opening/closing cause reduced efficiency of train service in terms of increased delays and reduced on-time performance (OTP) of Metro-North and Amtrak passenger trains. This reduced efficiency can in turn reduce the line capacity of the rail lines.

[10] "*Replacement of Norwalk Bridge on the Northeast Corridor*," prepared for the 2014 Hurricane Sandy Competitive Resilience Program.

1.4.9. Reduced Dependability and Capacity for Marine Traffic

As previously noted, when the bridge fails in the closed or partially opened position, some or all marine traffic cannot pass under the bridge and renders navigation unreliable and unpredictable. The existing vertical clearance also limits vessel passage in the bridge closed position, which affects navigation capacity.

1.4.10. Lack of Sustainability

The existing bridge is not sustainable as continued deterioration will cause bridge failures. Increased routine bridge maintenance will not extend the useful life of the bridge, so without major rehabilitation or replacement, the existing bridge will cease to function and result in more frequent train delays or even full shut-downs of the bridge, adversely affecting both rail and marine traffic. Increasing routine and major maintenance costs, combined with the cost associated with correcting a bridge failure, result in high life cycle costs to operate this bridge.

1.5. Other Transportation-related Goals and Objectives

In addition to the project's purpose to address and remedy the specific needs previously described, the project is intended to satisfy other transportation-related objectives and provide benefits related to the regional economy and environmental quality.

1.5.1. Regional Economy

A properly functioning Walk Bridge is important to both the local and regional economy. Walk Bridge is a vital link in the NEC, which connects Washington, DC to Boston, MA and includes major cities such as Philadelphia and New York City. Amtrak operates intercity and high speed passenger rail service on the NEC and serves more intercity travelers within the Northeast than all airlines combined. Metro-North provides commuter rail service to New York City from Connecticut communities as far north as New Haven, Waterbury, and Danbury. CTDOT's Shoreline East provides commuter rail service from New London to New Haven, with service connections on Metro-North trains to Grand Central Terminal. According to the NEC Commission,[11] the NEC carries more than 700,000 passengers per day for business, recreation, and personal purposes. The NEC carries a workforce that contributes $50 billion annually to the national gross domestic product. An unexpected loss of all NEC service for one day alone could cost the nation nearly $100 million in added highway congestion, productivity losses, and other transportation impacts.

1.5.2. Environmental Quality

The Walk Bridge project should preserve the scenic, aesthetic, and historic values of the surrounding area. Project designs should be sensitive to, and compatible with the surrounding area whenever possible. Providing reliable train service and therefore reducing reliance on automobile and truck travel will produce air quality benefits and reduce greenhouse gas emissions. For example, the passenger rail service provides a viable and dependable alternative to highway travel on the congested Interstate Route 95 (I-95), which serves the same corridor as the NEC along its complete route between Florida and Maine. A long-term failure of one of four movable bridges on the NHL, including Walk Bridge, would result in an additional 125,000 daily commuters to I-95[12] contributing to added vehicle emissions. Additionally, failure of Walk Bridge would result in additional truck traffic to replace the existing freight service using the bridge.

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[11] NEC Commission. *Northeast Corridor Five-year Capital Plan, Fiscal Years 2016-2020*. April 2015
[12] Connecticut DOT. *LetsGoCT! Fact Sheet*. March 2015

2. Project Alternatives

2.1. Introduction

This chapter describes the broad range of alternatives that was considered to address the purpose and need for the project and includes a description of how the alternatives were developed and screened. This chapter includes descriptions of the alternatives, a summary of the alternatives not advanced for further study, a summary of the alternatives that were advanced, and the reasons for selection of the Preferred Alternative.

CTDOT's design strategy for the Walk Bridge Project focused upon meeting the project purpose and need: providing a resilient bridge structure to enhance the safety and reliability of rail service, offering operational flexibility and ease of maintenance, and providing for increased capacity and efficiencies of rail transportation, while maintaining or improving navigational capacity. An important overall design objective was therefore predicated upon providing ***system resiliency*** and ***operational redundancy***, as mandated by FTA in its funding appropriation.[1]

2.2. Alternatives Development and Screening

CTDOT identified a range of alternatives and grouped them into four general categories:

1. **No Build (No Action) Alternative**: continuing the existing operations and maintenance of the historic swing (movable) bridge;
2. **Rehabilitation Alternative**: rehabilitating the existing bridge to extend its useful life by 100 years, a timeframe comparable to the useful life of a new bridge;
3. **Replacement Alternative – Movable Bridge**: constructing a new movable bridge, of either the bascule type or vertical lift type, on the same general alignment, and demolishing the existing bridge;
4. **Replacement Alternative – Fixed Bridge**: constructing a new fixed (non-movable) bridge on the same or a different general alignment and demolishing the existing bridge.

The parameters considered in the development and evaluation of alternatives and design options included:

- Horizontal and vertical navigation clearances
- Track spacing for center tracks
- Span length
- Counterweight locations
- Pier locations
- Mechanical systems
- Electrical systems
- Bridge aesthetics, including historic considerations
- Environmental considerations
- Resiliency
- Redundancy
- Constructability
- Rail, marine, and local impacts during construction
- Cost, including initial costs and life cycle costs

More than 70 different design variations within the four groups of alternatives were initially investigated to identify representative options that consider these parameters and meet the project purpose and need. CTDOT identified and developed concepts to replace the existing Walk Bridge with dual, double-track movable spans in accordance with the design objectives for resiliency and redundancy. For a bascule

[1] Notice of Funding Availability for Resilience Projects in Response to Hurricane Sandy, 78 FR 78486.

movable bridge, design options included deck girder, through girder and through truss bascule bridges of both the trunnion and rolling lift genre.[2] For a vertical lift movable bridge, design options included deck girder, through girder, or through truss vertical lift bridges with span-drive or tower-drive lift span operating systems.[3]

CTDOT held multiple meetings with public agencies and project stakeholders, including the USACE, USCG, the City of Norwalk, Metro-North, property owners, and waterway users to ascertain concerns and requirements for the replacement bridge design and to obtain public and agency input. CTDOT also held a public scoping meeting on February 24, 2015, an agency scoping meeting on March 5, 2015, and a public information meeting on May 11, 2016. With input from these meetings, CTDOT concluded that the evaluation of alternatives would focus on replacement of the bridge and would include consideration of a bascule movable bridge type, a through truss vertical lift movable bridge type, as well as a fixed bridge (non-movable) type with three design options of varied vertical clearances over the Norwalk River: a low-level, a mid-level, and a high-level bridge.

2.3. Alternatives Not Advanced for Further Evaluation

Of the four alternative groups which were evaluated, three groups were dismissed from further evaluation for a number of reasons: they would not meet the project purpose and need; they would be inferior to other alternatives in meeting project purpose and need; they would result in higher initial or long-term costs; or they would have a higher potential for adverse environmental impact. The alternatives not advanced for further evaluation consist of the following, and the reasons for not advancing these alternatives and design options are summarized in Table 2-1:

- **Rehabilitation Alternative.**
- **Replacement Alternative –Fixed Bridge**, all options.
- **No Build Alternative** (although this alternative is carried forward as a baseline condition for comparison purposes).

Table 2-1—Alternatives Not Advanced

Alternative/Option	Reasons for Not Advancing
Rehabilitation Alternative	Would not meet purpose and need with regard to structural age and deterioration, reliability, resiliency, safety standards, redundancy, operational flexibility, maintenance, rail capacity and efficiency, dependability and capacity for marine traffic, and sustainability.
Replacement Alternative – Fixed Bridge: Low-Level Option	Would not meet purpose and need with regard to dependability and capacity for marine traffic.
Replacement Alternative – Fixed Bridge: Mid-Level Option	Would not meet purpose and need with regard to dependability and capacity for marine traffic.
Replacement Alternative – Fixed Bridge: High-Level Option	High environmental impacts. High costs.
No Build Alternative	Would not meet purpose and need with regard to structural age and deterioration, reliability, resiliency, safety standards, redundancy, operational flexibility, maintenance, rail capacity and efficiency, dependability and capacity for marine traffic, and sustainability, but advanced to describe future no-action transportation conditions for comparison.

[2] See Chapter 11, Acronyms and Glossary of Terms, for descriptions.
[3] See Chapter 11, Acronyms and Glossary of Terms, for descriptions.

The following is a brief overview of these alternatives along with more detail about the reasons for not advancing them further. An overview of the No Build Alternative and the reasons for dismissal are included in Section 2.4.1. Additional information on the impacts of the No Build Alternative is presented in Chapter 3.

2.3.1. Rehabilitation Alternative

The Rehabilitation Alternative would require rehabilitation or replacement of the existing Walk Bridge elements that would extend the bridge's design life by an additional 100 years, which is comparable to a new bridge's design life.

The Rehabilitation Alternative would include measures to increase the structural and seismic capacity of the existing bridge, portions of the existing retaining walls, and high tower structures. To remedy corrosion, section loss and insufficient load ratings of the bridge superstructure, all elements exhibiting minor section loss would be strengthened, and all elements exhibiting major section loss would be replaced. Existing rivets would be replaced with high-strength bolts. All structural steel would be cleaned and coated. To address fatigue concerns, stringers and floorbeams would be replaced. All tension diagonals and truss chords would be replaced, as would gusset plates and connections. Other structural elements would be strengthened or replaced as required for increased live load capacity and seismic resistance. A combination of micropile and drilled shafts would be required to improve the stability and load carrying capacity of the existing foundations.

Although some swing span machinery has been replaced, the amount of current and predicted deterioration and wear is an issue that can only be eliminated by replacement of all operation machinery. Additionally, a complete replacement of the obsolete electrical service would be necessary to improve its electrical rating.

Repairs or partial replacements have been accomplished over the past 10 years on fender systems as well as on some track, signal and communication systems. However, in order to extend their functionality in the long term, full replacement of the fenders and track, signal, and communication systems is warranted.

Construction of a temporary, two-track bridge placed on an alignment immediately north of the existing bridge would be needed to allow for access to strengthen the existing masonry piers and to perform repairs on the existing structural, mechanical and electrical systems. Once this temporary bridge, or "runaround," becomes functional, train operations would shift from the existing bridge to the runaround bridge. This enables many rehabilitation measures to be completed while still accommodating rail service on the runaround. However, since the temporary runaround structure would not include a movable span and would also have a fixed bottom of structure elevation above Mean High Water, marine traffic would be limited to only those vessels that would fit under the runaround track structure. Replacement of the drive system and associated components also would require a complete channel outage.

The initial program cost of the Rehabilitation Alternative is estimated to range between $425 and $475 million.

The Rehabilitation Alternative was not advanced because it would not meet the project needs as detailed in Table 2-2.

Table 2-2—Project Needs Evaluation of the Rehabilitation Alternative

Project Needs[a]	Rehabilitation Alternative
Structure age and deterioration	Many structural elements require replacement. Extended construction schedule would be required for rehabilitation. Full track closures would be required for some improvements. Unknown potential problems in installation and fit-up with rehabilitating an old structure could extend schedule and costs beyond what is forecast. This need would not be fully met.
Decreasing reliability	Initial improvement in reliability due to replacement of key components, but systems would revert to current conditions resulting in unreliability. This need would not be met.
Lack of resiliency	Key mechanical and electrical systems would remain vulnerable to coastal storm events and temperature extremes. Provision of an emergency generator could improve reliability in some circumstances. This need would not be fully met.
Safety standards	The bridge does not meet current design standards which reflect improved safety aspects. This need would not be met.
Lack of redundancy	Overall system redundancy would not be enhanced. This need would not be met.
Limited operational flexibility	The operational limitations of the existing bridge would not be improved. This need would not be met.
Difficulty of maintenance	Certain maintenance would require a full bridge closure, presenting logistical problems for train and marine traffic. This need would not be met.
Reduced rail capacity and efficiency	Long term reliability would not be improved thereby resulting in potentially reduced capacity on the NHL. This need would not be met.
Reduced dependability and capacity for marine traffic	Long term reliability would not be improved thereby resulting in continued dependability and capacity issues for marine traffic. This need would not be met.
Lack of sustainability	Although bridge rehabilitation would improve conditions in the near-term, rehabilitation would not result in a sustainable bridge in the long term. This need would not be met.

Note: a. Project Needs are the existing bridge deficiencies as defined in the project purpose and need.

2.3.2. Replacement Alternative – Fixed Bridge

Three fixed span bridge replacement options were developed and not advanced for further evaluation. The evaluation of the alternative options relative to project purpose and need is detailed in Table 2-3. The low-level bridge option would reduce the capacity for marine traffic passing beneath the bridge and therefore would not meet this part of the project purpose and need. The high-level bridge option would meet all aspects of the purpose and need, but it would result in a high level of environmental impact because the bridge and approaches would be on a much higher vertical alignment and would be more than three times as expensive as the other fixed bridge options. Similar to the low-level bridge option, the mid-level bridge option would reduce the capacity for marine traffic crossing under the bridge, albeit to a lesser extent than the low-level bridge. Therefore the mid-level bridge option would not meet this part of the project purpose and need.

Table 2-3—Project Needs Evaluation of the Fixed Bridge Options

Project Needs[a]	Fixed Bridge Low-Level Option	Fixed Bridge Mid-Level Option	Fixed Bridge High-Level Option
Structure age and deterioration	As a replacement bridge, this need would be met.	As a replacement bridge, this need would be met.	As a replacement bridge, this need would be met.
Decreasing reliability	As a fixed bridge, the reliability of a movable bridge would not be an issue and therefore this need would be met.	As a fixed bridge, the reliability of a movable bridge would not be an issue and therefore this need would be met.	As a fixed bridge, the reliability of a movable bridge would not be an issue and therefore this need would be met.
Lack of resiliency	As a fixed bridge, the susceptibility of movable bridge mechanical and electrical systems would not be an issue. Clearance above the 500 year flood elevation would be provided. This need would be met.	As a fixed bridge, the susceptibility of movable bridge mechanical and electrical systems would not be an issue. Clearance above the 500 year flood elevation would be provided. This need would be met.	As a fixed bridge, the susceptibility of movable bridge mechanical and electrical systems would not be an issue. Clearance above the 500 year flood elevation would be provided. This need would be met.
Safety standards	As a replacement bridge designed and built to current standards, this need would be met.	As a replacement bridge designed and built to current standards, this need would be met.	As a replacement bridge designed and built to current standards, this need would be met.
Lack of redundancy	As a fixed bridge, structural redundancy can be designed into the structure and mechanical and electrical systems redundancy is not an issue. This need would be met.	As a fixed bridge, structural redundancy can be designed into the structure and mechanical and electrical systems redundancy is not an issue. This need would be met.	As a fixed bridge, structural redundancy can be designed into the structure and mechanical and electrical systems redundancy is not an issue. This need would be met.
Limited operational flexibility	As a replacement bridge designed and built to current standards, this need would be met.	As a replacement bridge designed and built to current standards, this need would be met.	As a replacement bridge designed and built to current standards, this need would be met.
Difficulty of maintenance	As a replacement bridge, designed and built to current standards, this need would be met.	As a replacement bridge, designed and built to current standards, this need would be met.	As a replacement bridge, designed and built to current standards, this need would be met.
Reduced rail capacity and efficiency	As a replacement bridge designed and built to current standards, reliability and other factors affecting rail capacity and efficiency are not issues. Therefore, this need would be met.	As a replacement bridge designed and built to current standards, reliability and other factors affecting rail capacity and efficiency are not issues. Therefore, this need would be met.	As a replacement bridge designed and built to current standards, reliability and other factors affecting rail capacity and efficiency are not issues. Therefore, this need would be met.
Reduced dependability and capacity for marine traffic	As a fixed bridge, the vertical clearance cannot be increased by opening the bridge. The vertical clearance is increased by 4 feet over the existing vertical clearance when closed but some boats will no longer be able to pass upstream of the Walk Bridge. This need would not be met.	As a fixed bridge, the vertical clearance cannot be increased by opening the bridge. The vertical clearance is increased by 18 feet over the existing vertical clearance when closed but some boats will no longer be able to pass upstream of the Walk Bridge. This need would not be met.	The vertical clearance would be the same as that provided under the upstream I-95 bridge. This need would be met.
Lack of sustainability	As a replacement bridge designed and built to current standards, this need would be met.	As a replacement bridge designed and built to current standards, this need would be met.	As a replacement bridge designed and built to current standards, this need would be met.

Note: a. Project Needs are the existing bridge deficiencies as defined in the project purpose and need.

Fixed Span – Low-Level Option

The low-level option would be a fixed bridge located on the existing horizontal and vertical alignments. For this option, the Norwalk River would be crossed by four deck plate girder spans, providing approximately 20 feet of vertical clearance above Mean High Water, four feet more than the existing bridge. There would be four bridge piers located in the river with spans of approximately 100 feet and a horizontal navigational clearance of approximately 70 feet. The total bridge length would be 865 feet. It would extend approximately 270 feet to the west of the existing bridge's west abutment, and approximately 30 feet to the east of the existing bridge's east abutment.

In addition, retaining walls approximately 100 feet long would be required at the west end of the low-level bridge option (not including cross over track, high tower, and OCS work).

CTDOT estimated the construction and program cost of the low-level option to range between $290 and $340 million. Life cycle costs, equalized to present worth of 100 year life, were estimated to range between $5.6 and $6.1 million per year.

Fixed Span – Mid-Level Option

The mid-level option would be a fixed bridge with a top of track profile approximately 7 feet higher than the existing bridge. For this option, the Norwalk River would be crossed by two deck plate girder spans to the west and two deck plate girder spans to the east of a 170-foot through plate girder navigation span. This bridge option would provide 34 feet of vertical clearance over Mean High Water, an increase of 18 feet over existing conditions. This span arrangement would place three piers in the river with a horizontal navigation clearance of approximately140 feet. The through plate girder, while minimizing structure depth, would change the horizontal railroad track alignment, because it would require more space between Tracks 1 and 2 than currently exists (approximately 25 feet as compared to the existing 12.5 feet). Similar to the low-level bridge option, the total bridge length of the mid-level option would be 865 feet. It would extend approximately 270 feet to the west of the existing bridge's west abutment, and approximately 30 feet to the east of the existing bridges east abutment.

Rail work would be required to accommodate the grade raise and change in horizontal alignment. Similar to the low-level option, this option would require retaining walls. Retaining wall lengths of 120 feet to the west and 1,000 feet to the east would be required. The rail work required to accommodate the grade raise would impact approximately 1,400 linear feet along the tracks (not including cross over track, high tower and OCS work).

CTDOT estimated the construction and program cost of the mid-level option to range between $320 and $370 million. Life cycle costs, equalized to present worth of 100 year life, were estimated to range between $4.3 and $4.8 million per year.

Fixed Span – High-Level Option

The high-level option would be a fixed bridge with a top of track profile approximately 35 feet higher than the existing bridge. The horizontal alignment would be similar to that of the mid-level bridge option. For this option, the navigational channel of the Norwalk River would be crossed by a 170-foot through plate girder span resulting in a 140 foot horizontal navigational clearance. This bridge option would provide 60 feet of vertical clearance, matching the vertical clearance of the upstream I-95 bridge. The through plate girder, while minimizing structure depth, would require more space between Tracks 1 and 2 than currently exists. The total bridge length is estimated to be 4,300 feet bridge and an additional 1,600 feet of rail work would be required to accommodate the large increase in grade. This additional rail work would extend approximately from the South Norwalk Station on the west to 600 feet beyond Osborne Avenue on the east. Approximately 1,000 feet of the Danbury Branch will require reconstruction in order to accommodate the re-connection to the main line tracks

CTDOT estimated the construction and program cost of the high-level option to be in excess of $1 billion. Life cycle costs, equalized to present worth of 100 year life, were estimated to range between $3.8 and $4.3 million per year.

2.4. Alternatives Retained for Further Evaluation

In addition to the **No Build Alternative**, CTDOT retained and advanced a **Build Alternative** for further evaluation in this EA/EIE: the **Replacement Alternative – Movable Bridge**. Two types of bridges were considered for the Build Alternative, both replacement movable bridges: a rolling lift bascule bridge was advanced; and, a through truss vertical lift bridge was advanced. A variation of the vertical lift bridge type with a longer span also was advanced. Respectively, the three options advanced are called Option 4S, Option 8A, and Option 11C, and they are described in Section 2.4.2. These options emanated from the considerations and screening of more than 70 options (refer to Section 2.2) and are representative of the bascule and vertical lift bridge types as a balance of user needs, engineering, environmental, cost, and constructability needs and constraints. As design progresses on a bridge type, design refinements such as modifying final span lengths and other dimensional attributes are possible.

2.4.1. No Build Alternative

The No Build Alternative would retain the existing bridge and provide for normal maintenance activities during the life of the bridge. There would not be any major rehabilitation or replacement of structural elements, foundation elements, mechanical components, or electrical systems. The existing high towers would be retained and undergo normal maintenance by the owner. This alternative is carried forward for evaluation to describe the transportation conditions if no actions other than normal maintenance were conducted, and for comparison to the Build Alternative. However, the No Build Alternative would not meet the purpose and needs, as detailed in Table 2-4.

Table 2-4—Project Needs Evaluation of the No Build Alternative

Project Needs[a]	No Build Alternative
Structure age and deterioration	Normal maintenance would not prolong the structure's useful life. This need would not be met.
Decreasing reliability	Bridge failures would likely increase and worsen. This need would not be met.
Lack of resiliency	Key mechanical and electrical systems would continue to be vulnerable to storm surges and other weather events. This need would not be met.
Safety standards	Current design standards for safety, which are currently not met, would remain unmet. This need would not be met.
Lack of redundancy	Single structure causes closure of all tracks if bridge fails and for some maintenance activities. This need would not be met.
Limited operational flexibility	This need would not be met.
Difficulty of maintenance	Full closure of all tracks would be required for some maintenance activities. This need would not be met.
Reduced rail capacity and efficiency	The unreliable nature of the bridge would reduce capacity on the NHL. This need would not be met.
Reduced dependability and capacity for marine traffic	Bridge failures would obstruct marine traffic. This need would not be met.
Lack of sustainability	Increased maintenance would be required and the bridge could eventually fail to operate, causing stoppages of rail and marine traffic. This need would not be met.

Note: a. Project Needs are the existing bridge deficiencies as defined in the project purpose and need.

Figure 2-1 presents a rendering of the existing Walk Bridge. Figure 2-2 presents an elevation of the existing Walk Bridge.

Figure 2-1—Rendering of the Existing Swing Span

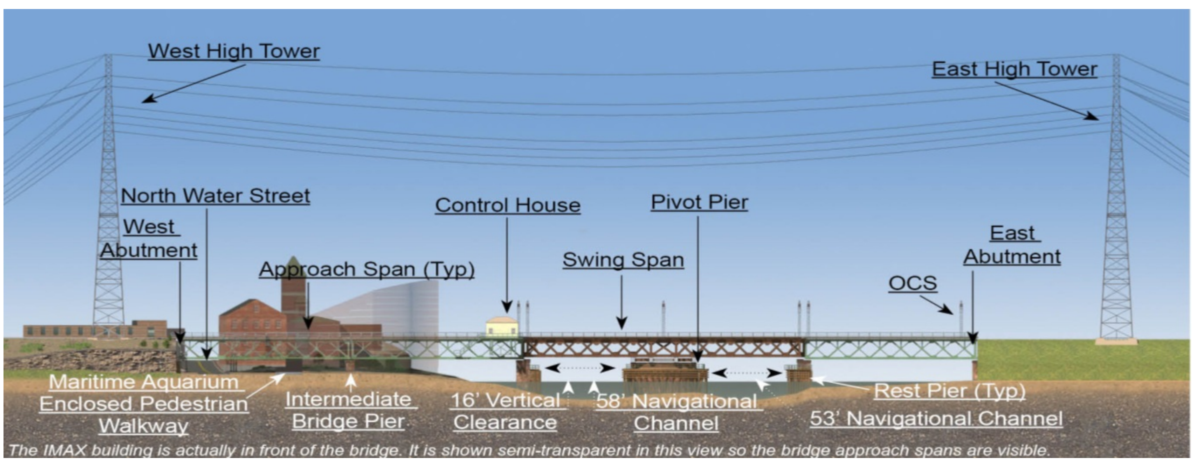

Figure 2-2—Existing Swing Span – Elevation View

2.4.2. Build Alternative: Replacement Alternative – Movable Bridge

Bascule Bridge Option (Option 4S)

A bascule bridge (Figure 2-3, Figure 2-4, and Figure 2-5) would provide two side-by-side single-leaf rolling lift bascule spans across the Norwalk River, each with separate mechanical and electrical equipment and controls so that each span can work independently of the other, or in unison with the other. Option 4S was chosen for analysis in this document as representative of a bascule movable bridge that meets project purpose and need and balances user needs, engineering, constructability, environmental impacts, and costs. It would provide a vertical clearance of approximately 27 feet above mean high water when the movable span is in the closed position, and a vertical clearance of at least 60 feet, when the movable span is in the opened position, as shown on the elevation view of the bascule bridge, Figure 2-5. When closed, the vertical clearance of Option 4S is increased by approximately 11 feet over the existing vertical clearance of 16 feet due to the configuration of the structure. However, the top of rail elevations on the new bridge would be approximately the same as the top of rail elevations on the existing bridge. A horizontal clearance of at least 120 feet would be provided for navigation, and the alignment of the navigation channel under the new bridge with the alignment of the navigation channel under the Stroffolino Bridge would be improved.

Figure 2-3—Rendering of Bascule Bridge in the Closed Position (Option 4S)

The rolling bascule spans would be comprised of 170 foot movable truss spans with overhead counterweights. As the span moves, the structure would be supported by curved segmental girders that are connected to the bascule span and the counterweight. As the span rotates during movements, it would also translate, or roll, horizontally, with the movements guided by the curved segmental girder. The overhead counterweights would be configured to permit the counterweights to pass to the outside of the adjacent fixed approach spans. The drive machinery, electrical components, and controls for operating the span would be located above track level, improving the resiliency of the systems by offering protection from high water events.

The new movable spans would each carry two tracks: Tracks 1 and 3 on the northern span and Tracks 2 and 4 on the southern span. The tracks would be on a non-parallel alignment with adequate spacing between the two center tracks (Tracks 1 and 2) to accommodate structural and mechanical clearances. With this non-parallel alignment, the total width of the two bridge structures would vary from approximately 50 feet at the western abutment to 95 feet at the eastern abutment. The movable spans would be flanked by four spans on the western side and two spans on the eastern side. These approach spans would be fixed spans and would not move. Including the approach spans, the total length of Walk Bridge would be approximately 650 feet from bridge abutment to bridge abutment.

Figure 2-4—Rendering of Bascule Bridge in the Open Position (Option 4S)

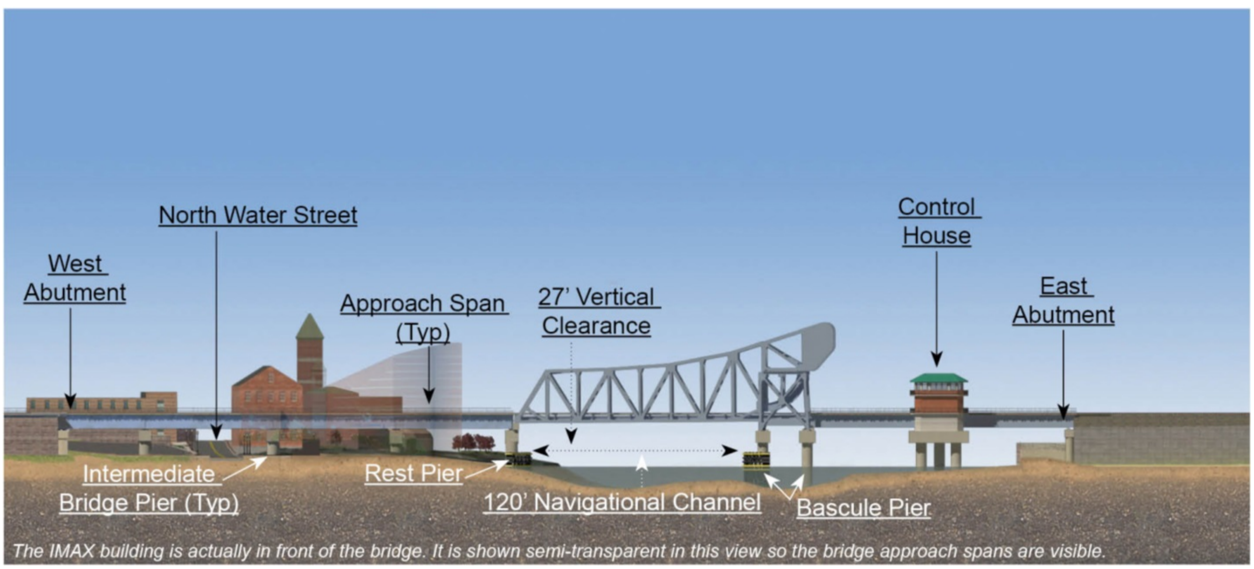

Figure 2-5—Elevation View of the Bascule Bridge (Option 4S), Span Closed

The bridge would be supported by new abutments at each end and by six intermediate bridge piers, including the bascule pier and the bascule rest pier. The foundations for the bascule piers, rest pier, and intermediate pier supporting the control house would all be located in the Norwalk River and would be comprised of drilled shafts installed into bedrock with a cap beam connecting the drilled shafts. The western bridge abutment would be located approximately 100 feet further west than the existing abutment to avoid construction conflicts with the existing abutment, high tower foundations, and retaining walls. Although not the intent of the abutment relocation, this action would result in a more open environment on the west side of North Water Street under the bridge. A new control house would be located on the southern end of the intermediate pier.

The bascule pier would consist of two adjacent, open piers that support the rolling bascule span structural elements. Drilled shafts with cap beams would make up the bascule pier foundations. The open nature of the substructure would promote hydraulic flow through the limits of the bridge.

A new fender system would be constructed approximately 10 feet from the new bascule and rest piers to protect them, providing at least 120 feet of horizontal clearance in the navigation channel. The fenders would be supported by concrete, steel or composite material piles. Navigational lighting in accordance with USCG standards would be installed.

In addition to replacement of Walk Bridge, the project would include other improvement elements as shown on Figure 2-6. The railroad corridor approaching the bridge from the west would be on retained fill. The existing retaining walls would be replaced with new retaining walls along both sides of the corridor for a distance of approximately 350 feet. These two new retaining walls would be constructed within the railroad right-of-way in the same general location as the existing retaining walls. The work would not extend to the Danbury Branch interlocking but would end approximately 100 feet east of this interlocking, which is approximately 250 feet east of the existing Washington Street Bridge.

East of Walk Bridge, the project would continue on the existing railroad corridor location with construction of new retaining walls within the existing right-of-way on both the northern and southern sides of the corridor. The project would extend east to a point approximately 300 feet east of the Fort Point Street Bridge. The railroad bridge over Fort Point Street would be replaced, including replacement of the existing superstructure and bridge abutments. This is necessary to accommodate the diverging track alignments for the two non-parallel Walk Bridges. The Fort Point Street Bridge abutments may be constructed in the same general location as the existing bridge abutments, or may be pulled back to accommodate a wider Fort Point Street below. CTDOT would continue to work with the City of Norwalk as design progresses to determine the abutment locations and span length of this bridge.

Track, catenary, and signal work would be performed in addition to the work to replace Walk Bridge. Track work would include replacing about one-half mile of tracks and ballast within the existing railroad right-of-way from approximately the Washington Street Bridge to approximately 300 feet east of the Fort Point Street Bridge. Overhead catenary and supports would be replaced within the limits of the project, generally from the Washington Street Bridge to a point approximately 300 feet east of the Fort Point Street Bridge. All approach track, catenary and signal work for the project would be within the existing state right-of-way.

The existing Walk Bridge and fender system would be dismantled and removed. This would include removal of the foundations and fender supports in the river to a depth to be determined in consultation with USACE and USCG. The existing western bridge abutment would be removed in its entirety, while the eastern abutment would be retained and partially lowered so that the remaining portions of the abutment can be used as a retaining wall to support an extension of the bike/pedestrian trail north of the bridge to areas south of the bridge.

The probable construction cost of the Bascule Bridge (Option 4S) is estimated to range between $330 and $365 million in year 2020 dollars, which is the anticipated mid-point of construction. Life cycle costs, equalized to present worth of 100 year life, are estimated to range between $3.4 and $3.9 million per year.

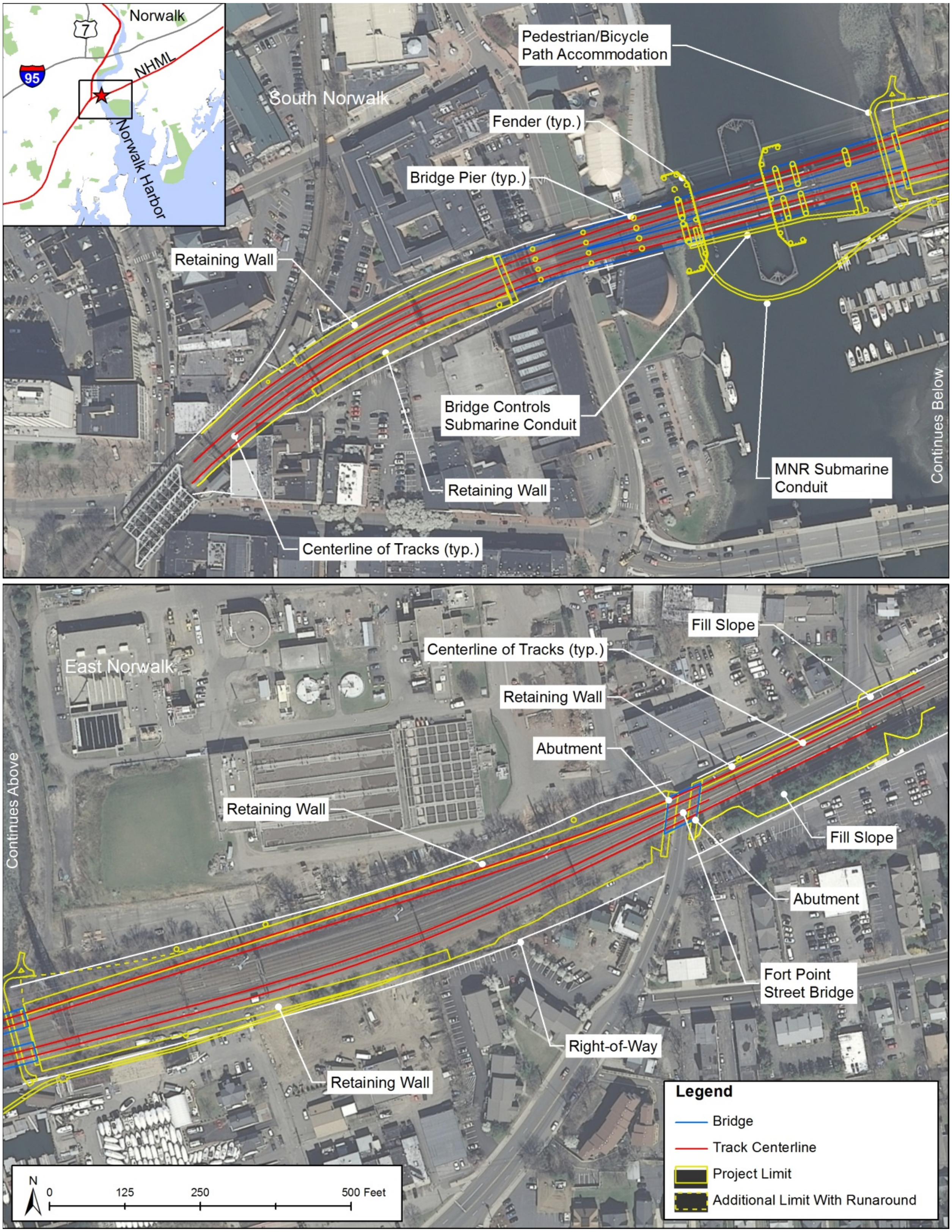

Figure 2-6—Illustration of the Project Limits with the Bascule Bridge (Option 4S)

Vertical Lift Bridge Option (Option 8A - Short Span)

A vertical lift bridge (Figure 2-7, Figure 2-8 and Figure 2-9) would provide two side-by-side vertical lift spans across the Norwalk River, each with separate mechanical and electrical equipment and controls so that each span can work independently of the other, or in unison with the other. Option 8A was chosen for analysis in this document as representative of a short span vertical lift movable bridge that meets project purpose and need and balances user needs, engineering, constructability, environmental impacts, and costs. A span-drive vertical lift bridge with a 170-foot open-deck through-truss lift span would provide a minimum of 120 feet of horizontal navigational clearance and 60 feet of vertical clearance when the span is fully raised. There would be two separate lift spans, one through-truss span for Tracks 1 and 3 and one through-truss span for Tracks 2 and 4, providing system redundancy. The tracks would be on a parallel alignment across the Norwalk River, resulting in the two movable spans being parallel with one another. Track spacing between Tracks 1 and 2 would be 25 feet to allow for structural and mechanical system clearance between the adjacent lift spans. The alignment of Tracks 1 and 3 would remain close to the current alignment, while the alignment of Tracks 2 and 4 would be shifted to the south to accommodate the increase in center track spacing. The total width of the bridge would be approximately 70 feet. As shown on Figure 2-9, the lift span would provide approximately 27 feet of vertical clearance above Mean High Water in the closed position, which would be approximately 11 feet more than the vertical clearance of the existing swing span. To achieve 60 feet of vertical clearance at mean high water, the lift span would be raised 35 feet above the profile of the existing bridge. The bridge tower heights would be determined during final design and would range between approximately 100 and 150 feet above the top of the support piers (the taller tower heights are shown).

Figure 2-7—Rendering of the Short Span Vertical Lift Bridge in the Closed Position (Option 8A)

The movable spans would be flanked by four spans on the western side and two spans on the eastern side. These approach spans would be fixed spans and would not move. Including the approach spans, the total length of Walk Bridge would be approximately 690 feet from bridge abutment to bridge abutment.

Figure 2-8—Rendering of the Short Span Vertical Lift Bridge in the Open Position (Option 8A)

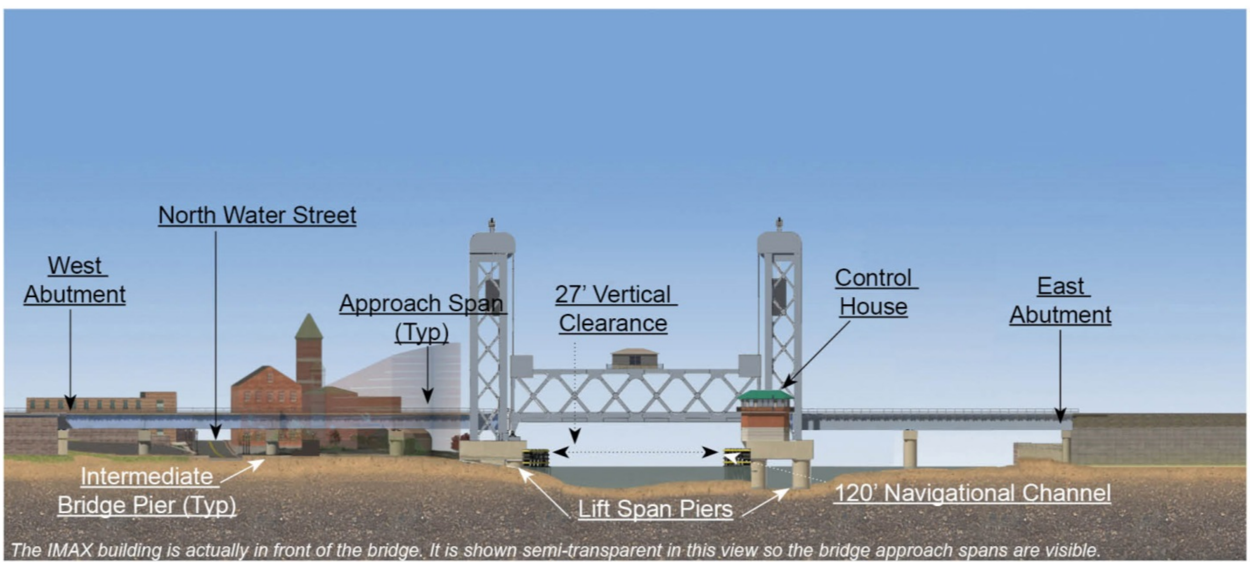

Figure 2-9—Elevation View of the Short Span Vertical Lift Bridge (Option 8A), Span Closed

The bridge would be supported by new abutments at each end and by six intermediate bridge piers, including the vertical lift bridge piers. The foundations for the vertical lift span piers and one intermediate pier would all be located in the Norwalk River and would be comprised of drilled shafts installed into bedrock, with a cap beam connecting the drilled shafts. The western bridge abutment would be located approximately 100 feet further west than the existing abutment to avoid construction conflicts with the existing abutment, high tower foundations, and retaining walls. Although not the intent of the abutment relocation, this action would result in a more open environment on the west side of North Water Street under the bridge. A new control house would be located on the southern end of the east vertical lift span pier.

A new fender system would be constructed approximately 10 feet from the new vertical lift span piers to protect them, providing at least 120 feet of horizontal clearance in the navigation channel. The fenders would be supported by concrete, steel or composite material piles. Navigational lighting in accordance with USCG standards would be installed.

In addition to replacement of Walk Bridge, the project would include other improvement elements as shown on Figure 2-10. Like the bascule movable bridge, the railroad corridor approaching the bridge from the west would be on retained fill. The existing retaining walls would be replaced with new retaining walls along both sides of the corridor for a distance of approximately 350 feet. These two new retaining walls would be constructed within the railroad right-of-way in the same general location as the existing retaining walls. The work would not extend to the Danbury Branch interlocking but would end approximately 100 feet east of this interlocking, which is approximately 250 feet east of the existing Washington Street Bridge.

East of Walk Bridge, the project would continue on the existing railroad corridor location with construction of a new retaining wall within the existing right-of-way on the southern side of the corridor. A retaining wall would not be necessary on the north side of the corridor in the area from the Walk Bridge to Fort Point Street. The project would extend east to a point approximately 300 feet east of the Fort Point Street Bridge. The railroad bridge over Fort Point Street would be replaced. The Fort Point Street Bridge abutments may be constructed in the same general location as the existing bridge abutments, or may be pulled back to accommodate a wider Fort Point Street below. CTDOT will continue to work with the City of Norwalk as design progresses to determine the abutment locations and span length of this bridge.

Track, catenary, and signal work would be performed in addition to the work to replace Walk Bridge. Track work would include replacing about one-half-mile of tracks and ballast within the existing railroad right-of-way from approximately the Washington Street Bridge to approximately 300 feet east of the Fort Point Street Bridge. Overhead catenary and supports would be replaced within the limits of the project, generally from the Washington Street Bridge to a point approximately 300 feet east of the Fort Point Street Bridge. All approach track, catenary and signal work for the project would be within the existing state right-of-way.

The existing Walk Bridge and fender system would be dismantled and removed. This would include removal of the foundations and fender supports in the river to a depth to be determined in consultation with USACE and USCG. The existing western bridge abutment would be removed in its entirety, while the eastern abutment would be retained and partially lowered so that the remaining portions of the abutment can be used as a retaining wall to support an extension of the bike/pedestrian trail north of the bridge to areas south of the bridge.

The probable construction cost of the short span Vertical Lift Bridge (Option 8A) is estimated to range between $380 and $415 million in year 2020 dollars, which is the anticipated mid-point of construction. Life cycle costs, equalized to present worth of 100 year life, were estimated to range between $3.4 and $3.9 million per year.

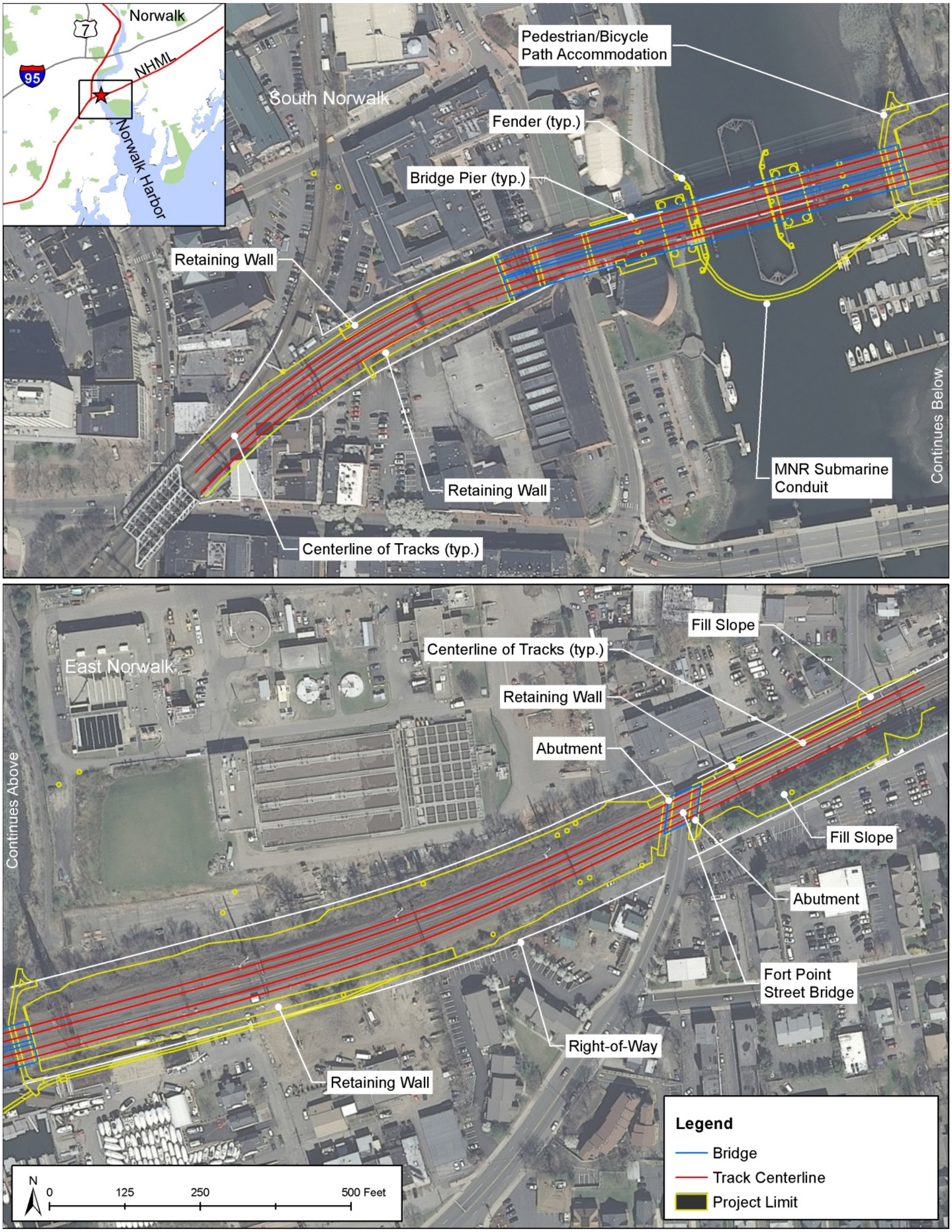

Figure 2-10—Illustration of the Project Limits with the Short Span Vertical Lift Bridge (Option 8A)

Vertical Lift Bridge Option (Option 11C - Long Span)

Like the short span vertical lift bridge, a long span vertical lift bridge (Figure 2-11, Figure 2-12, and Figure 2-13) would provide two side-by-side vertical lift spans across the Norwalk River, each with separate mechanical and electrical equipment and controls so that each span can work independently of the other, or in unison with the other. Option 11C was chosen for analysis in this document as representative of a long span vertical lift movable bridge that meets project purpose and need and balances user needs, engineering, constructability, environmental impacts, and costs. A vertical lift bridge with a 240-foot open-deck through-truss lift span would provide a minimum of 200 feet of horizontal navigational clearance and 60 feet of vertical clearance when the span is fully raised. There would be two separate lift spans, one through-truss for Tracks 1 and 3 and one through-truss for Tracks 2 and 4, providing system redundancy. The tracks would be on a parallel alignment across the Norwalk River, resulting in the two movable spans being parallel with one another. Track spacing between Tracks 1 and 2 would be 25 feet to allow for structural and mechanical clearance between the lift spans. The alignment of Tracks 1 and 3 would remain close to the current alignment, while the alignment of Tracks 2 and 4 would be shifted to the south to accommodate the increase in center track spacing. The total width of the bridge would be approximately 70 feet. As shown on Figure 2-13, the lift span would provide approximately 27 feet of vertical clearance in the closed position, which would be approximately 11 feet more than the vertical clearance of the existing swing span. To achieve 60 feet of vertical clearance at mean high water, the lift span would be raised 35 feet above the profile of the existing bridge. Like the short span vertical lift bridge, Option 11C's bridge tower heights will be determined during final design and would range between approximately 100 and 150 feet above the top of the support piers (the taller tower heights are shown).

Figure 2-11—Rendering of the Long Span Vertical Lift Bridge in the Closed Position (Option 11C)

The movable spans would be flanked by four spans on the western side and one span on the eastern side. These approach spans would be fixed spans and would not move. Including the approach spans, the total length of the Walk Bridge would be approximately 690 feet from bridge abutment to bridge abutment.

Figure 2-12—Rendering of the Long Span Vertical Lift Bridge in the Open Position (Option 11C)

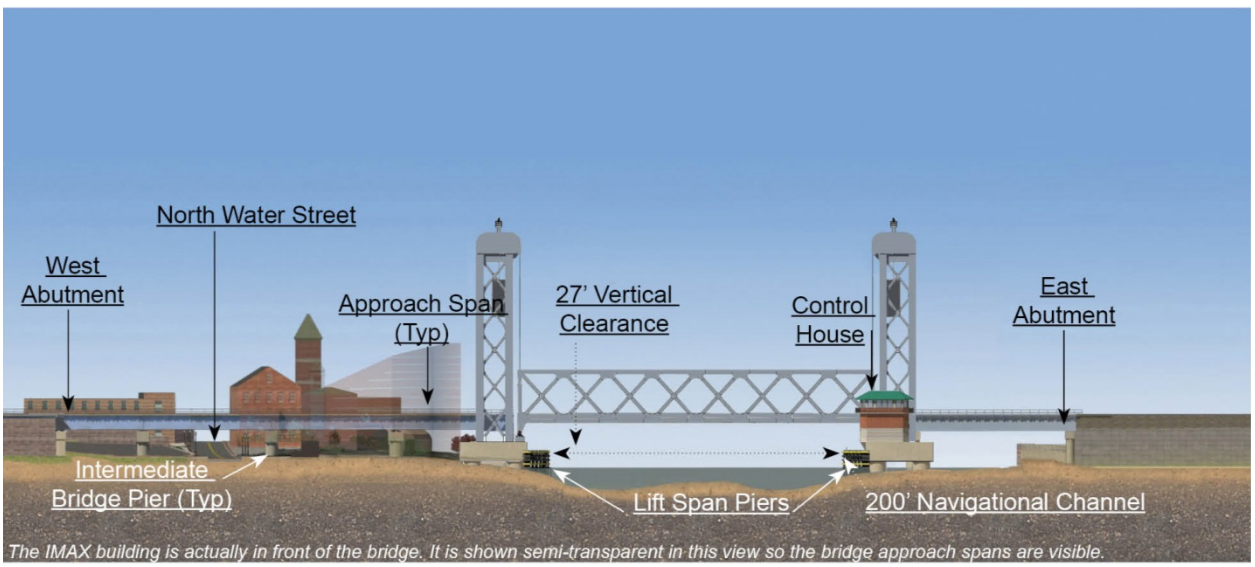

Figure 2-13—Elevation View of the Long Span Vertical Lift Bridge (Option 11C)

The bridge would be supported by new abutments at each end and by five intermediate bridge piers, including the vertical lift bridge piers. The eastern lift pier would be located further east than the eastern lift pier for the short-span vertical lift bridge (Option 8A), thus increasing the span length and the horizontal clearance between the vertical lift bridge piers. Both piers supporting the vertical lift span towers would be placed outside of the limits of the existing swing span, with no new foundation construction occurring in either the west or east navigation channels, as currently defined by the existing swing span. The foundations for the vertical lift span piers would be located in the Norwalk River and would be comprised of drilled shafts installed into bedrock, with a cap beam connecting the drilled shafts. The western bridge abutment would be located approximately 100 feet further west than the existing abutment to avoid construction conflicts with the existing abutment, high tower foundations, and retaining walls. Although not the intent of the abutment relocation, this action would result in a more open environment on the west side of North Water Street under the bridge. A new control house would be located on the southern end of the east vertical lift span pier.

A new fender system would be constructed approximately 10 feet from the new vertical lift span piers to protect them, providing at least 200 feet of horizontal clearance in the navigation channel. The fenders would be supported by concrete, steel, or composite piles. Navigational lighting in accordance with USCG standards would be installed.

The differences between the short span (Option 8A) and long span (Option 11C) options lie in the pier placement and span length between the east and west bridge abutments of the Walk Bridge, as just described. Beyond these abutments, the improvements to the corridor approaching the Walk Bridge would be the same for the short span or long span options of the vertical lift bridge, as shown on Figure 2-14. The railroad corridor approaching the bridge from the west would be on retained fill. The existing retaining walls would be replaced with new retaining walls along both sides of the corridor for a distance of approximately 350 feet. These two new retaining walls would be constructed within the railroad right-of-way in the same general location as the existing retaining walls. The work would not extend to the Danbury Branch interlocking but would end approximately 100 feet east of this interlocking, which is approximately 250 feet east of the existing Washington Street Bridge.

East of Walk Bridge, the project would continue on the existing railroad corridor location with construction of a new retaining wall within the existing right-of-way on the southern side of the corridor. A retaining wall would not be necessary on the north side of the corridor in the area from the Walk Bridge to Fort Point Street. The project would extend east to a point approximately 300 feet east of the Fort Point Street Bridge. The railroad bridge over Fort Point Street would be replaced. The Fort Point Street Bridge abutments may be constructed in the same general location as the existing bridge abutments, or may be pulled back to accommodate a wider Fort Point Street below. CTDOT will continue to work with the City of Norwalk as design progresses to determine the abutment locations and span length of this bridge.

Track, catenary, and signal work would be performed in addition to the work to replace Walk Bridge. Track work would include replacing about one-half-mile of tracks and ballast within the existing railroad right-of-way from approximately the Washington Street Bridge to approximately 300 feet east of the Fort Point Street Bridge. Overhead catenary and supports would be replaced within the limits of the project, generally from the Washington Street Bridge to a point approximately 300 feet east of the Fort Point Street Bridge. All approach track, catenary and signal work for the project would be accomplished within the existing state right-of-way.

The existing Walk Bridge and fender system would be dismantled and removed. This would include removal of the foundations and fender supports in the river to a depth to be determined in consultation with USACE and USCG. The existing western bridge abutment would be removed in its entirety, while the eastern abutment would be retained and partially lowered so that the remaining portions of the abutment can be used as a retaining wall to support an extension of the bike/pedestrian trail north of the bridge to areas south of the bridge.

The probable construction cost of the long span Vertical Lift Bridge (Option 11C) is estimated to range between $425 and $460 million in year 2020 dollars, which is the anticipated mid-point of construction. Life cycle costs, equalized to present worth of 100 year life, were estimated to range between $3.7 and $4.2 million per year.

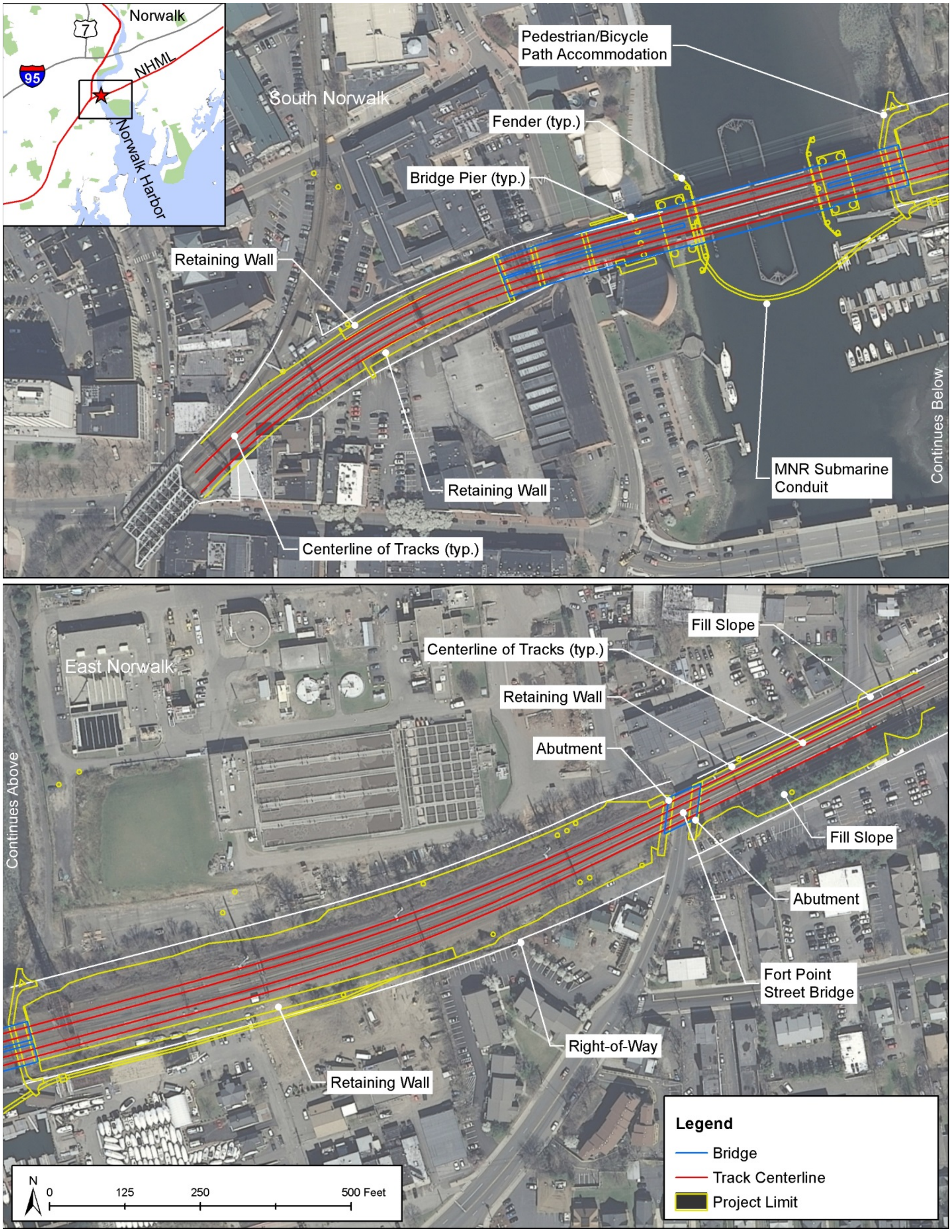

Figure 2-14—Illustration of the Project Limits with the Long Span Vertical Lift Bridge (Option 11C)

Removal of High Towers

The three options for replacing the Walk Bridge all require the removal of the two existing high towers which carry Eversource Energy high voltage power and Metro-North Railroad communications over the Norwalk River. These towers do not meet current structural design standards and will conflict with the replacement bridge and associated track alignments. Several options for replacement of the utility functions that exist on the high towers are under consideration from engineering, cost, environmental, and historical perspectives. Metro-North communication functions will potentially be carried on the new bridge on either side of the movable span, transitioning to a placement beneath the Norwalk River at the navigation channel, as shown on Figure 2-6, Figure 2-10, and Figure 2-14. Engineering studies are being undertaken, and coordination is underway with Metro-North Railroad, Eversource, the State Historic Preservation Office (CT Department of Economic and Community Development), historic stakeholders, and the City of Norwalk to determine the best option for replacing the utility functions that exist on these high towers, including a new alignment. The Eversource power relocation will undergo a separate environmental evaluation and permitting process, including potential CT Siting Council review, among other reviews, where there will be opportunities for public review and comment. Eversource Energy will be responsible for relocating its lines and the associated environmental evaluations and permits. CTDOT will be responsible for removing the existing high towers as part of the Walk Bridge Replacement Project.

Dredging for a Wider Navigation Channel

Because the existing bridge's support piers will be removed, including the swing span's pivot pier and rest piers, and protective fenders, the new bridge will provide for a wider navigational opening. Therefore, portions of the river under the bridge that are not currently maintained as part of the federal navigation channel, will be dredged to match the federal channel depth of ten feet and tie into the existing 125 foot navigation channel that exists upstream of the bridge. Channel dredging will be conducted using a hydraulic clamshell bucket during the approved in-water work months, typically November through January where containment is not required. The approximate amounts of dredged material are estimated at 4,100 cubic yards (cy) for the Bascule Bridge option and the short span Vertical Lift Bridge option, and 4,900 cy for the long span Vertical Lift Bridge option. Additional information on channel dredging is provided in Section 5.3.6.

A discussion of the existing aquatic resources and habitats affected, the potential impacts, and potential mitigation is provided in Section 3.14. Section 5.3.18 includes a discussion of the actions CTDOT will take during final design for testing and disposal of dredged sediments.

State and federal permits from CTDEEP OLISP, USCG, and ACOE will be required for dredging activities in the federal navigation channel, as described in Chapter 7.

2.5. Preferred Alternative

CTDOT considered the project purpose and need, engineering, constructability, potential impacts to rail and navigation traffic, estimated costs, and potential environmental impacts of the alternatives and options. With public input, CTDOT has determined that the **Build Alternative,** specifically the **Replacement Alternative – Movable Bridge, Long Span Vertical Lift Bridge (Option 11C),** is the preferred alternative. The Build Alternative is the only alternative that satisfies the project purpose and need. Each of the three design options for the Build Alternative would have similar environmental impacts. However, construction requirements and the associated impact to rail and navigation traffic, as well as the costs of the three design options, would be different.

The existing bridge, in whole or in part, is expected to remain in service throughout a significant portion of the construction duration. Maintaining the integrity of the existing bridge, in particular the foundations, is imperative to minimizing disruptions to rail and navigation traffic. Therefore, bridge replacement options requiring activities that limit proximity exposure of the existing bridge during construction are viewed favorably. For example, designs with foundations located in close proximity to the existing supports, specifically the pivot pier, exhibit more risk than other designs. Option 11C is the only alternative for which all foundations are located beyond the limits of the existing swing span.

Superstructure erection for all options will require a two-track outage. However, the amount of substructure work that can be completed without service disruptions (from a four-track operation to a two-track operation) would vary among the options. The design concept that allows for conducting the largest portion of substructure work in advance of an outage, along with the shortest period of superstructure construction, is expected to require the shortest overall construction duration. The shortest construction duration generally corresponds with the least disruptions to rail, maritime, and other users. Option 11C offers the greatest opportunity for maximum substructure construction prior to imposing a two-track outage, thereby minimizing the remaining duration of construction once the outage takes effect.

Designs that present fewer challenges during scheduled outages will have less risk of extending those outages and prolonging the disruptions to commuters and waterway users. The east movable span foundations for Option 4S and Option 8A would be located in the existing east navigation channel. Equipment access for float-in installation of the new lift spans is, therefore, obstructed by the existing pivot pier and limited to the west channel unless the pier is removed in advance of the span installation, indicating that additional temporary support is required for the tracks remaining in service. Option 4S also exhibits a highly asymmetric and unbalanced lift span configuration, further complicating a float-in installation. Symmetry and balance are favorable characteristics of Option 8A and Option 11C. Additionally, access to both channels would mitigate the pivot pier obstruction, presenting a potential advantage for Option 11C over Option 8A.

Work in the river is inherently riskier than work that is not in the water. For Option 11C, the elimination of the eastern intermediate approach span pier and the location of the east lift span tower foundation closer to shore, outside the navigation channel, and in shallower water (compared to Option 4S and Option 8A), introduce clear advantages regarding risks associated with in-water construction.

Option 11C exhibits navigation advantages over Option 4S and Option 8A by not blocking the east channel and thereby delaying immobilization of the swing span. Construction equipment can be operated on one side of the existing pivot pier while maintaining safe vessel transit through the bridge on the opposite side. Since the swing span would be operational until it is removed, over-height vessels could pass through the bridge, albeit on a restricted schedule that balances construction efficiency with the reasonable needs of safe, efficient navigation. Based on the configuration of the new movable spans and the associated track alignment, Option 11C does not require the use of a temporary runaround bridge during construction.

Option 8A introduces a vertical navigation restriction prior to completion of the lift span towers due to locking down the swing span for partial demolition or replacement with a non-movable temporary span. Option 4S requires removal of the existing bridge in the east channel to install the bascule pier foundations, thereby imposing a vertical restriction with temporary spans for drilled shaft installation, which is earlier in the construction sequence than Option 8A.

The environmental impacts of the three design options are comparable. All options would require that the historic Walk Bridge and high towers be demolished. Fort Point Street Bridge also would be replaced under all options. In general, all other environmental impacts would be similar. The bascule bridge option

(Option 4S) would require a wider bridge and project footprint on the east side of the Norwalk River than the two vertical lift bridge options. The footprint impacts of the options to natural resources would be comparable; however, the impacts of the bascule bridge to tidal wetlands, freshwater wetlands and subtidal habitat would be slightly higher than the vertical lift bridge options. When the impacts associated with a temporary runaround bridge are considered, some impacts would be further increased. In all cases, the long span vertical lift bridge option (Option 11C) would have the same or slightly less impact to natural resources than the short span vertical lift option (Option 8A).

The existing high towers present prominent vertical elements at the site and they contribute to the overall historic character of the project area. As previously noted, these latticed high towers must be removed. A potential advantage of the vertical lift bridge options (Option 8A and 11C) is that these options will reintroduce a prominent vertical element to the site and will offer flexibility, as the design advances, to retain this vertical element and continue to contribute to the character of the project area.

Figure 2-15 illustrates the estimated construction durations for each of the three design options. At approximately 40 months, Option 11C will require the shortest overall time from commencement of Walk Bridge construction to restoration of four-track service and full operation capability for marine traffic. This compares to 44 months for the short span vertical lift bridge (Option 8A) and to 47 months for the bascule bridge (Option 4S).

Figure 2-15 shows that more construction activities can be undertaken while the existing swing span is operational with Option 11C, thereby reducing the vertical navigation restrictions during construction by up to 14 months compared to the other two options. Two-track rail operation with Option 11C is four months shorter than Option 8A and seven months shorter than Option 4S, thus minimizing the duration of rail restrictions during construction. Construction of Option 11C will result in less disruption to rail service and navigational traffic during construction.

Temporary track outages, temporary channel restrictions or closures, and temporary street detours could potentially affect business operations in the area of construction. Selection of Option 11C minimizes this temporary disruption by minimizing the duration of construction activities, restrictions, or closures. As a result, this Option 11C corresponds with the least social and economic risks and impacts to the City of Norwalk and the larger region.

The estimated costs of Option 11C are higher than the other two design options. At an estimated construction cost between $365 million and $415 million, Option 11C would cost about 12 percent more than Option 8A ($325 million -$375 million) and about 10 percent more than Option 4S ($330 million - $380 million). Life cycle costs also would be highest for Option 11C at between $3.7 million and $4.2 million per year. This compares to annual life cycle costs ranging from $3.4 million to $3.9 million for Option 4S and $3.4 million to $3.9 million for Option 8A. CTDOT has determined that Option 11C's shorter construction duration and the reduced disruption to rail traffic along the NEC and navigation traffic on the Norwalk River, along with lower environmental impacts, outweighs the additional costs of Option 11C.

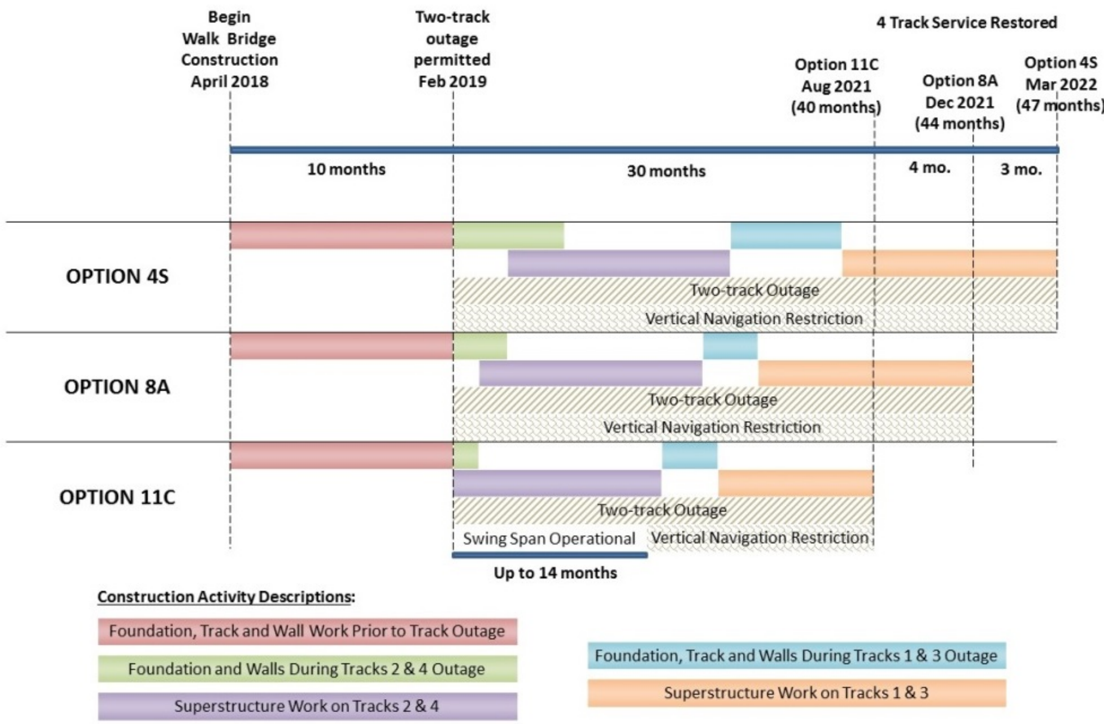

Figure 2-15 – Construction Schedule - Comparison of Bridge Options

3. Environmental Resources, Potential Impacts, and Mitigation

Chapter 3 presents the existing conditions at the Walk Bridge Replacement Project site, potential permanent impacts due to the project, and proposed mitigation measures to reduce and/or minimize those impacts. Chapter 5 addresses short-term construction-related impacts and mitigation measures.

As presented in Chapter 2, CTDOT assessed multiple alternative concepts for the project. From this analysis, CTDOT determined that replacement of the existing structure with a movable bridge is necessary to meet the project purpose and need. Chapter 3 assesses benefits and impacts of the two remaining alternatives:

- No Build Alternative, which would maintain the current Walk Bridge in its existing condition and configuration by performing routine maintenance until the end of its safe, useful life; and

- Build Alternative, which consists of the replacement of the existing bridge with a movable bridge structure. CTDOT is considering three options for the Build Alternative:
  - Bascule Bridge Option (Option 4S)
  - Short Span Vertical Lift Bridge Option (Option 8A)
  - Long Span Vertical Lift Bridge Option (Option 11C)

These Build Alternative options are representative of the bascule and vertical lift bridge types as a balance of user needs, engineering, environmental, cost, and constructability needs and constraints. As design progresses on a bridge type, design refinements such as modifying final span lengths and other dimensional attributes are possible.

The assessment of existing conditions and potential impacts has been prepared in accordance with NEPA's and CEPA's implementing regulations.

3.1. Rail Transportation

3.1.1. Introduction and Methodology

This section presents an overview of the NHL, which is the regional rail transportation system that traverses the Walk Bridge, and assesses the potential impacts of the project upon the existing regional rail network.

As described in Chapter 1, the Walk Bridge is essential infrastructure on the NHL. Given the importance of the existing bridge to the regional transportation network, and the potential impacts of the project upon the region, the Walk Bridge Replacement Project is evaluated within a regional transportation context that encompasses the southern Connecticut coastline.

Existing information about Walk Bridge and the NHL was obtained from current reports prepared by CTDOT and the Metropolitan Transportation Authority (MTA), a New York public authority working in cooperation with CTDOT to operate service along the NHL. Ongoing actions and proposed projects to upgrade the NHL were identified through a review of CTDOT's C*onnecticut State Rail Plan, 2012-2016*; CTDOT's *Five Year Capital Plan for Fiscal Years 2015-2019*; the South Western Region Metropolitan Planning Organization's (SWRMPO's) *South Western Region 2015-2018 Transportation Improvement*

Program (TIP), the four year financial program for implementation of federally-funded projects included in the Long Range Transportation Plan; and the 2015 Statewide TIP (current as of June 22, 2016), the State's four-year planning document that lists all projects expected to be funded with Federal Highway Administration (FHWA) and FTA participation.

3.1.2. Existing Conditions

Infrastructure

Overview of New Haven Line

Walk Bridge is located on the NHL approximately 41.5 miles northeast of Grand Central Terminal in New York City. The NHL is a four-track main line railroad[1] constructed of continuously welded rail. It is powered with high-voltage, alternating current, single-phase electricity conducted through an overhead contact system (OCS). The NHL's right-of-way and physical infrastructure within Connecticut are owned by the State of Connecticut and maintained by CTDOT.

Figure 3-1 presents a schematic of the entire NHL network within Connecticut, which runs northeast-southwest along the southwestern shoreline of the state. The NHL network includes the main line (46.8 miles within Connecticut) and three branch lines: the New Canaan Branch (7.9 miles), which extends north from Stamford to New Canaan; the Danbury Branch (24.2 miles), which extends north from South Norwalk to Danbury; and the Waterbury Branch (27.1 miles), which extends north from Milford to Waterbury. At the northeastern end of the main line, at New Haven Union Station/State Street station, the railroad transitions ownership to different rail carriers, including Amtrak, as the railroad continues north on the NEC to Boston. At the southwestern end of the line, the railroad connects to the MTA's Hell Gate Line, which provides direct access south to Grand Central Terminal in New York City.

The NHL is maintained at Federal Railroad Administration (FRA) Class 4 standards, which allow for a maximum allowable passenger train operating speed of 80 miles per hours (mph) and a maximum allowable freight train speed of 60 mph.[2] There are several locations on the NHL with speed restrictions due to the age and deteriorating condition of the infrastructure. Currently, trains are prohibited from traveling over 45 mph while crossing Walk Bridge. Other factors affecting train speeds include track curvature and interlockings.

North American railroads have established weight and clearance standards. On railroads that do not meet these standards, large or fully loaded railcars cannot be operated, resulting in higher shipping costs. The entire NHL, including Walk Bridge, currently has a weight limit for freight shipments of 263,000 pounds per carload. The North American rail network's standard shipment weight, which applies across North America, is 286,000 pounds per carload, and in some markets, the standard has expanded to a gross carload weight of 315,000 pounds.[3] Per the Connecticut State Rail Plan, the NHL is identified as a priority segment for upgrade to a 286,000 pound freight limit, to promote economic growth, reduce fuel use, and reduce truck traffic on the state's highway system.[4]

[1] There is a 5.5-mile segment of three tracks in Milford.
[2] Tracks in Connecticut range from FRA Class 7, with maximum allowable passenger train operating speeds of 125 mph, to Class 1, with maximum allowable operating speeds of 15 mph for passenger trains and 10 mph for freight trains.
[3] State of Connecticut Department of Transportation *Connecticut State Rail Plan, 2012-2016*.
[4] Ibid.

Figure 3-1—New Haven Line Network

Catenary System

The catenary system is broadly defined as the conductors, catenary messenger and contact wires, hangers, sectioning devices, and ground connections forming the overhead power distribution system, together with their related supports servicing the rail corridor. The steel lattice support system consists of approximately 100-foot tall portals overhanging the tracks with foundations on either side of the rail bed.

High Towers

Two high towers, located on the east and west sides of the Norwalk River over the rail corridor, carry 22 Metro-North aerial power conductors and aerial communication/signal cables, and eight Eversource Energy 115kV transmission lines.[5] The towers are steel latticed frame, and were constructed in 1912 and rehabilitated in 1990. The tower frames consist of a rigid H-configuration with two lower legs, three horizontal struts connecting the legs, and two sets of primary cross bracing between the lower legs. The towers originally had a height of 199 feet above the base, but were later modified with overbuilds (for the Eversource power lines), increasing their height to approximately 235 feet.

Communications and Signals

The Walk Bridge is located within Control Post 241 (CP-241) Interlocking near Mile Post (MP) 41. The CP-241 interlocking provides the necessary signal system protection for Walk Bridge, incorporating the appropriate locking and control system interface for the swing span, including the continuous vital indications of the span locks and rail seating detection required for the safe movement of trains, in compliance with federal regulations.[6]

Stations

There are 38 station stops on the NHL within Connecticut (including the main line and branches). There are four rail stations in Norwalk, two of which are located in close proximity to Walk Bridge. The South Norwalk Train Station is located approximately one-half-mile south of Walk Bridge, at 29 Monroe Street. The East Norwalk Train Station is located approximately one-half-mile east of Walk Bridge, at East Avenue and Winfield Street. The Merritt 7 Train Station is located at 1 Glover Avenue, approximately 3.5 miles north of Walk Bridge. The Danbury Branch has one track at this location. The Rowayton Station is located at 1 Belmont Place, approximately 2.25 miles southwest of Walk Bridge. All four stations are owned by CTDOT. The East Norwalk and South Norwalk Stations are operated by the City of Norwalk, and the Norwalk Parking Authority operates the parking facilities at both stations. The Merritt 7 Station and parking lot are operated by CTDOT. The Rowayton Station and two parking lots are operated by the Sixth Taxing District under a long term lease with the State of Connecticut.

Ongoing and Proposed Infrastructure Upgrades on the NHL

CTDOT is responsible for all capital improvements on the NHL within the state. CTDOT implements a substantial rail capital program and capital construction program to support its two commuter railroads, the New Haven Line and the Shore Line East (SLE).[7]

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[5] Connecticut Department of Transportation, Office of Rail Project, *"Relocation Feasibility Study High Towers Walk and Saga Movable Railroad Bridges, Final Submittal"*, February 12, 2010.
[6] Code of Federal Regulation Title 49 Part 236.312, *Movable bridge, interlocking of signal appliances with bridge devices*.
[7] CTDOT, "Optimizing the State of Connecticut; Transportation Capital Infrastructure Program," December 2015.

Table 3-1 presents a selected list of CTDOT-sponsored infrastructure upgrades and capital investments on the NHL obtained from state and regional planning documents. Ongoing actions and proposed projects to upgrade the NHL were identified through a review of CTDOT's C*onnecticut State Rail Plan, 2012-2016*; CTDOT's *Five Year Capital Plan for Fiscal Years 2015-2019*; the SWRMPO's *South Western Region 2015-2018 TIP, current as of March 17, 2016;* ; and the 2015 STIP, current as of June 22, 2016.

Table 3-1—CTDOT Infrastructure Upgrades Proposed for the New Haven Line, 2015 – 2019

Project	Location	Description/Status
Replacement or Rehabilitation of the New Haven Railroad Bridge over the Norwalk River (Walk Bridge)/Bridge No. 04288R	New Haven Main Line (NHML)/Norwalk	Rehabilitation or replacement of the Walk Bridge is identified on the South Western Region 2015-2018 TIP, in CTDOT's 2015-2019 Capital Plan, and in the 2015 STIP. The Walk Bridge Replacement Project also includes the replacement of the Fort Point Street Bridge/Bridge No. 41.31.
New Haven Mainline OCS and Bridge Replacement	NHML from the New York line to New Haven	Completion of OCS replacement from CP 234-CP261, Stamford to Milford. Bridge. Replacements include Boston Post Road Bridge in Darien; Rowayton Avenue Bridge in Norwalk; Monroe Street Bridge in Norwalk. Scheduled for completion May 2017.
Positive Train Control (PTC)	NHML & Waterbury Branch	Overlay to the existing cab signal system technology to improve line safety and prevent train-to-train collisions, overspeed derailments, incursions into established work zones, and the movement of a train through a switch left in the wrong position. Required by the Rail Safety Improvement Act of 2008. Anticipated for completion in 2018.
NHL Track Program	NHL various locations	Replacement of ties and rail and cyclical surfacing to achieve state of good repair (SOGR).
NHL Interlocking & Drainage	NHL various locations	Replacement of interlocking switches at select locations as they reach the end of their useful life, including replacement in kind and replacement with high-speed turnouts; improvements to system-wide drainage
Moveable Bridge Replacement over the Housatonic River (Devon Bridge)/Bridge No. 08080	NHML/Stratford and Milford	CTDOT design on-going to replace the 7-span, open deck structure; originally constructed in 1905.
Moveable Bridge Replacement over the Mianus River (Cos Cob Bridge)	NHML/Greenwich	CTDOT design on-going to replace the 12-span, open deck, steel truss structure; originally constructed in 1904.
Rehabilitation of East Avenue Bridge	Bridge No. 42.14, East Avenue, Norwalk	CTDOT design on-going to replace the existing bridge with ballast deck, rehabilitate the bridge substructure; originally constructed in 1905.
Rehabilitation of Osborne Avenue Bridge	Bridge No.41.96 over Osborne Avenue, Norwalk	CTDOT design on-going to replace the existing superstructure, with ballast deck, and rehabilitate the existing substructure; originally constructed in 1894.
Moveable Bridge Replacement/rehabilitation over the Saugatuck River (Saga Bridge)	NHML/Westport	Replacement/rehabilitation of the double-span bridge; originally constructed in 1905.
Communications and Signal System Replacement	NHML from the New York line to New Haven	Replacement and update of signal system technology, including updating all rail switches, wayside signals, interlockings.

Project	Location	Description/Status
CP-243 Universal Interlocking	NHML, west of East Norwalk Station	Construction of a new universal interlocking to accommodate Express-Local train overtakes and limited headways between trains. Identified on the 2015 STIP.
Danbury Branch Improvements at Dock Yard	Danbury Branch/Norwalk	Improvements to “change ends” for maintaining the existing “South Norwalk Turns,” preserving the existing service strategy on the New Haven Line. Completion of the improvements on the Danbury Branch and Dock Yard will eliminate 10 train movements per 24 hour period from the outage area for Walk Bridge on the NHL.

Infrastructure Upgrades At and In the Vicinity of Walk Bridge

The following further describes the ongoing and proposed CTDOT and Metro-North projects in the vicinity of Walk Bridge:

Catenary Upgrades. Since 2004, more than 80 percent of the OCS power lines on the NHL have been replaced with a new “constant tension” system which is more reliable and allows trains to take advantage of the maximum speeds on the line. The phased full overhead wire replacement program, which extends from the New York state line to New Haven, is estimated to be completed by May 2017. At the site of Walk Bridge, replacement of existing mainline catenary system on the east approach is ongoing, through the C1A Catenary Replacement Project (State Project No. 0301-0145, Norwalk River to Bridgeport). Replacement of catenary on the west approach has been completed.

Signal Upgrades. CTDOT is implementing a phased replacement of the NHL signal system, which includes modifying signal block lengths to increase train capacity between interlockings and to increase speed where possible. Construction of the first of four segments, CP 229 (Greenwich) to CP 241 (Norwalk) is ongoing. Signal upgrades in the vicinity of Walk Bridge include new signal huts proximate to the South Norwalk Train Station.

Walk Bridge Repairs. Repairs and upgrades to Walk Bridge are ongoing. In 2014, CTDOT completed short term repairs to Walk Bridge involving a separate drive system to open and close the movable pieces of rail that lock the bridge into place; electronic switches; repairs to rollers and rods in the center pier on which the bridge pivots; and readjustment of the gear and shaft system to properly align wedges at either end of the movable span that lock it into place. In 2014, Metro-North installed new timber ties, continuous welded rail, new miter rails, and presence detectors on Walk Bridge.[8] In 2015, Metro-North completed repairs to the rail lift roller extensions and west end centering pins on the bridge, to enable the bridge to close properly. Replacement of the center pivot pier roller shafts is ongoing.[9]

At the request of and in coordination with the U.S. Coast Guard (USCG), CTDOT is conducting emergency repairs to the deteriorated timber fender system protecting the pivot pier of existing Walk Bridge (State Project No. 0301-0172). Several of the timber piles have up to 100 percent section loss, areas of collision damage, and missing or deteriorated walers. In-kind repairs and replacements will restore the existing fender system to a state of good repair (SOGR) until the replacement of Walk Bridge. The temporary fender system repair project, which started in July 2016, is estimated to take approximately four to six months. The temporary fender repairs will be replaced in the Build Alternative with a permanent fendering system for the replacement bridge.

[8] Metropolitan Transportation Authority, Safety and Reliability Update, 05/22/2015.
[9] MTA Metro-North Railroad Committee Meeting, 12/14/2015.

Danbury Branch Improvements at Dock Yard (State Project No. 0301-0180). CTDOT is proposing a series of improvements on the Danbury Branch Line, located just north of the branch line's connection to the New Haven Line (NHL) at NHL Milepost (MP) 41.3. Construction will take place between MP 0 and MP 1.0 on the Danbury Branch line. The purpose of the project is to improve operations along the NHL, including accommodating Express-Local train overtakes and limited headways between trains. This work will facilitate rail projects on the NHL, especially related to track outages, while maintaining rail service throughout the area. Improvements at Dock Yard also will mitigate operational impacts during the replacement of Walk Bridge (Bridge No. 04288R) on the NHL.

Project improvements include installation of new storage tracks and track renewal within the limits of Dock Yard, removal and replacement of existing catenary structures, installation of new catenary structures with a new overhead contact system (OCS) that extends the electrified territory, and upgrades to the fiber optic and signal systems. To accommodate required changes in track vertical alignment and new track installation, the project will require the replacement of Ann Street Bridge (Bridge No. 08200R/MP 0.19) with a new ballast deck steel superstructure.

CTDOT is completing environmental review of the project, including Section 106 and Section 4(f) reviews, and is coordinating the receipt of environmental approvals with CTDEEP. This project will be completed prior to the start of the two-track outages required for the Walk Bridge Replacement Project.

CP-243 Universal Interlocking, (State Project No. 0301-0181). CTDOT is constructing a new universal interlocking along the New Haven main line east of the East Norwalk Station at CP-243. Construction of a new universal interlocking and system upgrades within the CP-243 project area will improve operations along the NHL, including the ability of the Metro-North system to accommodate Express-Local train overtakes and limited headways between trains. The CP-243 project will help facilitate the construction of rail infrastructure projects on the NHL, particularly related to track outages, while maintaining rail service through the area.

The new interlocking will include track realignment and crossovers and new track switches from approximately Strawberry Hill Avenue to the Norwalk-Westport town line [corresponding to Milepost (MP) 43.0-43.5]. New signals will be installed from the South Norwalk Station (including CP-241) in South Norwalk to approximately 500 feet east of the Saugatuck River in Westport, for a distance of approximately 3.5 miles and will include signal houses. New fiber optic upgrades to support signaling equipment for the new interlocking will be installed through the project area, and depending upon location, will be located aerially or within track ballast, and also in submarine cables crossing the Saugatuck River and Norwalk River. Also included will be overhead contact system (OCS) replacement on the main line, including the installation of new catenary structures and removal of existing catenary structures.

CTDOT is completing environmental review of the project, including Section 106 and Section 4(f) reviews, and is coordinating the receipt of environmental approvals with CTDEEP and USACE. This project will be completed prior to the start of the two-track outages required for the Walk Bridge Replacement Project.

Rehabilitation of East Avenue Bridge (State Project No. 0170-1375). CTDOT is designing the replacement of the bridge superstructure and rehabilitation of the bridge substructure. The bridge (Bridge No. 42.14) was originally constructed in 1905. CTDOT proposes to schedule the project concurrently with the Walk Bridge Replacement Project. CTDOT is completing NEPA review of this project.

Rehabilitation of the Osborne Avenue Bridge (State Project No. 0301-0161). CTDOT is designing the replacement of the bridge superstructure and rehabilitation of the bridge substructure. The bridge (Bridge No.41.96) was originally constructed in 1894. CTDOT proposes to schedule the project concurrently with the Walk Bridge Replacement Project. CTDOT is completing NEPA review of this project.

Passenger Rail Service

Passenger train traffic includes commuter rail service provided by Metro-North and intercity passenger rail service provided by Amtrak. Table 3-2 and Table 3-3 present a summary of the daily (weekday) and weekend passenger train traffic that passes over Walk Bridge in the eastbound (to New Haven) and westbound (to New York City) directions, according to the November 2014 Metro-North schedule.[10]

Table 3-2—Summary of Weekday Trains Operating on Walk Bridge (East Norwalk)

Service	Total	Service Period			
		Morning Peak (6 am – 9 am)	Mid-Day Off Peak (9 am – 4 pm)	Afternoon Peak (4 pm – 7 pm)	Night Off Peak (8 pm – 5 am)
Metro-North					
• Eastbound	55	6	16	14	19
• Westbound	58	20	14	10	14
Amtrak					
• Eastbound	21	3	9	5	4
• Westbound	21	3	9	5	4
Total, Weekday	**155**	**32**	**48**	**34**	**41**

Source: Metro-North Railroad New Haven Line Employee Schedule, November 2014

Table 3-3—Summary of Weekend Trains Operating on Walk Bridge (East Norwalk)

Service	Total	Service Period			
		Morning Peak (6 am – 9 am)	Mid-Day Off Peak (9 am – 4 pm)	Afternoon Peak (4 pm – 7 pm)	Night Off Peak (8 pm – 5 am)
Saturday Service					
Metro-North					
• Eastbound	35	6	14	6	9
• Westbound	35	6	14	6	9
Amtrak					
• Eastbound	15	1	7	4	3
• Westbound	15	1	8	3	3
Total, Saturday	100	14	43	19	24
Sunday Service					
Metro-North					
• Eastbound	35	2	12	6	15
• Westbound	35	6	14	6	9
Amtrak					
• Eastbound	15	1	6	4	4
• Westbound	18	1	8	5	4
Total, Sunday	103	10	40	21	32
Total, Weekend	**203**	**24**	**83**	**40**	**56**

Source: Metro-North Railroad New Haven Line Employee Schedule, November 2014

[10] Metro-North Railroad New Haven Line Employee Schedule, November 2014.

Metro-North Commuter Rail Service

More than 80 percent of the trains on the NHL are operated by Metro-North, working under an agreement between the State of Connecticut and the MTA. On an average weekday, 336 trains operate on the NHL network,[11] providing service to Grand Central Terminal.[12] In 2014, Metro-North's total ridership of 85.2 million was the highest in the railroad's history. Of this total, the NHL's ridership was more than 39.6 million riders, an increase of 1.6 percent over 2013 totals. Commuter ridership grew 0.5 percent, while non-commuter ridership increased by almost 3 percent. Since its inception in 1984, ridership on Metro-North has more than doubled and ridership on the NHL has increased by over 40 percent. In recent years, the "reverse" commute market (New York residents commuting to the Region) and intermediate commute market (Bridgeport and New Haven area residents commuting to the Region) have grown at a faster rate than the traditional New York City-bound commute market.[13]

In 2014, Metro-North's system-wide on-time performance (OTP) was 91.5 percent, which represented a decline from the 2013 OTP of 94.8 percent, and from Metro-North's OTP goal of 93 percent. Several situations contributed to the OTP decline from 2013 to 2014, including: speed restrictions enacted at multiple locations in Metro-North territory; extreme winter weather in 2013-2014; limited peak-period direction trains on a nine-mile stretch on the NHL due to a fire and equipment loss; and failures of Walk Bridge in May and June 2014, where the structure failed to close properly after opening for marine traffic and created extensive delays.[14]

Amtrak Intercity Rail Service

Amtrak's intercity passenger rail service on the NHL provides connecting service to New York City's Penn Station,[15] as well as to destinations further south, including Philadelphia, Baltimore, and Washington, DC. Amtrak's intercity rail service, the Northeast Regional, and its high-speed intercity passenger rail service, Acela Express, together represent approximately 20 percent of the total train traffic on the NHL. Amtrak's intercity service is a through-service (does not stop) in Norwalk; the Acela service has stops in New Haven and Stamford, and the Northeast Regional service has stops in New Haven, Bridgeport, and Stamford.

Passenger Ridership Projections

Substantial ridership increases are projected on the NHL by 2030.[16] Assuming that future capital investments stay comparable to current levels, Metro-North projects that commuter rail ridership on the NHL will reach 57 million annual trips by 2030. Amtrak projects that by 2030, its intercity rail ridership will reach 5.4 million annual trips.[17]

Both Metro-North and CTDOT have established goals of substantially increasing the NHL commuter rail ridership based on major infrastructure investments.[18] CTDOT's rail ridership goal is to double the 2010

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[11] Regional Plan Association, *Getting Back on Track; Unlocking the Full Potential of the New Haven Line*, January 2014, Revised February 2014.
[12] Metro-North trains access Grand Central Terminal via the Harlem Line, which starts at the termination point of the NHL in Mount Vernon, Connecticut.
[13] Western Connecticut Council of Governments, *Going Forward: The Plan to Maintain & Improve Mobility. South Western Region Long Range Transportation Plan, 2015-2040*, Draft, March 2015.
[14] Metropolitan Transportation Authority, *Mission Statement, Measurements, and Performance Indicators Report Covering Fiscal Year 2014*, Submitted as part of the MTA 2014 Annual Report to the Governor.
[15] Amtrak trains on the NHL access Penn Station via the Hell Gate Line, which splits off from the NHL at New Rochelle, New York.
[16] Regional Plan Association (RPA), *Getting Back on Track; Unlocking the Full Potential of the New Haven Line*, January 2014, Revised February 2014.
[17] NEC Working Group. NEC Infrastructure Master Plan, 2010.
[18] RPA, *Getting Back on Track: Unlocking the Full Potential of the New Haven Line*, January 2014, Revised February 2014.

commuter and intercity totals region-wide by 2030.[19] CTDOT's goal meets the goals of the NEC Commission,[20] a Congressionally-established board comprised of representatives from eight states, the District of Columbia, Amtrak, and the U.S. Department of Transportation, which is charged with developing strategies to improve the Northeast's core rail network.

Freight Rail Service

Freight service is very limited over the Walk Bridge. CSX Transportation (CSX), a Class I railroad,[21] provides through and local freight service on the NHL. CSX does not operate east of Darien, Connecticut, and does not cross over the Walk Bridge. Providence and Worcester Railroad Company (P&W), a Class II railroad, provides through freight service on the NHL. P&W operates seasonally (spring through autumn); with approximately eight to ten train movements per week from New Haven to Danbury via the main line and Danbury Branch, crossing over the Walk Bridge.

CTDOT reports that the existing rail freight service providers and the freight rail system currently meet service requirements of current customers. Due to physical, operational and institutional issues in the region, CTDOT's Office of Strategic Planning and Projects reports that the existing rail system may not be able to absorb further freight growth.[22]

3.1.3. Potential Impacts

No Build Alternative

As described in Chapter 2, the No Build Alternative assumes that Walk Bridge would remain in service as it currently exists, with continued maintenance and emergency repairs implemented as necessary.

In the No Build Alternative, the existing deficiencies of Walk Bridge would not be resolved. Currently, a bridge failure affects train traffic in both directions, as all four tracks are impacted. Additionally, some maintenance activities require that the bridge structure remain open. As noted in Chapter 2, normal maintenance would not prolong the useful life of the bridge, which is a critical piece of infrastructure on the NHL.

The No Build Alternative would include the infrastructure improvements to the NHL summarized in Table 3-1. Despite these improvements, the existing conditions of Walk Bridge, including the bridge's decreased speed requirement and the weight limitation, could counteract the improvements implemented on the line. As indicated in Chapter 2, the bridge's existing deficiencies (project needs) result in reduced rail capacity and efficiency.

CTDOT anticipates that without the proposed project, NHL service reliability over the bridge would decline as Walk Bridge ages, and problems, including bridge failures, would occur more frequently. Bridge failures would directly affect Metro-North's and Amtrak's OTP, similar to the way the May and June 2014 bridge failures contributed to the overall decline in OTP experienced in 2014. The decline in OTP could adversely impact ridership growth.

[19] CTDOT, *Connecticut State Rail Plan, 2012-2016*, August 2012, Draft.
[20] The Northeast Corridor Infrastructure and Advisory Commission.
[21] A Class I railroad is defined as a line haul freight carrier with annual operating revenues equal to or greater than $467 million (2013, adjusted for inflation). A Class II railroad is defined as a line haul freight carrier with annual operating revenues between $37.4 million and $467 million.
[22] CTDOT Office of Strategic Planning & Projects, Bureau of Policy & Planning, *Transportation in Connecticut: The Existing System*, 2014.

The No Build Alternative would not be consistent with the South Western Region TIP, the STIP, CTDOT's Capital Plan, or the most recent transportation planning document, the February 2015 "Let's Go CT!," which includes the replacement of Walk Bridge, as well as the other movable bridges on the NHL, as a key element in CTDOT's strategic plan to improve NHL operations. The March 2015 "Let's Go CT!" update noted that, "even in the closed position, the condition of the bridges reduces the performance of the rail line because of the speed restrictions and weight limitations imposed on them."[23] In the No Build condition, Walk Bridge could adversely impact the overall condition of the NHL and its ability to accommodate freight service providers.

Build Alternative

As described in Chapter 2, the Build Alternative will address the existing deficiencies of Walk Bridge which directly impact the daily train service. Along with the other planned improvements to the NHL, the Build Alternative will increase efficiencies, and thereby contribute to Metro-North's and Amtrak's passenger ridership and OTP goals.

The Build Alternative will facilitate increased rail speeds, and will remove the existing weight limit restrictions placed on freight shipments. Both the Walk Bridge and Fort Point Street Bridge replacements will be designed for American Railway Engineering and Maintenance-of-Way Association (AREMA)-suggested Cooper 80 (CE80) loading. Per Cooper 80 loading, there is no limit to the maximum allowable car load; in practice, allowable maximum freight rail car load is generally 315,000 pounds. Both Walk Bridge and Fort Point Street Bridge replacements, as well as the track between the bridges (Mile Post (MP) 41.5 to Mile Post 41.8), will allow for greater freight loads per Cooper 80 loading.

The Build Alternative is included in the South Western Region TIP and the 2015 STIP, and will be consistent with both Connecticut and NEC Commission transportation goals and strategic planning documents.

There would be essentially no difference between the Bascule Bridge option and the two Vertical Lift Bridge options in the permanent condition with respect to rail transportation. Note that the differences in bridge opening and closing times between the bascule and vertical life bridge types are minimal; the amount of time that the bridge is open for navigational traffic, and closed to rail traffic, is more a function of the time it takes the vessel(s) to transit the navigation channel while the bridge is open than of the bridge type.

During construction, there would be differences among the three Build options with respect to rail operations, which are addressed in Chapter 5.

3.1.4. Mitigation Measures

The Build Alternative will substantially improve existing rail transportation over Walk Bridge as well as contribute to improved service along the NHL. Because the project will eliminate the existing deficiencies of Walk Bridge (project needs), and improve the overall rail transportation conditions on the NHL, long-term mitigation measures will not be required for the permanent condition. Chapter 5 presents proposed mitigation measures for the construction period.

[23] CTDOT, "Let's Go, CT!, The State of Connecticut's Bold Vision for a Transportation Future," February 2015.and fact sheet update, "Rail Bridge Conditions and Need on New Haven Line," March 2015

3.2. Marine Transportation

3.2.1. Introduction, Regulatory Background, Methodology

This section addresses the existing marine transportation in the Norwalk River and Harbor in the vicinity of Walk Bridge, including the context of the Norwalk Harbor and the Norwalk River as a navigable waterway, a federal navigation channel, and public trust area. It assesses the impacts of the Build Alternative upon navigability and the existing and anticipated marine traffic, including commercial and recreational marine users.

Management of Norwalk Harbor is a federal, state, and municipally-shared responsibility. Since 1945, the USACE has authorized and maintained the federal navigation channel. Per the Rivers and Harbors Act of 1894, the U.S. Coast Guard (USCG) is responsible for establishing the procedures and practices for vessel movements through Walk Bridge, including authorizing vertical and horizontal navigational clearances. In accordance with the Connecticut Harbor Management Act (Section 22a-113k through 22a-113t of the Connecticut General Statutes), the Norwalk Harbor Management Commission was established in 1984 to prepare and implement the *Norwalk Harbor Management Plan*, a guide for the City's use of the harbor for recreational, commercial, industrial, and other purposes.

The Connecticut Public Trust Doctrine establishes the Norwalk River and Harbor as public trust areas, defined as the submerged lands and waters waterward of the mean high water line in tidal, coastal, or navigable waters of the state of Connecticut. The public's rights within public trust areas include fishing and boating; in terms of access, navigable waters are equivalent to a public road.[24]

Data on the federal navigation channel and Walk Bridge operations was obtained from the USACE New England Division (http://www.nae.usace.army.mil) and USCG Sector Long Island Sound (http://www.uscg.mil/d1/sectlis). Data on existing marine conditions, including commercial traffic in Norwalk Harbor, was obtained from the Norwalk Harbor Management Plan, Norwalk Harbor Management Commission, and regional agency reports.

3.2.2. Existing Conditions

Overview of Norwalk Harbor

Norwalk Harbor extends from the mouth of the Norwalk River at Long Island Sound northwest for approximately 4.5 miles to the head of the navigation channel at the Wall Street Bridge in central Norwalk.[25] The USACE classifies Norwalk Harbor as a recreational and small commercial harbor. The mixed-use harbor includes recreational boating, commercial shell-fishing, and other water- dependent activities. Norwalk Harbor is extensively used. The Norwalk Harbor Management Commission reports that over 3,000 recreational power boats and sail boats use Norwalk as their home port, and there are over 2,700 vessel trips to and from the Harbor's port facilities each year, including barges, excursion and chartered vessels, and commercial oyster (shellfish) and fishing boats.[26]

[24] CT Department of Energy and Environmental Protection, The Public Trust; http://www.ct.gov/deep/cwp/view.asp?A=2705&Q=323792
[25] USACE Navigation Data Center. http://www.navigationdatacenter.us/.
[26] Pinto, John Thomas, Ph.D. "Importance of Norwalk Harbor, a mid-sized harbor, for economic growth and development." Presentation to the State of Connecticut Port Authority Working Group. January 6, 2015.

Walk Bridge is located within the City of Norwalk's Inner Harbor,[27] shown on Figure 3-2. The Inner Harbor is the most developed section of Norwalk's waterfront, and contains many of the City's recreational, commercial, and industrial water-dependent facilities. Water-dependent facilities in the Inner Harbor include 15 marinas; 13 private clubs with boating/mooring facilities; and five commercial port facilities, including the Norwalk Police Department's Marine Unit. Section 3-17 provides additional information on water-dependent uses in Norwalk River and Inner Harbor.

Photo by Geoff Steadman, Norwalk Harbor Management Commission

Figure 3-2—Norwalk Inner Harbor

Federal Navigation Channel

The federal channel is 12 feet deep and 200 feet wide from the Outer Harbor to Gregory Point in East Norwalk, where it narrows to 150 feet wide up to the wharves at South Norwalk. The channel then widens to 250 feet along the wharves to the Stroffolino Bridge. For its final 1.5-mile stretch, which includes Walk Bridge, the federal navigation channel is 10 feet deep. The channel width narrows at Walk Bridge, constrained to two openings, and then transitions to 125 feet wide north of the bridge, until it reaches a 10-foot deep turning basin at the head of the harbor (and freshwater/tidal water boundary) at the Wall Street Bridge.

Figure 3-3, excerpted from National Oceanic and Atmospheric Administration (NOAA) Nautical Chart No. 12368,[28] shows the varying widths of the federal navigation channel as it approaches Walk Bridge and extends north to the Wall Street Bridge.

[27] Per the Norwalk Harbor Management Plan, the Norwalk Inner extends from just south of the Coast Guard Auxiliary Station at Calf Pasture Point to include all covers and embayments to the head of navigation at the Wall Street Bridge.
[28] NOAA Nautical Chart 12364 – Long Island Sound-New Haven Harbor Entrance and Port Jefferson to Throgs Neck, Edition 40, July 2015, http://www.charts.noaa.gov/.

Figure 3-3—Federal Navigation Channel at Walk Bridge, NOAA Nautical Chart #12368

In January 2014, the USACE completed a three-phase maintenance dredging project of the federal navigation channel, consisting of 12-, 10-, and 6-foot channel and 10- and 6-foot anchorages including Norwalk Harbor, Norwalk River, and East Norwalk.

Figure 3-4 presents the results of the October 2014 bathymetric survey of the Norwalk River at Walk Bridge. The single-beam bathymetric survey data of the channel bottom indicates that the existing mudline meets, and in many locations exceeds, the federally required 10-foot channel depth. Based on the range of bathymetry shown in Figure 3-4, it appears that the depth at mean low water (MLW) is approximately 13 feet. The bathymetric data indicates that the channel depth is greater through the west navigation channel of the swing span than it is through the east navigation channel. Note that the channel depth is not constrained at the bridge opening in the west channel.

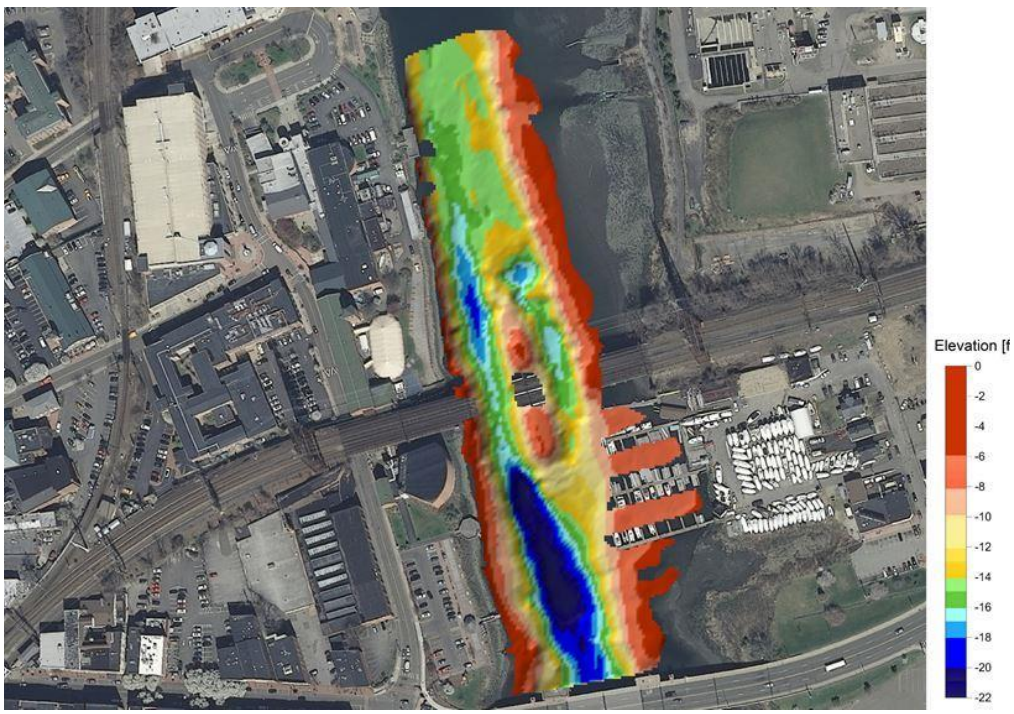

Figure 3-4—Bathymetric Survey of the Norwalk River at Walk Bridge

Bridge Vertical and Horizontal Clearances

Including the Wall Street Bridge, Walk Bridge is one of four bridges within the Norwalk River and Harbor navigational channel. Other bridge crossings proximate to Walk Bridge include the Stroffolino/Route 136 Bridge, located approximately 0.1 nautical mile (500 feet) downstream of Walk Bridge, and the Connecticut Turnpike/I-95 Bridge (Yankee Doodle Bridge), located approximately 0.53 nautical mile (3,300 feet) upstream of Walk Bridge.

In the closed position, Walk Bridge has a vertical clearance of 16 feet at mean high water (MHW) and 23 feet at MLW. In the open position, the existing bridge's vertical clearance is limited by the overhead transmission lines which have an approved vertical clearance above the waterway of 203 feet. Walk Bridge has approximately 58 feet of horizontal clearance in the west navigation channel, and approximately 53 feet of horizontal clearance in the east navigation channel.

The Stroffolino Bridge, a movable bascule bridge, has a vertical clearance of 8 feet at MHW and 15 feet at MLW when closed, and a horizontal clearance of 100 feet at the channel span. The I-95 Bridge, a fixed span bridge, provides approximately 60 feet of vertical navigation clearance and a 100-foot horizontal navigation clearance.

Bridge Operating Schedule

Pursuant to 33 CFR 117, the USCG prescribes the operating schedules for Walk Bridge and the Stroffolino Bridge.

Prior to July 2014, from 5:00 am until 9:00 pm, Walk Bridge opened on signal, with the exception of the morning peak commuting period (7:00 am - 8:45 am) and the evening peak commuting period (4:00 pm - 6:00 pm) from Monday through Friday.[29] During those periods, the bridge was opened only for emergencies. Fringe commuting periods (5:45 am -7:00 am and 6:00 pm -7:45 pm) had restricted openings to once in any 60-minute period. From 9:00 pm until 5:00 am, the bridge opened only following a four-hour advance notice.[30]

In July 2014, following the two bridge failures in spring 2014, the USCG implemented a temporary deviation from the established operating schedule to facilitate the maintenance and repairs to the electrical and mechanical operating systems at Walk Bridge. The temporary deviation, from July 17, 2014 through December 31, 2014, authorized a bridge opening only following an 8-hour advance notice. Further, no bridge openings were authorized during morning and evening commuting periods. The USCG approved a subsequent test deviation, effective January 1, 2015 through June 28, 2015, authorizing bridge opening only following a 2-hour advance notice, with the exception of Monday through Friday, from 4:30 am through 10:00 am and from 2:00 pm through 9:00 pm, where the bridge was not opened for the passage of vessel traffic.[31]

CTDOT requested a permanent change in the operating schedule due to the substantial volume of train traffic across the bridge during peak commuting hours. Following public review and comment, in April 2016, the USCG proposed a revised weekday schedule for Walk Bridge to accommodate both rail and marine traffic as follows: 1) between 4:30 am and 9:00 pm, Walk Bridge will open on signal after at least a two-hour advance notice, except that during the morning peak commuting period (5:45 am - 9:45 am) and the evening peak commuting period (4:00 pm - 8:00 pm), the bridge will not open for navigational traffic unless an emergency exists; and 2) from 9:00 pm through 4:30 am, the bridge will open on signal after at least a four-hour advance notice.[32]

The USCG indicates that the proposed schedule modification will create efficiencies in bridge opening while continuing to meet navigation needs. The USCG found that during the restricted test deviation from January through June 2015, Metro-North was able to accommodate all requests for bridge openings. Further, the USCG determined that in comparing 2014 bridge logs (prior to the restricted schedule) and 2015 bridge logs (with the restricted schedule), the difference in the number of requested bridge openings was negligible.

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[29] The openings of the Stroffolino Bridge follow a similar pattern during peak commuting times from Monday through Friday, with an additional restriction from 11:45 am to 1:15 pm. Further, bridge openings are not required for the passage of vessels that draw less than 14 feet of water (33 CFR 117.217).
[30] 33 CFR 117.217
[31] U.S. Department of Homeland Security, United States Coast Guard. Local Notice to Mariners, District:1; Week: 06/15. 11 February 2015.
[32] Commander, First Coast Guard District, Public Notice 1-150, April 4, 2016; 81 Federal Register No. 64; April 4, 2016, under USCG Docket Number USCG-2014-1057.

Bridge Opening Trends

Figure 3-5 presents the number of Walk Bridge openings per month during the period of January 2012 through July 2015.[33] The data show that use of Walk Bridge generally is related to seasonal navigation trends and the increased recreational use of the river during non-winter times. The highest frequency of bridge openings generally occurs between May and December, and the number of openings declines after December. Few, if any, bridge openings occur during the months of January through March. Bridge openings become more frequent beginning in April.

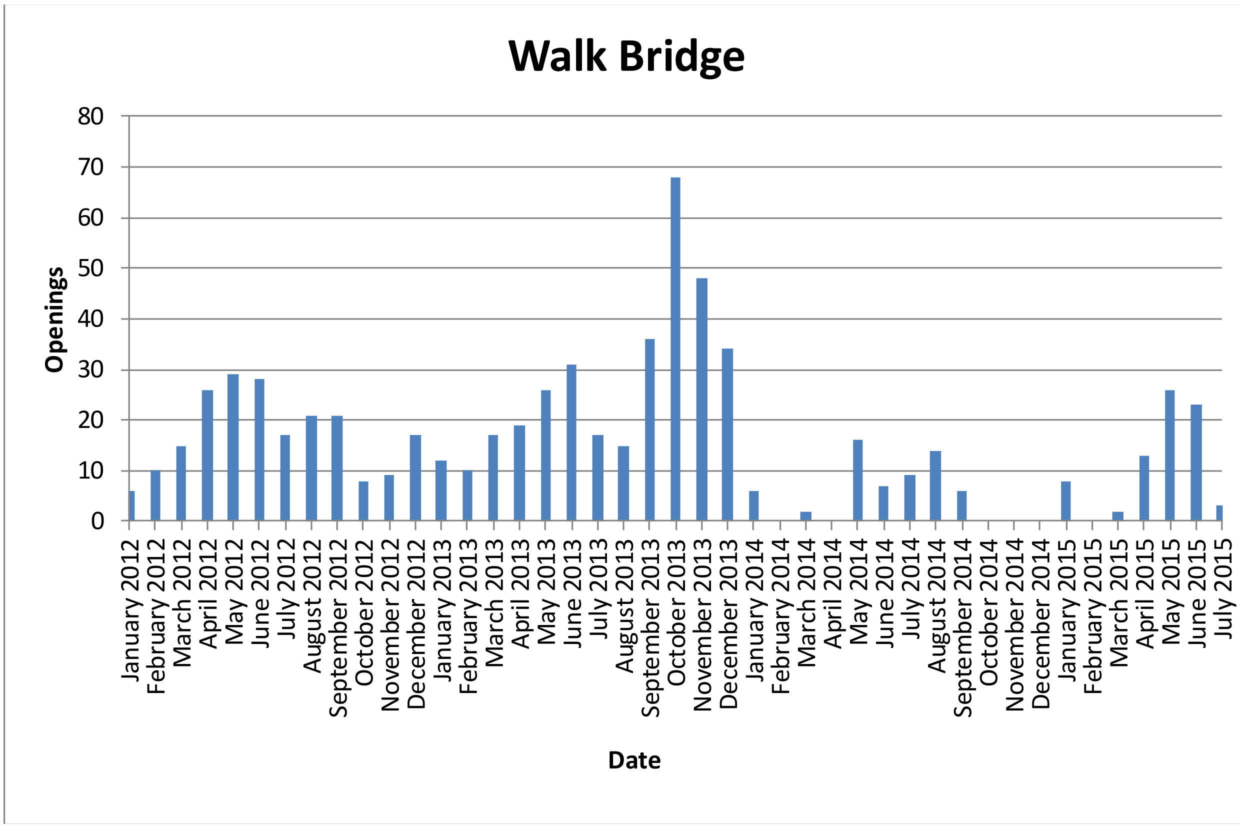

Figure 3-5—Walk Bridge Openings per Month, January 2012 through July 2015

The decrease in bridge openings in the 2014 season may be attributable to bridge repair work. As previously indicated, the USCG determined that the restricted bridge opening schedule in 2015 did not adversely impact the number of requested bridge openings.

The Walk Bridge opening logs for 2012 include documentation of bridge failures and near failures. There were several instances of reported difficulties with opening and closing the bridge in May and August 2012. From June 30, 2010 until July 10, 2012, the bridge was reported to be out of service (closed for navigational traffic); in August 2012, the bridge was reported to be closed to navigational traffic for an approximate 24-hour period.

[33] Note that 2012 data is incomplete: mid-October 2012 through mid-November 2012 is missing.

Marine Traffic

Both east and west channels under Walk Bridge currently support navigation. Based upon consultation with waterway users, commercial and larger recreational vessels primarily use the west channel; and smaller vessels, including local rowers, primarily use the east channel.

Commercial and Large Vessel Traffic

Table 3-4 presents a summary of domestic commercial trips and waterborne commerce through Norwalk Harbor from 2008 through 2012, according to the USACE Navigation Data Center.[34] The majority of vessels required a draft[35] of 10 to 12 feet, followed by draft requirements of 6 to 9 feet. Few vessels traversing the harbor required a draft of 13 to 17 feet. The majority of commercial vessel trips occurred by non-self-propelled dry cargo barges. Freight primarily includes sand and gravel, used in the production of concrete and asphalt, and fuel oil, which represents a small percentage of the total cargo. Based upon a review of existing land uses around Norwalk Harbor, it is likely that the majority of vessels carrying cargo in Norwalk Harbor pass through Walk Bridge, traveling to distribution points north of the bridge.

Table 3-4—Domestic Commercial Traffic and Commerce through Norwalk Harbor, 2008-2012

Year	Total Vessel Trips (all directions[a])	Total Cargo (short tons, all directions)
2008	288	156,931
2009	193	89,933
2010	186	99,791
2011	227	118,426
2012	192	96,636

a. All directions = the total traffic moving from one location to another where the origin is within the limits of the subject port + traffic moving from one location to another where the destination is within the limits of the subject port.
b. A short ton is equal to 2,000 pounds.
Source: USACE Navigation Data Center. http://www.navigationdatacenter.us/.

Per discussions with marine users and the Norwalk Harbor Management Commission, the primary commercial interests utilizing Walk Bridge include Devine Brothers, Inc., United Marine Boatyard, and Norwalk Marine Contractors, which have facilities located north of the I-95 Bridge. Devine Brothers operates a cement plant and acts as a bulk petroleum, cement, sand, and gravel distributor. United Marine Boatyard provides yacht service and storage, with a capacity for storage of up to 80 vessels on a 2-acre parcel. Norwalk Marine Contractors is a marine and land construction company. Barges and tugs servicing Devine Brothers and tall-mast recreational sail boats that are maintained by United Marine generally require an opening of Walk Bridge in order to reach their final destination. Figure 3-6 shows a barge passing through the bridge's west channel.

[34] http://www.navigationdatacenter.us/. Per the Navigation Data Center, no vessel trips for foreign commerce traversed through Norwalk Harbor from 2007 through 2012. 2012 represents the most recent information available from the Navigation Data Center.
[35] Draft is defined as the depth of water required to float a ship.

Figure 3-6—Commercial Barge in West Channel

Per a river usage survey conducted for CTDOT in 2009, the length of barges ranged from less than 100 feet long to approximately 280 feet long; and the width ranged from approximately 35 feet to 50 feet. Tugboats tending the barges ranged in height from 26 feet to 35 feet. The survey found that operators are trending toward the use of larger barges and/or two-barge tows to mitigate their difficulty in getting bridge openings.[36] Many of these vessels must also pass under the I-95 Bridge; there are several vessels that must pass beneath the I-95 Bridge at low tide due to their overall height.

Vessels requiring a Walk Bridge opening also typically transit through the Stroffolino Bridge. Although they are within 500 feet of one another along the Norwalk River, the navigation openings of both structures are poorly aligned. For larger commercial vessels, including tugs with single-wide barges, northern movements through the Walk Bridge can be challenging due to the location of the swing span's west navigation channel relative to that of the Stroffolino Bridge.

Marinas and boating facilities located north of Walk Bridge include: the Norwalk Boat Club; St Anne's Club, with approximately 40 boat slips; Shore Points Marina; and Oyster Bend Marina, with more than 50 boat slips. The average height of sport fishing boats is approximately 18 to 20 feet; heights of sailboats range from 15 feet up to 35 feet and higher.[37]

Several marinas are located south of Walk Bridge, and include locations both north and south of the Stroffolino Bridge. Despite a large presence of tall mast sail boats that moor at these locations, these vessels rarely travel north on the Norwalk River and have very little interaction with the Walk Bridge and generally do not affect the frequency of Walk Bridge openings.

Marine traffic in Norwalk Harbor has generally declined since 2008, as indicated in Table 3-4. Vessel trips in 2012, the most recent annual report, represented a decline in marine traffic of more than 30 percent from vessel trips reported in 2008. In a 2010 overview of freight conditions in the southwestern

[36] CTDOT, Metro-North Railroad Bridge over Norwalk River, Norwalk, CT. State Project 301-0040. Vessel Impact Study. February 16, 2009. Prepared by HNTB.
[37] CTDOT, Bridge Safety and Evaluation. River Use Survey, Walk Bridge No. 41.47 (Previously No. 04288R). Survey Date: October 1999. Prepared by CME Associates, Inc., Woodstock, CT.

Connecticut region, the South Western Regional Planning Agency (SWRPA)[38] cited the insufficient channel depth of the Norwalk River/Harbor as a contributing factor to the decline in freight traffic, noting that Devine Brothers was able to bring in oil barges only at high tide with less than fully loaded barges due to shallow depths in the Norwalk River.[39] (Note that subsequent to this evaluation, the USACE completed its 18-year river dredging project.)

According to the Norwalk Harbor Management Commission, there has not been an increase in the number of marine-oriented businesses since completion of the USACE's dredging program in 2014. The Commission notes that the unreliability of Walk Bridge is a contributing factor affecting marine traffic along the Norwalk River: "many vessels are delayed waiting for bridge openings due to bridge malfunctions, bridge crew availability, or just the increase in rail traffic. It's not uncommon for a tug with a barge or a vessel with a tall mast to be held north or south of the bridge, while negotiating weather or tide conditions, for 45 minutes or longer."[40]

Small Vessel Traffic

The Norwalk River is base for an active rowing community for Norwalk and surrounding communities, including recreational and competitive rowing for children and adults from middle school through Masters programs. The Norwalk River Rowing Association,[41] based along the river north of Walk Bridge in central Norwalk, serves over four hundred people a year, attracting people from southwest Connecticut and into New York. Programs include middle and high school crews and Masters (adult) level programs, with participants ranging in age from twelve to the eighties The Youth Program has over 140 students from more than a dozen school districts in the greater Norwalk area. The Maritime Rowing Club at Water Sports Center, housed at Coastwise Boatworks (11 Goldstein Place), sponsors multiple teams, including middle school and high school crew teams, and adult teams.[42] Other rowing groups using the Norwalk River include the Connecticut Boat Club, a girls youth rowing club attracting members from southwestern Connecticut and Westchester County, New York; and Fairfield University, with both men's and women's rowing teams.

CTDOT conducted several meetings with local rowing groups to ascertain their current use of the Norwalk River. Rowing is generally a three-season sport, with peak rowing season extending from early March to mid-November. During the season, the river is used by rowers Monday through Friday typically between 5:15 am and 9:00 am and between 2:45 pm and 6:30 pm. The rowing groups do not use the river at night. Approximately 1,800 meters of available rowing space exists north of Walk Bridge, upstream to Wall Street. When rowing upstream, rowers currently use the east channel of Walk Bridge. Approximately 3,800 meters of available rowing space exists south of Walk Bridge to Manressa Island. Access to Norwalk Harbor south of Walk Bridge is critical to rowing operations; north of the bridge, the crews cannot row at full speed. Figure 3-7 shows rowing activity upstream of Walk Bridge.

[38] The South Western Regional Planning Agency (SWRPA) is comprised of the seven coastal communities in southwestern Connecticut, consisting of the cities of Norwalk and Stamford and the towns of Darien, Greenwich, New Canaan, Weston, Westport and Wilton. As of January 2015, SWRPA merged with the Housatonic Valley Council of Elected Officials (HVCEO), which represented western Connecticut communities along the Connecticut River, to form the Western Connecticut Council of Governments (WCCOG). WCCOG is responsible for planning for 18 communities in western and southwestern Connecticut.
[39] South Western Regional Planning Agency. *2010 South Western Region Freight Overview*. 2010.
[40] Anthony Mobilia, Norwalk Harbor Management Commission, Personal Communication, S. Walker, HNTB. January 9, 2016.
[41] http://norwalkriverrowing.org
[42] http://maritimerowing.net/about/

Photo by Geoff Steadman, Norwalk Harbor Management Commission

Figure 3-7—Rowing on the Norwalk River

3.2.3. Potential Impacts

No Build Alternative

In the No Build Alternative, current marine conditions would not be altered. Bridge openings would be required for vessels more than 16 feet high, which represent the majority of commercial and recreational vessels passing under Walk Bridge.

It is anticipated that over time, the No Build Alternative would adversely impact marine transportation, including commercial and recreational marine users located upriver from Walk Bridge. As the bridge ages, maintenance requirements, including time periods of channel restrictions and closures during bridge repair, may be expected to increase. The ability of the bridge to open on demand would decline, and bridge failures would be expected to occur more frequently.

It is anticipated that the USCG's current restricted bridge opening schedule would remain in place in the No Build Alternative, potentially becoming more restrictive should bridge failures increase.

In the No Build Alternative, no channel improvements would occur, and the poor navigation alignment between the Walk and Stroffolino Bridges would continue to exist.

Build Alternative

The Build Alternative will improve marine traffic conditions in the Norwalk River. With a new replacement bridge, the reliability of bridge operations will be substantially improved. The proposed increased bridge height will reduce the frequency of bridge openings, which will benefit commercial and recreational marine users. All three Build options propose a vertical clearance of approximately 27-feet, increasing the existing vertical clearance by 11 feet. The three Build options propose additional horizontal clearance, which will facilitate easier barge and tow operations. Both the Bascule Bridge (Option 4S) and the short span Vertical Lift Bridge (Option 8A) propose a 120-foot horizontal clearance. The long span Vertical Lift Bridge (Option 11C) would further enhance the navigational opening, with a 200-foot horizontal clearance.

The additional dredging in the Build Alternative (proposed for all three options) to straighten the alignment between Walk Bridge and the Stroffolino Bridge will greatly improve the navigability of the river between and through the two bridges, improving overall conditions for large and small vessel users. The widened channel at Walk Bridge and the removal of the pivot pier also will improve rowing conditions and rower (and other small boat) safety, by providing more visibility for rowers and boaters.

The bridge opening schedule is expected to return to a permanent status upon completion of the project. The USCG may determine the operating schedule based on results of a test period to determine efficiencies for both rail and marine traffic. It is anticipated that the revised bridge opening schedule will incorporate the improvements of the Build Alternative, including the bridge's higher clearance in the closed position, enhanced reliability, and reduced manpower requirements.

The improved navigation conditions of the Build Alternative, including the improved reliability of the bridge and wider navigation channel, also may produce indirect economic benefits to the commercial marine community in Norwalk. Current marine-based businesses may be more likely to expand and new marine-based businesses may be more likely to locate to an area with reliable infrastructure and stable conditions.

During construction of the Build Alternative, marine users will be adversely impacted. The anticipated duration of marine impacts will vary among the three Build options. Chapter 5 addresses temporary impacts to marine transportation and vessel users during the construction period, including differences among the three Build options.

3.2.4. Mitigation Measures

Because the Build Alternative will improve the overall marine transportation and marine traffic conditions in the Norwalk River at the site of Walk Bridge, permanent mitigation measures will not be required. Chapter 5 presents proposed mitigation measures to minimize construction period impacts.

3.3. Traffic, Transit, and Parking

3.3.1. Introduction and Methodology

This section describes the roadways, transit routes, and public parking facilities in the project area and the potential effects of the project alternatives on these routes and facilities.

Available mapping and information for area roadways, transit systems, and public parking supplies were obtained from the governing authority[43] and on-line sources such as Google Maps.

[43]City of Norwalk website, www.norwalkct.org, Accessed August 4, 2015; Norwalk Transit Authority website, www.norwalktransit.com, Accessed August 4, 2015; Norwalk Parking Authority website, www.norwalkpark.org, Accessed August 5, 2015; Norwalk Seaport Association, Inc. website, www.seaport.org, Accessed August 4, 2015.

3.3.2. Existing Conditions

Roadways

As shown in Figure 3-8, roadways in the vicinity of the project include interstate, US, and state numbered routes, as well as several city streets. Interstate Route 95 (I-95) crosses the Norwalk River in an east-west direction slightly more than one-half-mile up-river from (north of) Walk Bridge. I-95 extends from Florida to Maine and serves many major metropolitan areas along the east coast of the United States. Like the NEC, of which Walk Bridge is a part, I-95 carries interstate passenger and freight traffic between major metropolitan areas in the northeast region of the US. US Route 7 is a multilane divided highway in Norwalk, and it terminates at its southern end at I-95 in Norwalk about one-half-mile northwest of Walk Bridge. US 7 then runs north through Connecticut, Massachusetts, and Vermont. US Route 1 is a variable width arterial highway in Norwalk that generally parallels I-95 in Norwalk. US 1 extends from Florida to Maine.

The only other numbered route in the vicinity of the project is State Route 136 (Washington Street). It crosses the Norwalk River in an east-west direction on the Stroffolino bascule draw bridge about 500 feet south of Walk Bridge. Washington Street is four lanes on the Stroffolino Bridge and generally two lanes with parking in other sections. Heading west from the Stroffolino Bridge, Washington Street intersects with North Water Street/Water Street and then with North Main Street/South Main Street before crossing under the railroad right-of-way to connect with Dr. Martin Luther King, Jr. Drive. Washington Street ends at Fairfield Avenue. East of the Stroffolino Bridge, Washington Street connects to Fort Point Street, a four lane roadway with parking that narrows to two lanes before crossing under the railroad right-of-way (ROW).

North Water Street and Water Street run north-south, generally parallel to, and about 200 feet west of the Walk Bridge river span. North Water Street runs under the Walk Bridge approach structures. Both streets are generally two lane streets in the project area, with no parking allowed except for some metered parking on North Water Street between Walk Bridge and Washington Street.

Similarly, North Main Street and South Main Street run north-south about 1,000 feet west of Walk Bridge. Both are generally two lane streets in the project area with some metered parking.

Transit Service

The Norwalk Transit District (NTD) operates a bus system called WHEELS. NTD routes and schedules indicate that there are five bus routes passing through the project area on each weekday on 20-40 minute intervals, as shown in Figure 3-8. WHEELS does not operate on weekends and certain holidays. Three routes are located predominantly west of the Norwalk River; one route is east of the river, and one route crosses the river but is predominantly on the west side of the river. All WHEELS routes terminate at the WHEELS Hub, which is located on Burnell Boulevard near River Street in downtown Norwalk, about 1.5 miles northeast of Walk Bridge.

Figure 3-8—Roadways,Transit Routes, and Public Parking in the Vicinity of Walk Bridge

WHEELS Route 12 services the South Norwalk Railroad Station on its route between the WHEELS Hub and South Norwalk. WHEELS Route 11 also services the South Norwalk Railroad Station on its route from the WHEELS Hub to Norwalk Community College and crosses the Stroffolino Bridge. WHEELS Route 10 services the South Norwalk Railroad Station on its north-south route between the WHEELS Hub and Wilson Avenue. The route runs north-south along S. Main and N. Main Streets. WHEELS Route 9 runs north-south along Water and North Water Streets on its route from the WHEELS hub to Woodward Avenue. This route services the Maritime Aquarium at Norwalk. WHEELS Route 8 services the East Norwalk Railroad Station on its route from the WHEELS hub to Calf Pasture Beach. The NTD operates three regional routes that service Norwalk: The Coastal Link to Milford, CT; Route 41 to Stamford, CT: and Route 7 to Danbury, CT. None of these regional routes uses roadways near the project area. Dispatch-A-Ride is door-to-door transportation service within the city of Norwalk. This paratransit service is available to persons meeting certain disability eligibility requirements.

Parking

The Norwalk Parking Authority (NPA) operates 12 parking lots and garages within the city of Norwalk. NPA also regulates on-street parking in the City. Of the 12 lots and garages, four are located near the project area and are shown in Figure 3-8. The Haviland Lot is located on Haviland Street about 1,000 feet southwest of Walk Bridge. The Maritime Garage is located at 11 North Water Street, about 500 feet north of where the Walk Bridge approach structure crosses North Water Street. The Webster garage is located on Washington Street, approximately 1,200 feet west of Walk Bridge. The North Water Street Lot is located about 200 feet south of where the Walk Bridge approach structure crosses North Water Street. NPA also operates a garage near the South Norwalk Railroad Station and three lots near the East Norwalk Railroad Station, as shown in Figure 3-8.

Ferry Service

There is ferry service to Sheffield Island in Long Island Sound. Its departure dock in Norwalk, at 10 Water Street, is located on the west side of the Norwalk River about 300 feet from Walk Bridge between the Stroffolino Bridge and Walk Bridge. The ferry does not pass under the Walk Bridge on its course to Sheffield Island. The Maritime Museum operates an excursion boat into Long Island Sound. This boat dock is adjacent to the Sheffield Island dock. These docks are shown in Figure 3-8.

3.3.3. Potential Impacts

No Build Alternative

The No Build Alternative would have no long term or temporary effects on roadways, transit routes, and public parking facilities in the project area.

Build Alternative

The Build Alternative will have no long term adverse effects on roadways, transit routes, public parking facilities, and ferry services in the project area. The vertical clearance of the replacement Walk Bridge over North Water Street will be increased by the Bascule Bridge or Vertical Lift Bridge options. The railroad bridge over Fort Point Street will be replaced. As a result, the vertical clearance of the new structure over Fort Point Street may also be increased. CTDOT will continue to coordinate with the City of Norwalk as design is advanced regarding the cross-sectional widths of North Water Street and Fort Point Street under the railroad bridges.

Construction period impacts to traffic, transit, parking, and ferry services are described in Section 5.3.3.

3.3.4. Mitigation Measures

Long term mitigation for roadways, transit routes, and public parking facilities is not needed or proposed for the Build Alternative.

3.4. Pedestrian and Bicycle Facilities

3.4.1. Introduction and Methodology

This section addresses the existing and planned pedestrian and bicycle facilities in the area of Walk Bridge and how the project may affect them.

The neighborhoods of South Norwalk and East Norwalk have experienced a recent urban renewal through a mix of new development and redevelopment that has increased the density of bicyclists and pedestrians in the area.[44] This growth has served to fill in gaps that had previously deterred pedestrian activity and has created a renewed focus on connectivity for pedestrians and bicyclists. The City of Norwalk has now developed a vision that emphasizes the importance of its walking and bicycling corridors. The vision states: "All Norwalk residents and visitors have access to the benefits of walking and cycling. They are physically active and they and their children have learned to safely walk and bike, giving them mobility and independence. Norwalk is a community where people can walk or ride from their home to work, transit, to places for shopping and entertainment and for recreation."[45]

Pedestrian and bicycling facilities were identified through a variety of resources including: CTDEEP GIS data clearinghouse,[46] University of Connecticut Libraries' Map and Geographic Information Center (MAGIC) GIS Data clearinghouse,[47] consultation with the City of Norwalk, the City of Norwalk GIS website,[48] and the Norwalk River Valley Trail (NRVT) website.[49] Future plans and recommendations for long-term improvements to bicycle and pedestrian facilities in Norwalk and the Norwalk River Valley were identified through multiple planning documents including: the *Norwalk Master Plan of Conservation and Development (2008)*, the *Norwalk River Valley Trail Routing Study (2012)*, the *Norwalk Connectivity Master Plan (2012)*, the *Norwalk Pedestrian and Bikeway Transportation Plan (2012)*, the *Norwalk Trail Study - Maritime Link (2014)*, and the *Mid-Harbor Planning Study (2004).*[50]

3.4.2. Existing Conditions

The area between the South Norwalk Train Station and East Norwalk Train Station is a dense urban center with narrow streets. The Norwalk River divides the two areas, with Washington Street (Route 136) via the Stroffolino Bridge serving as the east-west connection for pedestrians and bicyclists. As shown in Figure 3-9, the South Norwalk (SoNo) Neighborhood generally is more densely developed and provides more sidewalks for pedestrians than the East Norwalk Neighborhood. The following is a description of these streets and the pedestrian and bicycle facilities they provide.

[44] City of Norwalk, CT, "South Norwalk TOD Pilot Program", April 24, 2014
[45] Fitzgerald & Halliday, "Norwalk Pedestrian & Bikeway Transportation Plan, Recommended Improvement Plan", January 2012.
[46] http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707 (accessed July 27, 2015)
[47] http://magic.lib.uconn.edu/ (accessed July 27, 2015)
[48] http://host.cdmsmithgis.com/norwalkct/ (accessed July 27, 2015)
[49] http://www.nrvt-trail.com/ (accessed July 27, 2015)
[50] Fitzgerald & Halliday, "Norwalk Swing Bridge Pathway Evaluation," 2016.

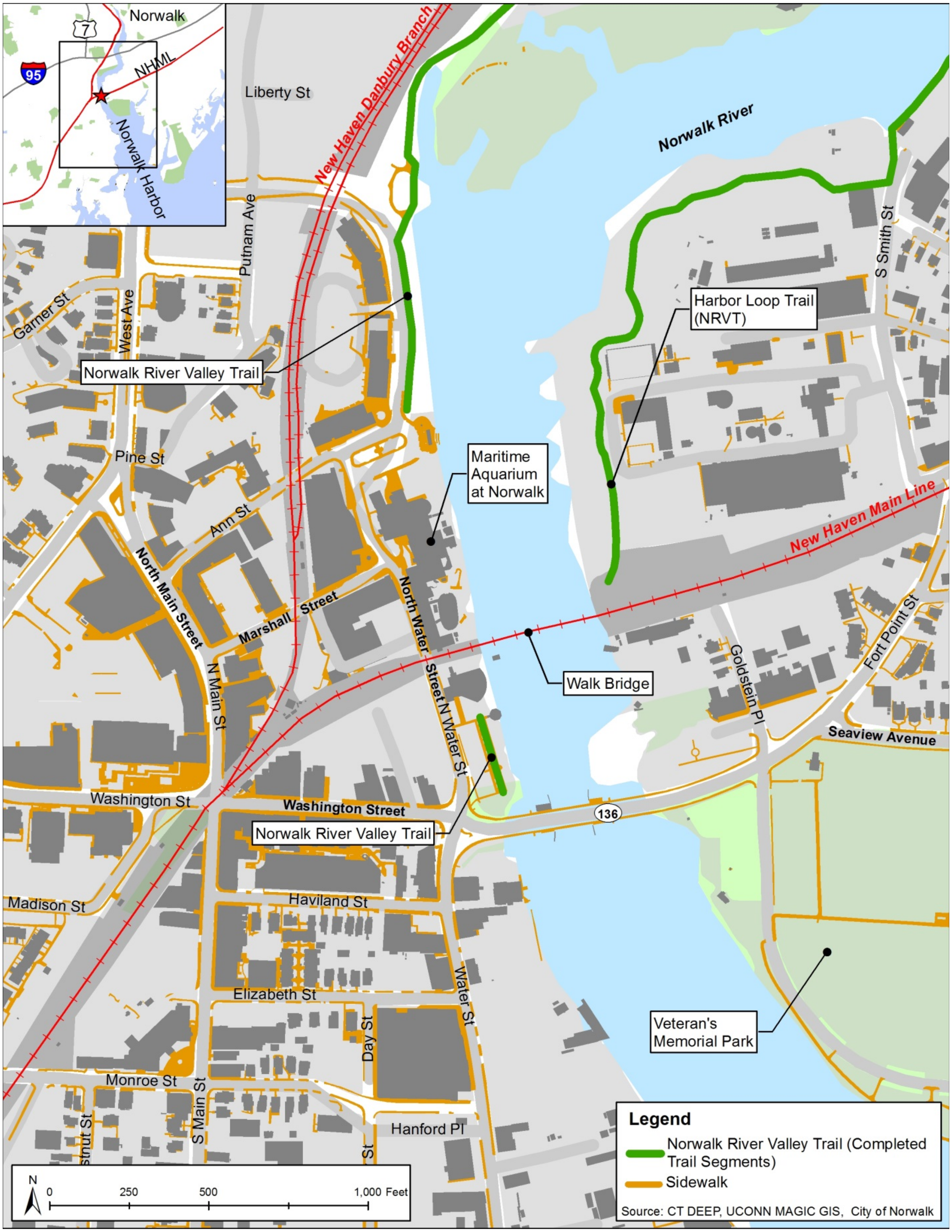

Figure 3-9—Pedestrian and Bicycle Facilities in the Vicinity of Walk Bridge

North Water Street runs parallel to the Norwalk River west of Walk Bridge. North Water Street is a two-lane roadway with variable width sidewalks on both sides of the road. The roadway cross section in the direct vicinity of the bridge is narrowed in spots due to obstructions, such as the railroad bridge abutment, street lights, hydrants, and street plantings. There is no dedicated bike lane and the roadway's shoulder width varies, tapering to less than a foot width in many locations. As such, bicyclists share the roadway with vehicular traffic. Deficiencies in the bicycle and pedestrian facilities on North Water Street are noted in the *Norwalk Pedestrian and Bikeway Transportation Plan* and the *Norwalk Connectivity Master Plan.*

Marshall Street intersects with North Water Street north of Walk Bridge and is a two-lane roadway with variable width sidewalks on both sides, some tree plantings, street lights, and sections of on-street parking on one side of the road. There is no dedicated bike lane and the roadway's shoulder width varies. As such, bicyclists share the roadway with vehicular traffic.

North Main Street intersects with Marshall Street, running parallel to North Water Street, and is a two-lane street with on-street parking and wide sidewalks on both sides. Retail and commercial establishments line North Main Street and it is generally pedestrian-friendly due the wide sidewalks with minimal obstructions. The on-street parking, lack of a bike lane, and narrow travel lanes render bicycle circulation challenging.

Washington Street runs between North Main Street and North Water Street and is a two-lane street with on-street parking and sidewalks on both sides. The roadway is generally pedestrian-friendly due to the wide sidewalks with minimal obstructions; however the on-street parking, narrow travel lanes, and lack of a bike lane make bicycle travel more challenging. Deficiencies in the bicycle and pedestrian facilities on Washington Street are noted in the *Norwalk Pedestrian and Bikeway Transportation Plan* and the *Norwalk Connectivity Master Plan.* East of the intersection with North Water Street, Washington Street becomes State Route 136 and is a four-lane roadway with sidewalks on both sides that is carried over the Norwalk River by the Stroffolino Bridge just south of Walk Bridge. CTDOT and the City have plans to improve bicycle accommodations on the Stroffolino Bridge through lane restriping and designation of bicycle lanes on the bridge.

Fort Point Street runs northeast from the Stroffolino Bridge, passing under the New Haven Main Line near South Smith Street. Fort Point Street is a four-lane roadway between the Stroffolino Bridge and Van Zant Street but transitions to two lanes north of Van Zant. Sidewalks line both sides of the roadway between the bridge and Van Zant Street, and crosswalks are provided at each of the intersections. South of the railroad underpass, the eastern sidewalk terminates and the western sidewalk narrows substantially. Although the sidewalk on the west side of the roadway allows for continuous pedestrian circulation, the lack of a bike lane or shoulder, the narrowing of the roadway north of Van Zant Street and through the underpass, and on-street parking in the block between Seaview Avenue and Van Zant, create challenging conditions for bicyclists and create sight line issues for motorists.

The **Norwalk River Valley Trail** (NRVT) is planned as a 38-mile multi-purpose trail connecting Rogers Park in Danbury to Calf Pasture Beach in Norwalk. The trail would create recreational opportunities for walkers, hikers, and cyclists, and would offer an alternative mode of transportation to reach rail stations, schools, offices, and businesses. The trail currently is not contiguous but exists in a series of discreet segments.[51]

[51] Norwalk River Valley Trail website (accessed September 2, 2015) http://www.nrvt-trail.com/

A 1.3-mile section of the NRVT runs along the west bank of the Norwalk River from Union Park to just north of the Maritime Aquarium property, approximately 800 feet north of Walk Bridge. This portion of the trail is eight to ten feet wide and paved in asphalt. From this point north of the Aquarium property, the trail turns west to employ the roadway infrastructure before returning to a boardwalk south of the Aquarium. The NRVT continues east on the sidewalk across the Stroffolino Bridge, also part of the East Coast Greenway. As outlined in the *Norwalk River Valley Trail Routing Study,* there are plans to extend the trail south of the Maritime Aquarium to Veteran's Memorial Park on the east bank of the river and then further south to Calf Pasture Beach. This study identifies the Maritime Aquarium trail head as an opportunity, but cites the railroad bridge and limited space along the water's edge as a notable challenges.

On the east side of the river, the WWTP Waterfront Walkway section of the **Norwalk Harbor Loop Trail** runs north in broken segments; it extends from Walk Bridge to the Interstate 95 Bridge (Yankee Doodle Bridge). Future plans identify the Harbor Loop Trail as continuing south, underneath Walk Bridge and terminating at the junction with the NRVT in Veteran's Memorial Park. The planned three-mile Harbor Loop Trail would connect the pathways on the east side of the river with the NRVT on the west, forming a complete loop around the harbor. Walk Bridge is currently an obstacle to the completion of the Harbor Loop Trail.

3.4.3. Potential Impacts

No Build Alternative

Under the No Build Alternative, Walk Bridge would not be replaced. The existing bridge structure would continue to serve as an obstacle to the completion of both the NRVT and Norwalk Harbor Loop Trail.

Build Alternative

The replacement of Walk Bridge will provide opportunities for long-term improvements to pedestrian and bicycle facilities in the vicinity of the bridge, including improvements that could advance the completion of the NRVT/Harbor Loop Trail.

The Build Alternative (all three options) will include the provision of a north-south connection on the east side of the river using the existing bridge abutment, as shown in Figure 3-10. The trail connection will be located atop the existing and partially lowered bridge abutment. This pedestrian and bicycle improvement will help to advance the completion of the Harbor Loop Trail on the east side of the river.

There are several options for a trail extension from the north-south connection on the east side of the river, identified in Figure 3-10. There is an opportunity for a pathway connection between the Norwalk Harbor Loop Trail and Washington Street at Veteran's Memorial Park, by traveling south along the eastern edge of the Norwalk River (Option A). A second option would extend the Norwalk Harbor Loop Trail to the south along the edge of the river, turning east and following the southern edge of the railway line to Goldstein Place. From there, the trail would travel south within the roadway to Washington Street (Option B). A third optional connection to local roadways would join the Norwalk Harbor Loop Trail to South Smith Street along the northern edge of the railway line to Fort Point Street (Option C). The final routing of the pedestrian and bicycle trail from the north-south connection may vary from the three options as described and shown in Figure 3-10, depending on CTDOT's land requirements for bridge operations and maintenance. The final trail routing could be constructed by CTDOT or others.

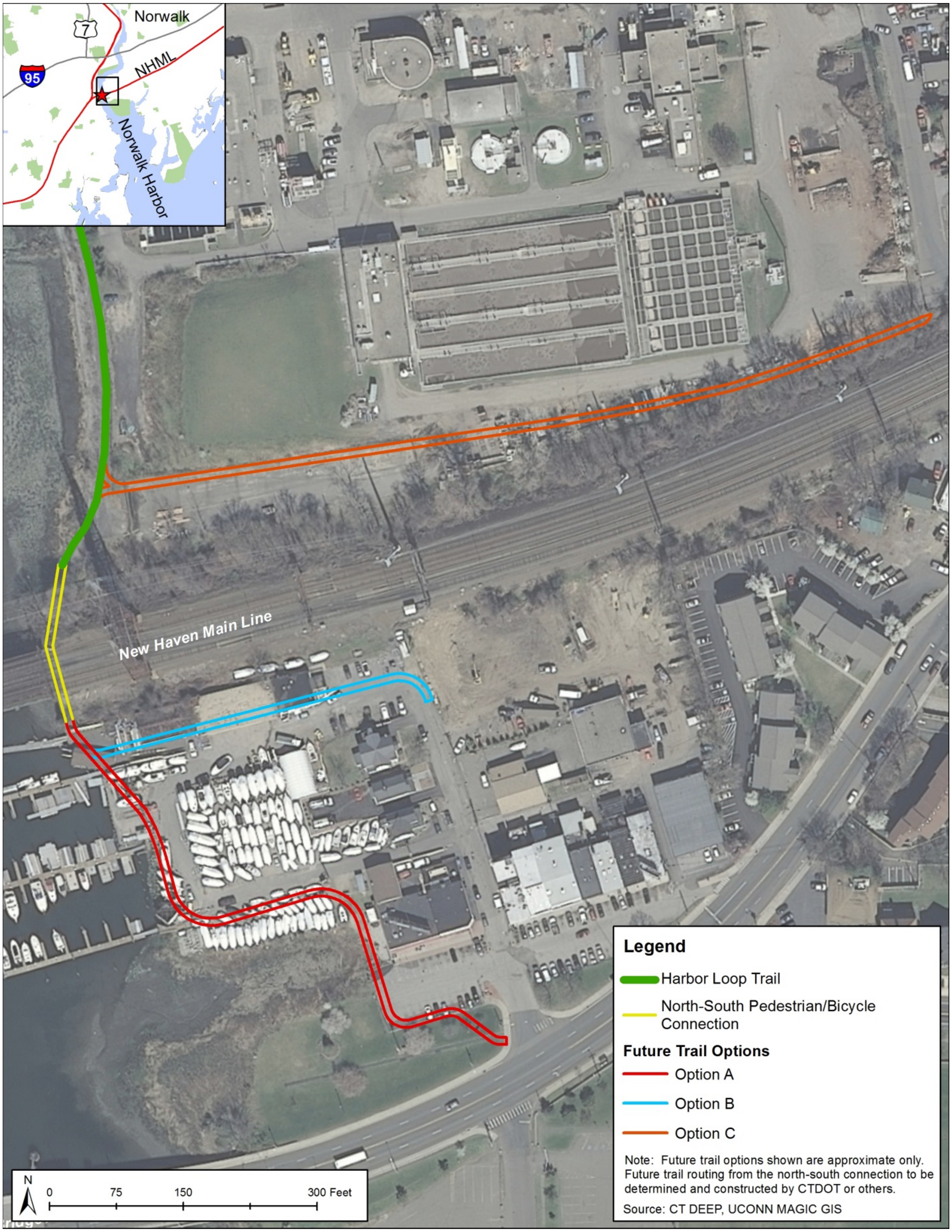

Figure 3-10—North-South Pedestrian and Bicycle Connection in East Norwalk

There are multiple alignment options for the NRVT on the west side of the river, including a separate pathway option and shared vehicle travel lane option. CTDOT will continue its ongoing dialogues with the City and stakeholders regarding pedestrian and bicycle connections on the west side of the river.

Construction period impacts to pedestrian and bicyle facilities are described in Section 5.3.3.

3.4.4. Mitigation Measures

Long-term mitigation for pedestrian and bicycle facilities is not required.

3.5. Land Use and Zoning

3.5.1. Introduction and Methodology

This section addresses the existing land uses adjacent to Walk Bridge and the City of Norwalk zoning districts applicable to the project area. Potential impacts during construction and operation are considered.

Information on existing land use and zoning was derived from data provided by municipal staff, field review, review of current aerials (2015), and review of land use maps produced by the Western Connecticut Council of Governments (WCCOG).[52]

3.5.2. Existing Conditions

Walk Bridge is located south of downtown Norwalk between the neighborhoods of East Norwalk and South Norwalk. Land uses and zoning districts around the bridge are shown in Figure 3-11.

Land Use

The SoNo neighborhood, located west of the bridge, is a dense mixed-use area with restaurants, bars, retail, office, light industrial, and residential units served by municipal bus service. Recently, this area has seen substantial publicly and privately funded revitalization.[53] One way that SoNo has accommodated the recent urban housing demand is through redevelopment of historic warehouse buildings with close proximity to the waterfront in South Norwalk. The neighborhood is also home to two parks and the Norwalk Police Headquarters. In addition to the South Norwalk Train Station that services the NHL, the neighborhood is served by four city bus routes. In the Norwalk *Plan of Conservation and Development*, the neighborhood is highlighted as a regional center with numerous development areas, some of which have already taken place.[54]

The Maritime Aquarium at Norwalk is located directly adjacent to Walk Bridge between the Norwalk River and North Water Street. The aquarium occupies the western bank of the Norwalk River on both the north side and south sides of the bridge; the two areas are connected by a covered pedestrian walkway running underneath the bridge. Across North Water Street from the aquarium on the north side of the rail corridor is the Norwalk Lock Building, a historic industrial building converted to commercial office space that abuts the retaining wall along the rail corridor, separated by a 10-foot access driveway. Continuing west along the north side of the rail corridor to the bridge over Washington Street, the land use continues

[52] Land use maps were produced in 2011 by SWRPA.
[53] City of Norwalk, CT, "South Norwalk TOD Pilot Program," April 24, 2014.
[54] City of Norwalk, CT, "City of Norwalk Plan of Conservation & Development," June 10, 2008.

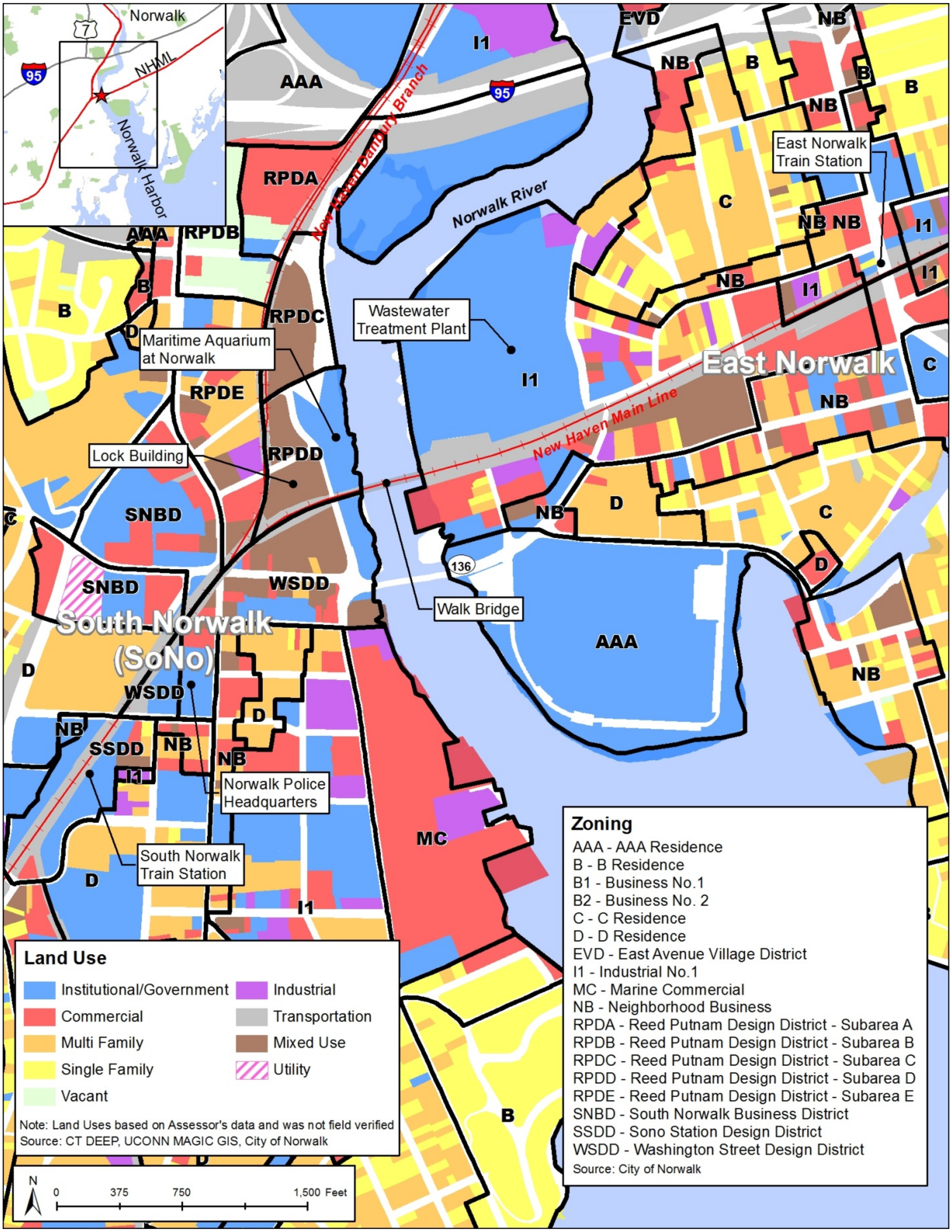

Figure 3-11—Land Use and Zoning in the Vicinity of Walk Bridge

to be made up of three and four-story mixed use buildings with commercial uses on the lower floors and residential uses on the upper floors.

The land use along the south side of the rail corridor west of the river is a similar make up, consisting of historic warehouse buildings rebuilt for new mixed use including the Ironworks SONO building, converted to incorporate over 100 residences, located across North Water Street from the aquarium's IMAX Theater. South of the theater along the riverbank, additional institutional services include ferry docks and a NPA public parking lot.

The east bank of the river directly adjacent to Walk Bridge is less densely developed than the west bank. The East Norwalk neighborhood is centered around the East Norwalk Train Station, which is located approximately one-half-mile east of the bridge. The Norwalk Water Pollution Control Authority (WPCA) Wastewater Treatment Plant (WWTP) is located approximately 750 feet to the northeast of Walk Bridge. The bridge and the WWTP are separated by a vacant CTDOT-owned lot primarily used for materials storage. The WWTP Waterfront Walkway section of the Norwalk Harbor Loop Trail runs north along the river from Walk Bridge. Coastwise Boatworks, a private marina, and the Maritime Rowing Club are located directly adjacent to the southeast quadrant of the Walk Bridge crossing of the Norwalk River. The Maritime Rowing Club's dock and water facilities abut the bridge, and its dockside facilities abut the rail corridor heading east. The in-water docking facilities of Coastwise Boatworks are located just downstream from the Maritime Rowing Club; its dockside boat storage is located adjacent to the rowing club's dockside facilities. The Liberty Square area, located in immediate proximity to Walk Bridge, consists of mixed land uses, including commercial uses (an auto body repair shop, contractor storage yard, plastic fabrication company) and single and multi-family residential uses.

The railroad corridor and its ROW in South Norwalk and East Norwalk is designated as a transportation land use.

Zoning

The City of Norwalk currently has over 30 zoning districts throughout the city. The following districts, shown on Figure 3-11, are located in the immediate vicinity of Walk Bridge:

- The northeast quadrant is zoned **Industrial 1**. According to the Norwalk regulations, "the district is intended to provide low-scale industrial facilities interspersed with other uses and with the utilities and infrastructure necessary to support such industrial operations. The provisions of this zone are designed to recognize the need for manufacturing space while ensuring that these areas are compatible with adjacent residential neighborhoods and with the capacity of available infrastructure."[55]
- The southeast quadrant is zoned **Neighborhood Business** directly adjacent to the bridge and **AAA Conservation Land** at Veterans Memorial Park. The intention of the AAA Conservation Land is to preserve land for park and recreation purposes.[56] The Neighborhood Business Zone is intended to encourage mixed-use development in neighborhood commercial areas and water-dependent uses are encouraged on those lots which are adjacent to the waterfront.[57]
- The northwest quadrant is zoned **Reed Putnam Design District – Subarea D (RPDD)** along the river and **Reed Putnam Design District – Subarea E (RPDE)** west of the NHL Danbury Branch. The districts were created to encourage development in accordance with the Reed Putnam Urban

[55] City of Norwalk Building Zone Regulations, Article 70 - Use Regulations Controlling Industrial Zones.
[56] City of Norwalk Building Zone Regulations, Article 41 - Conservation Developments.
[57] City of Norwalk Building Zone Regulations, Article 50 - Use Regulations Controlling Business Zones.

Renewal Plan, including creating opportunities for mixed-use development and enhancing public access to the Norwalk waterfront.[58] There are five different subareas within the Reed Putnam districts, reflecting differences in use, height, and bulk of buildings.

- The southwest quadrant is zoned **Washington Street Design District (WSDD)**. According to Article 50 of the Building Zone Regulations: "The purpose of this regulation is to preserve and enhance the unique character of the Washington Street Historic District and environs by encouraging the preservation of existing buildings, by encouraging the mixed-use of properties and by ensuring that all uses and structures will be compatible with one another and with the established character of the area."
- Two **Overlay Districts** are located west of the bridge. The first overlay district, "Designated Properties for Fees in lieu of Parking in South Norwalk," includes most of SoNo and allows for flexibility in parking requirements for uses located within its boundary.[59] The second overlay district, "Designated Properties for Transit-Oriented Development (TOD) at South Norwalk Railroad Station," specifies TOD provisions for properties within its boundary.[60]

While not a municipal zoning district, Walk Bridge is located within the Connecticut Coastal Area Boundary. The state-designation is intended to ensure that any development within the coastal area is conducted in a context sensitive manner without significantly disrupting either the natural environment or sound economic growth.

3.5.3. Potential Impacts

No Build Alternative

The No Build Alternative would result in no direct change to land use or zoning. The continued disruptions to rail service and marine traffic caused by occasional bridge inoperability could diminish the quality of life for residents, commuters, and visitors, making Norwalk a less desirable community in which to live and work. This diminished quality of life could stagnate or adversely impact ongoing revitalization and redevelopment and potentially alter future land uses, including waterfront development upriver of Walk Bridge.

Build Alternative

The purpose of the Walk Bridge Replacement Project is to replace the existing structure to improve rail service on the NEC, including the NHL, by eliminating the service disruptions which result from the occasional inoperability of the existing bridge. The improvement in service performance could increase confidence in the line and therefore help maintain and even promote the ongoing revitalization of the area, including the SoNo neighborhood. This continued revitalization is consistent with the existing land use patterns and zoning guidelines as well as future land use plans for the city and the region further defined in Section 3.7.

Overall, the Build Alternative will not result in changes in land use trends or zoning in the city of Norwalk. The project will result in limited land use changes on specific parcels due to parcel acquisitions and easements adjacent to and in proximity to the bridge. The land use changes would apply in any option of the Build Alternative.

[58] "Urban Renewal Plan for the Reed Putnam Area, Norwalk, Connecticut," Approved by the Norwalk Redevelopment Agency December 17, 1997.
[59] City of Norwalk Building Zone Regulations, Article 120 – Off-street Parking and Loading Regulations
[60] City of Norwalk Building Zone Regulations, Article 70 – Use Regulations Controlling Industrial Zones

To provide sufficient access to the Norwalk River at the bridge site and to provide for construction support uses, CTDOT will require the use of 23 parcels located at and in proximity to the bridge. Parcel acquisitions and easements are presented in Section 3.6. Of this total, two parcels are currently owned by CTDOT. CTDOT will purchase nine parcels, resulting in land use changes by converting parcels from their existing uses to transportation-support and construction-related uses. Additionally, 12 temporary easements, consisting of expansion of one existing easement and 11 new easements, will be required. The temporary easements are required for construction, access to the rail corridor or the Norwalk River, construction equipment assembly and staging, and equipment and materials storage. As currently envisioned, the temporary easements will not result in permanent land use changes; following construction, the parcels will revert to their current uses.

After construction completion, CTDOT will require permanent access to the replacement bridge on all four quadrants for operations and maintenance. Access rights will be obtained through new parcel acquisitions or new permanent easements. As a result, the existing transportation land use of the railroad corridor on both sides of the Norwalk River will be slightly extended to the north and south. As design advances, and in cooperation with property owners, CTDOT will continue to refine its access, operations and maintenance requirements and the need and extent of permanent easements.

3.5.4. Mitigation Measures

Long term mitigation is not required with the Build Alternative. The limited changes in land use associated with the project will not alter the general land use pattern, nor will they alter existing zoning.

3.6. Property Acquisition, Displacement, and Relocation

3.6.1. Introduction, Regulatory Background, and Methodology

This section describes property acquisitions and temporary and permanent easements that CTDOT will require for the Walk Bridge Replacement Project.

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), 42 USC 4601 et seq., and its implementing regulations, 49 CFR 24, govern property acquisition and relocation procedures for federal and federally-funded projects. The Uniform Act requires the fair and equitable treatment of people displaced from their homes or businesses by federal and federally-assisted programs, stipulating that real property is to be acquired at fair market value. The Uniform Act also establishes the requirements for relocation services, moving payments, replacement housing payments, and other payments related to commercial and residential moving costs and displacement.

Connecticut's Uniform Relocation Assistance Act, CGS Section 8-266 et seq., establishes a uniform policy for the fair and equitable treatment of persons displaced by the acquisition of real property by state and local land acquisition programs. The Act stipulates that all state agencies are authorized to comply with the federal Uniform Act for the purpose of participating in a federal or federally assisted project or program.

The Corridor Preservation Exemption (CPE), 49 USC 5323(q), authorizes FTA under certain conditions to assist in the acquisition of ROW[61] before the completion of the NEPA environmental review process

[61] For the purposes of corridor preservation under 49 USC 5323(q), ROW is defined as real property interest in a linear configuration needed for a core capacity improvement project, a corridor-based bus rapid transit (BRT) project, a fixed guideway BRT project, or a new fixed guideway capital project. to include real property interests needed for facilities directly adjacent to the fixed guideway. ROW also includes real property interests needed for facilities directly adjacent to the fixed guideway.

for transit projects that eventually will use the ROW. For the purposes of corridor preservation, ROW is defined as real property interest in a linear configuration needed for a core capacity improvement project or a capital project, as well as real property interests needed for facilities directly adjacent to the fixed guideway. Per the authorization, parcels that qualify for early acquisition under the CPE may not be developed until the required environmental reviews for the project have been completed.

City of Norwalk GIS mapping and CTDOT ROW plans were used to determine parcel boundaries in the vicinity of the project and to determine property impacts due to the project. Parcel data was obtained from the City of Norwalk Tax Assessor (http://gis.vgsi.com/NorwalkCT/).

3.6.2. Existing Conditions and Potential Impacts

Existing land uses in the vicinity of Walk Bridge are shown in Figure 3-11.

No Build Alternative

In the No Build Alternative, acquisitions, permanent easements, or temporary easements would not be required, therefore no impacts would occur.

Build Alternative

The replacement of Walk Bridge and track, catenary, and signal improvements will occur within the existing state ROW. To the greatest extent possible, the three Build Alternative options will be located on an alignment that matches the alignment of the existing bridge. Minor shifts in alignment that may be necessary to meet geometric requirements will be accomplished within the existing ROW.

In South Norwalk, new retaining walls located on the north and south sides of the railroad corridor will be built within the existing ROW. The elevation and width of the new retaining walls would be generally the same in the Build Alternative options; in the two Vertical Lift Bridge options, the walls would be slightly closer to the track, as the track spacing would be closer than that proposed with the Bascule Bridge.

In East Norwalk, on the southern side of the tracks, a retaining wall and side slopes will be built within the existing ROW. The elevation and plan for the retaining wall would be generally the same for the Bascule Bridge option and both of the Vertical Lift Bridge options. On the northern side of the tracks, the placement of the retaining wall would differ. With the Bascule Bridge, there is a potential for use of adjacent CTDOT-owned property to accommodate the run-around alignment. This adjacent CTDOT-owned property also would be required to accommodate the diverging track alignments for the two non-parallel replacement bridge structures. In the two Vertical Lift Bridge options, due to the proposed parallel track alignments, the use of the adjacent CTDOT-owned property would not be required.

The replacement of Fort Point Street Bridge would be designed to accommodate the Bascule Bridge, with diverging track alignments for the two non-parallel Walk Bridge structures, or the Vertical Lift Bridge, with parallel track alignments. The Fort Point Street Bridge abutments could be constructed in the same general location as the existing bridge abutments, or could be pulled back to accommodate a wider Fort Point Street below. The need for additional ROW to replace Fort Point Street Bridge is not anticipated for either the Bascule Bridge or the two Vertical Lift Bridge options. The replacement of Fort Point Street Bridge will not require parcel acquisitions, but could require temporary easements. CTDOT is continuing to refine its requirements for temporary easements for construction activities at this location.

Table 3-5 identifies the 23 parcels currently proposed for use in constructing and maintaining the Build Alternative. The number and proposed use of parcels to be acquired for the construction and future maintenance of the replacement bridge structure would be the same regardless of the Build Alternative option. Required parcels are shown in Figure 3-12 and include the following: two existing CTDOT-owned parcels; one existing CTDOT easement and expansion of that easement; nine full-parcel acquisitions; and 11 full-parcel and partial-parcel temporary easements. CTDOT will require the parcels for laydown areas for the temporary storage of construction equipment and supplies, contractor assembly and staging of equipment, contractor access to the Norwalk River and streets for transport of equipment and materials, contractor access to the railroad ROW, and dredged/excavated sediment temporary storage and management.

CTDOT will require permanent access to the replacement bridge for future operations and maintenance. On the east side of the river, CTDOT will use land it currently owns, a permanent easement, and parcel acquisitions. Abutting the railroad ROW to the north, CTDOT will utilize Parcel 3/2/6 (21 Goldstein Place); additionally, CTDOT will retain a permanent access and maintenance easement on the WWTP parcel (Parcel 3/2/3) extending east of 21 Goldstein Place to South Smith Street. CTDOT intends to retain a portion of land abutting the railroad ROW to the south at 11 Goldstein Place (Parcel 3/1/25) and 10 Goldstein Place (Parcel 3/1/30). On the west side of the river, CTDOT will retain permanent access and maintenance easements at 10 North Water Street (Parcels 2/19/2 and 2/19/3). The size of the permanent easements will be determined as design advances in cooperation with the City of Norwalk, the Norwalk Water Pollution Control Authority, and the Maritime Aquarium.

Table 3-5 presents the existing uses of the acquisition and easement parcels and the uses that will be displaced by the project. Uses displaced by the nine parcel acquisitions represent permanent displacements. It is anticipated that four businesses and up to six residences on three parcels located in East Norwalk will be permanently displaced. The local businesses include a private marina, an automotive use, and a contractor's storage yard on Goldstein Place, and a marine repair shop in Liberty Square. The residences are located on Goldstein Place. Displaced uses due to the permanent easements on the City of Norwalk's Maritime Aquarium property will be determined as design advances in cooperation with the City of Norwalk and the Maritime Aquarium. Section 5.3.4 discusses the temporary easements and temporarily displaced uses required for the project.

As shown in Table 3-5, FTA determined that the majority of the parcels meet its definition of ROW under the CPE and granted approval to CTDOT for early acquisition of ROW, through parcel acquisition or easement. In its approval of the early acquisitions, FTA noted that the parcels may not be developed in anticipation of the project until all required environmental reviews have been completed.

As design progresses, property impacts, including parcel acquisitions and temporary and permanent easements, will continue to be refined. To the greatest extent possible, CTDOT will strive to minimize impacts. As needed and practicable for safety and security, CTDOT will fence the parcels used for construction.

The contractor may opt to use other and/or additional parcels for construction staging, access, and/or equipment storage during the construction period. Should the contractor opt to use other or additional parcels during construction, the contractor will be responsible for obtaining regulatory permits and approvals prior to use.

Table 3-5—Proposed Parcel Use - Existing Conditions and Displaced Uses

Map/ Block/ Lot	Address	Existing Uses on Parcels [a]	Displaced Uses	Parcel Size (acre)	Portion of Parcel to be Used	FTA CPE [b]
Existing CTDOT-owned Parcels						
3/2/6	21 Goldstein Place	Materials storage; maintenance and operations	none	0.80	Full	---
2/24/7	67 Washington Street	Interlocking Tower/ SoNo Switch Tower Museum	none	0.20	Full	---
Expansion of Existing CTDOT-Easement Parcel						
3/2/3	60 South Smith St.	WWTP /maintenance and operations	none	14.88	Partial	yes
Proposed Acquisition Parcels						
3/1/15	1 Goldstein Place	Boat and vehicle storage/ 1,472 sf, 2-family residential structure	Boat and vehicle storage Two-family residences	0.11	Full	yes
3/1/16	3 Goldstein Place	Residence - 3,105 sf Single-family residential structure	Single-family residence	1.52	Full	yes
3/1/29	4 Goldstein Place	Auto body repair - 2,741 sf structure	Auto body repair	0.16	Full	yes
3/1/24	5 Goldstein Place	Residence - 2,695 sf Three-family residential structure	Three-family residences	0.13	Full	yes
3/1/19	6 Goldstein Place	Contractor storage yard with a 4,470 sf structure	Contractor storage yard	0.19	Full	yes
3/1/22	9 Goldstein Place	Undeveloped	none	0.65	Full	yes
3/1/30	10 Goldstein Place	Contractor storage yard	Contractor storage yard	0.22	Full	
3/1/25	11 Goldstein Place	Marina with a 10,810 sf club house; 4-bay, 2,304-sf garage; 88 sf shed; 53 boat slips; community rowing club	Marina and associated uses; community rowing club	0.50	Full	yes
3/1/8	217 Liberty Square	Plastic fabrication company - 4,452 sf structure	Plastic fabrication company	0.16	Full	yes
Proposed Temporary Easement Parcels [c]						
2/24/8	18 Marshall Street	Commercial/ multiple businesses and associated parking	Employee parking and service delivery access	1.95	Partial	yes
2/24/10	1 North Water St.	Commercial	none	1.89	Partial	yes
2/19/1	4 North Water St.	NPA North Water St. parking facility	Public parking	0.45	Full	yes
2/19/2	10 North Water St.	Maritime Aquarium of Norwalk	Outdoor animal exhibits, theater, parking [d]	0.84	Partial/ TBD	yes
2/19/3				3.43		yes
2/24/22	99 Washington St.	Commercial/multiple businesses	none	0.10	Partial	yes
2/24/24	83 Washington St.	Residential condominium	none	0.44	Partial	yes
2/24/26	79 Washington St.	Residential apartments, commercial	none	0.09	Partial	yes
2/84/19	68 Water Street	Office building and employee parking	Portion of parking area assoc. with office building	0.89	Partial	no
2/84/63	70 Water Street	Warehouse (vacant) - 2,370 sf	warehouse	1.01	Full	no
2/84/33	90 Water Street	Undeveloped commercial apparently used for employee and visitor parking	none	0.46	Full	no
Proposed Permanent Easement Parcels [c]						
3/2/3	60 South Smith St.	WWTP /maintenance and operations	none	14.88	TBD	yes
2/19/2	10 North Water St.	Maritime Aquarium of Norwalk	TBD [d]	0.84	TBD	yes
2/19/3				3.43		

Notes:
a. Current uses may differ from uses as determined from City of Norwalk Tax Collection property tax bills.
b. Early acquisition parcel approved by FTA pursuant to the Corridor Preservation Exemption, 49 USC 5323(q).
c. The sizes of temporary and permanent easements required for construction and maintenance of the Build Alternative will be determined and refined as design advances and in cooperation with property owners.
d. CTDOT is evaluating the type and extent of displaced uses associated with the proposed temporary and permanent easements, in cooperation with the City of Norwalk and the Maritime Aquarium.
Source: City of Norwalk Tax Collection property tax bill (http://my.norwalkct.org/eTaxbill/); accessed 1/ 20/ 2016.

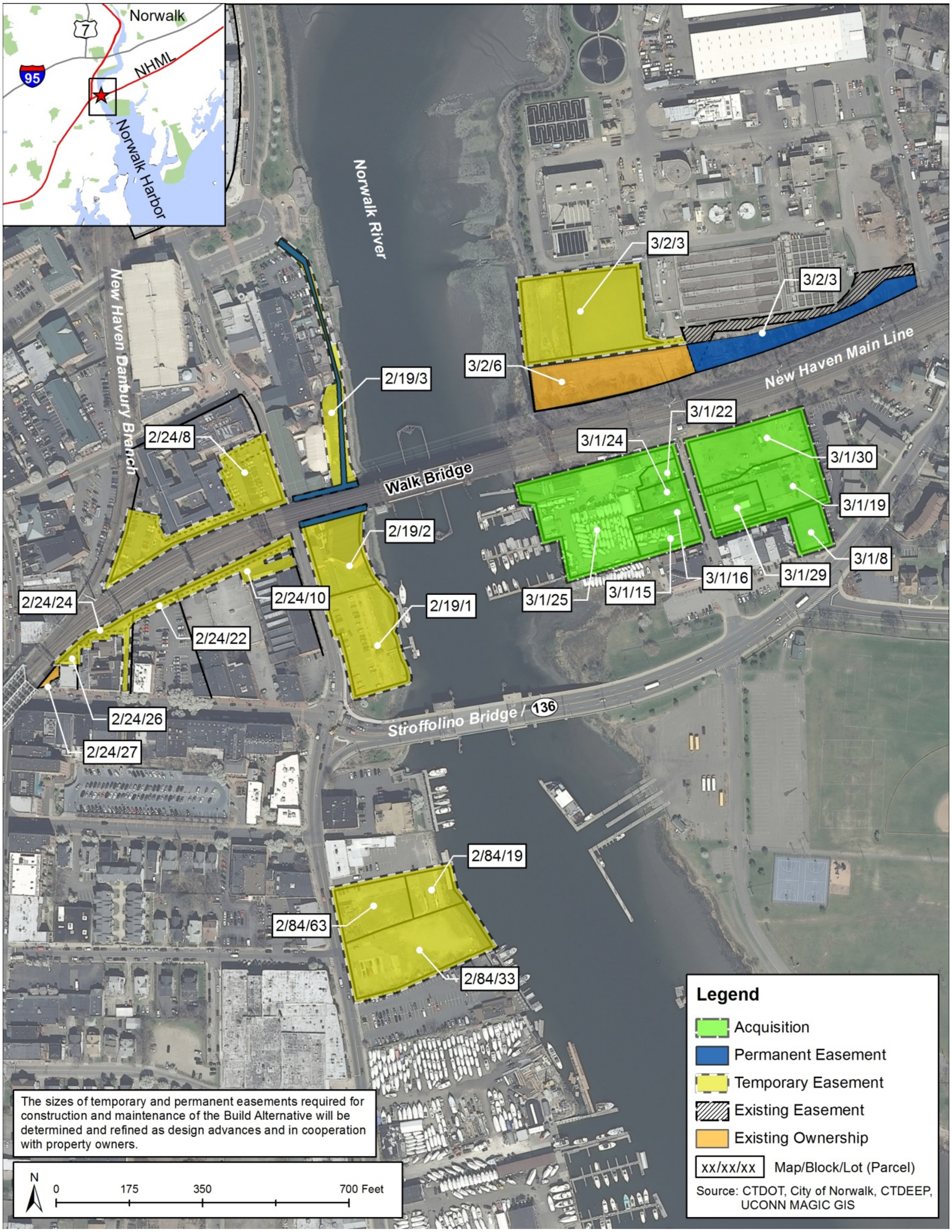

Figure 3-12—Locations of Proposed Parcel Use

3.6.3. Mitigation Measures

CTDOT will provide monetary and other relocation assistance to displaced property owners in accordance with the procedures outlined in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Connecticut's Uniform Relocation Assistance Act. Relocation assistance could include relocation advisory services, moving payments, replacement housing payments, other payments related to commercial and residential moving costs and displacement, and assistance regarding availability and rental costs of comparable dwellings and suitable business replacement properties It is anticipated that suitable relocation sites are available in the project vicinity for the displaced residences and businesses. CTDOT will develop an implementation plan to address the details of relocation assistance to be provided to displaced property owners.

Following completion of construction, CTDOT's Office of Rights of Way Property Management Division will be responsible for managing the properties acquired for the Walk Bridge Project, including the sale or lease of the properties.

3.7. Consistency with Existing Plans and Policies

3.7.1. Introduction, Regulatory Background, Methodology

This section assesses the consistency of the Walk Bridge Replacement Project with existing plans and policies. Per the Council on Environmental Quality (CEQ) guidelines, agencies are required to identify possible conflicts between the proposed action and Federal, regional, State, and local land use plans, policies, and controls (40 CFR 1502.16). CEPA requires an assessment of the project for its consistency with the State Conservation and Development Plan and the corresponding regional and municipal Plans of Conservation and Development.

Planning and policy documents of the different governmental planning entities were reviewed, focusing upon guidelines and directives that are most relevant to the Walk Bridge Replacement Project. To determine planning consistency, the No Build Alternative and the Build Alternative were evaluated relative to their ability to support or conflict with the stated policies and plans.

3.7.2. Existing Conditions

There are three governmental entities responsible for various planning functions within the Walk Bridge project area: the City of Norwalk; the Western Connecticut Council of Governments (WCCOG), the regional planning organization for eighteen municipalities in western Connecticut; and the State of Connecticut. Walk Bridge also is located within the multi-state regional planning area of the Northeast Corridor Infrastructure and Advisory Commission (NEC Commission). All of these governmental entities have published plans and policies.

3.7.3. Consistency Assessment

No Build Alternative

The No Build Alternative would conflict with current planning and policy documents. It would not support the rail and marine transportation and infrastructure improvement goals of the local, regional, state or federal planning entities. As stated in the LRTP, the condition of the existing Walk Bridge threatens the reliability of the NHL. The No Build Alternative would provide for normal maintenance during the life of the existing bridge; it would not extend the useful life or the bridge, nor would it achieve the system redundancy and reliability needed for future NHL operations and potential expansion.

Due to the unreliability of the existing Walk Bridge, over time, the No Build Alternative would conflict with the goals of the Norwalk Harbor Management Commission to enhance water-dependent uses in the Harbor. Additionally, the No Build Alternative would not further municipal and regional goals of expanding the pedestrian/bicycle network in the city.

Build Alternative

The Build Alternative is consistent with the transportation and infrastructure goals and policy directives of the local, regional, state and federal planning entities, including goals for both rail and marine transportation. The Walk Bridge Replacement Project is a transportation project intended to correct current operational deficiencies. By providing for a more reliable service, the project also will facilitate anticipated growth in ridership along the NHL, as proposed by CTDOT and the NEC Commission. The environmental protections incorporated into the design of the project will meet the goals of maintaining environmental quality through the construction and operation of the replacement structure. The proposed public access mitigation plans will meet goals of recreation, open space, and public access to the waterfront.

The following summaries demonstrate consistency of the project with existing municipal, regional, state, and multi-state plans and policies addressing rail and marine transportation, navigation, and pedestrian/bicycle trails.

Municipal Plans

- **City of Norwalk Plan of Conservation and Development**

The *City of Norwalk Plan of Conservation and Development* (*City Plan*), adopted in June 2008, presents a series of policy goals and objectives that focus upon six larger areas of urban development: balanced economic growth; environment and infrastructure; open space and recreation systems; community and cultural facilities; transportation; and governance, zoning and urban design.

Policy goals and objectives that are especially relevant to the Walk Bridge Replacement Project are in the areas of transportation, economic development, historic preservation, and open space and recreation systems. The project will maintain and improve existing rail and marine transportation, and will incorporate redundancy, resiliency, and safeguards for public safety. Due to the improved navigation, it is anticipated that the project will promote the growth of water-dependent uses, particulary upstream of Walk Bridge. CTDOT will continue to work with water-based businesses and activities to minimize the impacts of construction upon their daily activities. CTDOT will provide safeguards for minimizing impacts to environmental resources for the duration of project construction. The extension of the existing bicycle/pedestrian path will meet two important goals of the *City Plan* to maintain and improve water access to the public.

While the construction of the replacement structure will necessitate the demolition of the historic Walk Bridge, it is CTDOT's intent to incorporate historic design elements within the replacement bridge design to the extent practicable. During preliminary design, CTDOT solicited input from historic stakeholders, including the Norwalk Historic Commission, the Norwalk Preservation Trust, the Norwalk Historical Society, and the SONO Switch Tower Museum, through a series of design charrettes focused on bridge elements which could mitigate the loss of historic design elements. CTDOT will continue to solicit input from the City and historic stakeholders through final design of the replacement bridge. Through the input of the City and historic stakeholders, CTDOT will strive to meet a *City Plan* historic preservation objective to retain the character of the city by emphasizing historic preservation and quality design.

- **Norwalk Harbor Management Plan and Mid-Harbor Planning Study**

The *Norwalk Harbor Management Plan*, adopted in 1990 and most recently amended in 2009, serves as a guide for the City of Norwalk's use of the Norwalk Harbor for recreational, commercial, industrial, and other purposes. The *Norwalk Harbor Management Plan* compliments and coordinates with the *Norwalk Plan of Conservation and Development*, the policies of the Connecticut Coastal Management Act, and the Norwalk zoning regulations. The *Norwalk Mid-Harbor Planning Study*, revised to June 2005, focuses on the development potential of the Middle Harbor (approximately one mile in length, from the I-95 Bridge south to and including Walk Bridge).

There are several project-related harbor management guidelines and policies of the *Norwalk Harbor Management Plan*, specifically for the Inner Harbor Management Area, which includes and relates to Walk Bridge. These policies and guidelines address navigation, water-dependent uses, drawbridge operations, and water quality. Key recommendations of the Norwalk Mid-Harbor Planning Study applicable to the project include: protecting water-dependent uses; extending the Harbor trail; and enhancing existing publicly owned shorelines by removing invasive weeds, replanting with native plants, and reconstructing wetland areas where possible.

Through the construction of a more reliable bridge structure that will better service marine and rail users, the project will contribute toward the Commission's polices: an "open-to-all on equal terms" policy for use of the channel; its encouragement and support of water dependent uses in the Harbor; and its policy to ensure that bridge operations do not interfere with traffic or navigation. CTDOT's consideration of linkages to existing NRVT routes at the bridge site will facilitate the Commission's goal of providing pedestrian access to link boating facilities to South Norwalk's historic and commercial district, including the Maritime Aquarium. To comply with the Commission's policy to avoid or minimize adverse impacts to water quality, CTDOT will implement BMPs and monitor operations to protect aquatic resources through the construction period. CTDOT's wetland mitigation plan to restore degraded tidal wetlands will enhance the Norwalk River shoreline.

The parcel acquisition plan for the Walk Bridge Replacement Project is not inconsistent with the *Norwalk Harbor Management Plan* and *Mid-Harbor Planning Study*. While the construction of the Build Alternative will impact water-dependent uses, impacts will be of a short duration through the construction of the replacement bridge. CTDOT will work with the City of Norwalk, the Norwalk Harbor Management Commission, and other stakeholders to minimize temporary impacts to water-dependent uses during project construction.

Regional Plans

- **Regional Plan of Conservation and Development**

The *Regional Plan of Conservation and Development, 2006-2015* (*Regional Plan*) was adopted in February 2006. The ten goals of the *Regional Plan* focus on the major aspects of preservation and development. Planning goals, objectives, and recommendations that are especially relevant to the Walk

Bridge Replacement Project are in the areas of transportation, economic development, land use planning, and open space.[62]

By improving a key infrastructure facility along the NHL, the Build Alternative will promote two of the ten basic goals of the *Regional Plan*: improve and expand the region's public transportation system, including the NHL Railroad; and maintain the region's strong business climate by building on a viable transportation facility. The project's accommodations for pedestrian/bicycle connections to the NRVT will meet the *Regional Plan's* recommendations to promote pedestrian and bicycle uses, increase the amount of open space, and increase recreational opportunities. By contributing toward improved rail operations along the NHL, the Build Alternative will contribute to the *Regional Plan's* recommendations to improve air quality through increased passenger and freight-rail use.

- **South Western Region Long Range Transportation Plan, 2015-2040**

In March 2015, the Western Connecticut Council of Governments prepared *Going Forward: The Plan to Maintain & Improve Mobility*, the Long Range Transportation Plan (LRTP) for the South Western Region (draft). The LRTP serves as the "blueprint" for transportation for the eight municipalities represented by the South Western Region Metropolitan Planning Organization (SWRMPO), which includes the city of Norwalk.

By replacing the deteriorating bridge structure with a reliable bridge, the Build Alternative will address these key strategies of the LRTP: preserving the transportation network's structural integrity and operational efficiency; modernizing the transportation network by addressing system deficiencies, including structurally deficient bridges; and implementing strategic improvements to existing infrastructure to support anticipated ridership growth. The project will contribute toward a goal of the LRTP to increase the use of ports and waterways for the movement of goods in the region. Additionally, the pedestrian/bicycle accommodations included in the project will facilitate a strategy of the LRTP to develop a system of multi-use trails and on-street bicycle routes.

The LRTP specifies a number of capital improvements that would meet the plan's goals and objectives, including design and rehabilitation of Walk Bridge on the NHL.

- **South Western Region Transportation Improvement Program, 2015-2018**

SWRMPO is responsible for developing the South Western Region TIP, a four-year financially-constrained listing of all federally funded and regionally significant transportation projects. It is a living document that adjusts to project changes with input from SWRMPO. Developed in cooperation with federal and state agencies, including CTDOT, the TIP includes funding for transit, highway, and bicycle/pedestrian projects. The TIP serves as the vehicle for implementation of goals and objectives identified in regional LRTP. The 2015-2018 TIP was endorsed by SWRMPO in October 2014 and approved by USDOT and USEPA in January 2015 as part of the Statewide TIP (STIP).

The South Western Region 2015-2018 TIP, current as of March 17, 2016, lists Walk Bridge as a federally- and state-funded project proposed for construction in 2017 and 2018.[63]

[62] Note that while the one of the *Regional Plan's* goals is the preservation and adaptive reuse of historic structures, the goal is directed toward the preservation and adaptive reuse of historic buildings, such as residential and commercial structures, as opposed to the preservation and adaptive reuse of bridges and other infrastructure facilities.

[63] SWRMPO, South Western Region 2015-2018 Transportation Improvement Program (TIP), Region 1, FA Code 5337, Project Number 0301-0040, AQCd X6, Route/System NHL-ML (pages 1/6 and 2/6), 3/17/16. Appendix 3 includes the TIP pages identifying Walk Bridge.

- **Norwalk River Watershed Action Plan**

The Norwalk River Watershed Plan, updated in 2011, identifies short-term recommendations to improve water quality in the Norwalk River, with the vision of removing segments from the State's Impaired Waters list. Management goals of the *Watershed Plan* applicable to the Build Alternative include habitat restoration, land use/flood protection/open space, and water quality.

The Build Alternative is likely to include saltmarsh restoration, including intertidal habitat restoration, as a mitigation measure for construction impacts to tidal wetlands. The project will increase the flood storage capacity of the Norwalk River through the demolition of the existing bridge center piers, and will provide opportunities for increased open space through accommodations for pedestrian/bicycle connections along the waterfront. Construction of the project will include BMPs to minimize water quality impacts.

State Plans

- **State Plan of Conservation and Development**

The *Conservation and Development Policies: The Plan for Connecticut* (*State C&D Plan*), adopted in June 2013, lists six growth management principles to guide development within the State of Connecticut, two of which are especially relevant to the Walk Bridge Replacement Project.

Principle #4 addresses conserving and restoring the natural environment, cultural and historical resources, and traditional rural lands. The project will incorporate measures to protect Essential Fish Habitat within the Norwalk River and special concern species within the surrounding wetlands. The project will achieve a no-net-loss of wetlands by minimizing impacts to wetlands and mitigating for impacts that are unavoidable. While the demolition of the existing historic bridge will result in an adverse impact to historic resources, CTDOT is working with historic stakeholders and CTSHPO to develop mitigation measures, including incorporating design measures in the replacement bridge that retain the character of the historic structure.

Principle #5 addresses protecting and ensuring the integrity of environmental assets critical to public health and safety. CTDOT is incorporating strategies into the design of the replacement bridge to manage safety risks associated with increased frequency and/or severity of flooding. The bridge's structural, mechanical, and electrical systems will maximize system resiliency and operational redundancy. Chapter 4 addresses design adaptation strategies that the Build Alternative will incorporate to address climate change and infrastructure vulnerability.

CGS Section 16a-31 requires state agencies to be consistent with the *State C&D Plan* whenever they acquire, develop, or improve real property when costs are in excess of $200,000. As the primary purposes of the Build Alternative are to enhance public safety and bridge reliability, the project does not meet the definition of a "growth-related project," and a formal application of the Locational Guide Map (LGM) to the project is not required. As a guide for general planning purposes, however, the project is consistent with the policies of the LGM. The LGM identifies Norwalk as a Regional Center, indicating that it is targeted for redevelopment and revitalization, in particular for "compact, transit accessible, pedestrian-oriented, mixed-use" development. The railroad corridor within the city of Norwalk is located within a Priority Funding Area..

- **Connecticut State Rail Plan: 2012-2016**

In 2012, CTDOT produced the *Connecticut State Rail Plan: 2012 – 2016 (Rail Plan)*. The *Rail Plan* identifies service goals and recommends improvements related to both passenger rail service and freight service. In accordance with the goals of the NEC Commission, CTDOT's rail ridership goal is to double the 2010 commuter and intercity totals region-wide by 2030. Additionally, CTDOT anticipates increasing the 2010 rail freight volume by 20 percent by 2030.[64] Related goals include reducing travel time and achieving an OTP of at least 95 percent for all passenger rail services through equipment and capital investments; improving rail system reliability; and reducing public expenditures due to improved transportation efficiency and infrastructure.

The construction of a reliable bridge structure will improve operations along the NHL, thereby facilitating the service goals of the *Rail Plan*. Needed interim repairs of Walk Bridge, as well as its substantial improvement, are identified in the *Rail Plan's* Long-Range Investment Plan. Additionally, improvements to Walk Bridge are listed in its federal fiscal year (FFY) 2012-2016 Transit Capital Plan.

- **CTDOT Transportation Planning Strategy**

In 2013, CTDOT initiated *TransformCT*, a strategic planning program for improving the state's transportation infrastructure. In February 2015, CTDOT provided an update to its planning program, with a 30-year plan, *Let's Go CT! Connecticut's Bold Vision for a Transportation Future*. Proposed rail transportation improvement projects include rehabilitating or replacing all movable rail bridges on the NHL to attain a state of good repair. In a March 2015 factsheet announcing the 30-year plan, CTDOT identified the condition of the existing movable bridges on the NHL, including Walk Bridge, as the most critical of the NHL poor-rated bridges.[65]

- **Connecticut Statewide Transporation Improvement Program (STIP)**

The Connecticut Statewide Transportation Improvement Program (STIP), developed in compliance with 23 USC 134-135, the Clean Air Act Section 176(c) and Title VI requirements, lists all projects throughout the state which are expected to be funded with FHWA and FTA assistance over a four-year planning period.

The 2015-2018 STIP, current as of June 22, 2016, lists Walk Bridge as a federally- and state-funded project proposed for construction in 2017 and 2018.[66]

- **Connecticut Coastal Management Manual**

The Coastal Management Manual was developed as a tool for implementing the standards and policies of the Connecticut Coastal Management Act (CCMA). Section 3.16 and Section 3.17 describe the consistency of the Build Alternative with the standards and policies of the CCMA.

NEC Commission Plans

In April 2015, the NEC Commission produced the *Northeast Corridor Five-Year Capital Plan, Fiscal Years 2016-2020 (Capital Plan)*. The *Capital Plan* is a joint effort among eight states, the District of

[64] CTDOT. Connecticut State Rail Plan, 2012-2016. August 2012. Draft.
[65] CTDOT, "Rail Bridge Conditions and Needs on the New Haven Line; *Let's Go CT*!" March 2015.
[66] CTDOT, 2015 Statewide Transportation Improvement Program (STIP), Region 1, FA Code 5337, Project Number 0301-0040, AQCd X6, Route/System NHL-ML (page 1). Appendix 3 includes the STIP page identifying Walk Bridge.

Columbia, the U.S. Department of Transportation, Amtrak, eight commuter rail agencies, and other stakeholders to integrate the infrastructure investments required through 2020. The NEC Five-Year Capital Plan builds on prior planning efforts: the *NEC Infrastructure Master Plan, 2010-2030* (May 2010); a January 2013 report, the *Critical Infrastructure Needs on the NEC* , which describes the underlying needs for the most critical upgrades on the NEC; and a September 2014 progress report, *NEC Five-Year Capital Needs Assessment, Fiscal Years 2015 to 2019*. The need to replace or rehabilitate Walk Bridge was cited as a critical investment needed to address state-of-good-repair, reliability and capacity issues. The replacement of Walk Bridge is included in the *NEC Five-Year Capital Plan* as a "Major Backlog and Service Preservation & Improvement Project."

3.7.4. Summary

The Build Alternative is consistent with local, regional, state, and federal level planning and policy documents for improving rail transportation and infrastructure in the NEC. By incorporating the proposed mitigation measures described in Chapter 3 and Chapter 5, and summarized in Chapter 6, the Build Alternative will be protective of the natural and built environment.

CTDOT will continue to work with project stakeholders, including the historic stakeholders, the City of Norwalk, and community groups, through the design and construction of the replacement bridge, as discussed in Chapter 6.

3.8. Socioeconomics

This section presents existing socioeconomic data and examines the effects of the project on the social and economic environment. Socioeconomic conditions were characterized by evaluating the demographics within one-quarter to one-half mile of the project site.

The socioeconomic analysis for this project entailed collecting U.S. Census Bureau data for the city and the census tract data for the project area, as shown in Figure 3-13. Housing data was collected from SWRPA, and property valuations and home sales prices were obtained from the Connecticut Office of Policy and Management (OPM) Real Estate Sales Databases. Employment data was obtained from the U.S. Census Bureau and the Connecticut Department of Labor. Potential impacts to socioeconomic conditions were developed using on-line tax assessment data from the City of Norwalk.[67]

3.8.1. Introduction and Methodology

Existing Conditions

Located in Fairfield County, the most populous county in the state, Norwalk is the sixth largest city in the state. Norwalk is part of the Bridgeport-Stamford, CT-NY Urbanized Area and is part of the New York metropolitan area (New York-Newark-Bridgeport, NY-NJ-CT Combined Statistical Area). In the 2010 Census, Norwalk's population was recorded as 85,603 persons and 35,415 housing units.

The South Western Region (the region), consisting of eight municipalities in southwestern Connecticut, is substantially developed and is the second most densely populated planning region in the state of Connecticut. According to the 2010 Census, there were 364,519 persons residing in the 212.3 square mile region, resulting in a population density of approximately 1,717 persons per square mile (2.7 persons

[67] City of Norwalk tax collection property tax bill (http://my.norwalkct.org/eTaxbill/); accessed 1/20/2016.

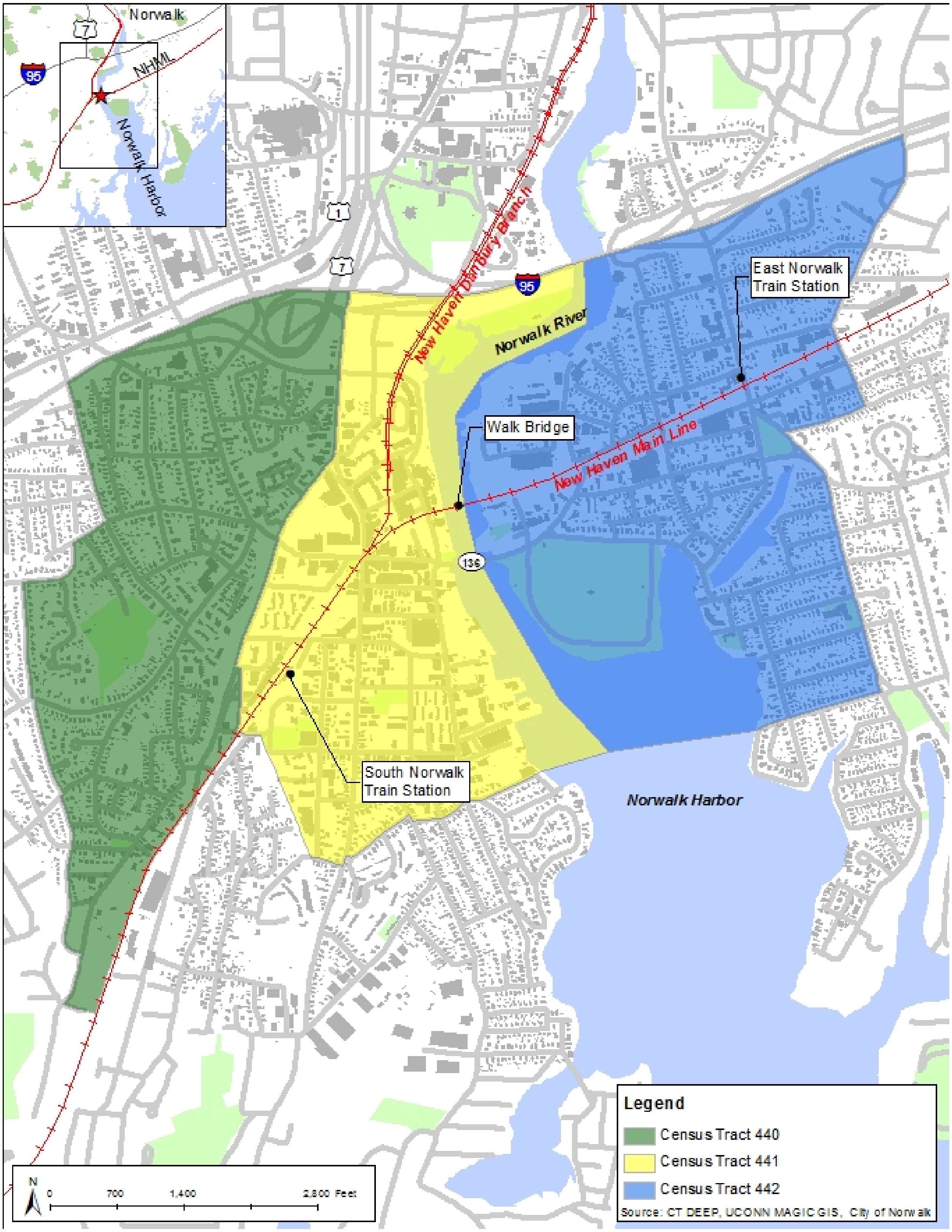

Figure 3-13—Census Tracts in the Vicinity of Walk Bridge

per acre). In 2010, the city of Norwalk registered the highest population density in the region,[68] at 3,744.7 persons per square mile (5.9 persons per acre).[69]

Norwalk's location, at the nexus of major rail (NEC/NHL) and highway transportation corridors (I-95 and Merritt Parkway) in this coastal setting on Long Island Sound, has made it a prime location for development and tourism. The project site adjoins the Maritime Aquarium and IMAX theatre, hosting 500,000 visitors a year, the largest Connecticut attraction within 100 miles of New York City.

Norwalk's economy is diverse: no more than one employer accounts for more than three percent of the total jobs, and no one business comprises more than 2.6 percent of the City's "Grand List" of taxable properties.[70] The city's residents represent a labor force of approximately 50,000 persons,[71] more than ten percent of the county labor force. Businesses in the city employ approximately 50,000 persons,[72] more than ten percent of the county's total employment.

The western portion of the project transects the heart of South Norwalk. The surrounding SoNo, or the South Norwalk, neighborhood has become an eclectic hub and dining, shopping, and entertainment center. In addition to the Maritime Aquarium/IMAX theater, the economic anchor for the area, the SoNo neighborhood hosts two cinemas, galleries, and more than 40 restaurants/eateries and 40 retail stores/services along immediately adjoining the neighboring blocks in SoNo. Businesses related to tourism in the blocks surrounding the site include Sheffield Island Cruises adjoining the site to the south, several museums and historic sites, and parking garages.

Revitalization of the SoNo area that began in the 1970s with the construction of the Maritime Aquarium has seen a recent resurgence with several large-scale developments recently completed or proposed across the street in the neighboring block across from the Maritime Aquarium. The reconstruction of the Ironworks SONO building, which includes residential waterfront apartments, ground flood retail, and restaurants, was recently completed adjacent to the rail corridor. Construction under way for the SoNo Pearl (99 Washington Street) on the adjoining parcel to the west will create high-end housing and parking, and plans are also underway for SoNo Hotel, an extended stay hotel. Major developments proposed or under construction in the vicinity of the project site are shown in Figure 3-14.

The city's housing stock is also varied, with housing types ranging from single-family homes to multi-story apartments. The combined property values in the city in 2012 were the third highest in the state, surpassed only by Greenwich and Stamford.[73] The city's combined high property values reflect the density of development, with multi-story new or historic former industrial buildings that have been repurposed for mixed use developments, consisting of residential uses on upper floors and commercial uses on lower levels. In contrast, Norwalk had the lowest median home sale prices in the region.[74] Affordable housing prices in the city make the area attractive for commuters, and newer developments in the SoNo District target live/work loft spaces, with the new Ironworks SONO mixed use development including residential lofts as small as 562 square feet.

[68] South Western Regional Planning Agency, *Transportation Planning Programs Including the Transportation Improvement Program 2012-2015 and the Long Range Transportation Plan 2011-2040*, August 2013.
[69] U.S. Census Bureau, Norwalk (city) QuickFacts, 2010.
[70] City of Norwalk (Finance Department), Connecticut, *Comprehensive Annual Financial Report*, *Fiscal Year Ended June 30, 2014*.
[71] Connecticut Department of Labor Office of Research, "2015 Connecticut Labor Force Data by Place of Residence," July 2015.
[72] Estimated using the U.S. Census Bureau, "B08604: Worker Population for Workplace Geography, universe: Workers 16 years and older, 2009-2013 American Community Survey 5-Year Estimates."
[73] Connecticut Office of Policy and Management, "2012 Net Grand List by Town," https://data.ct.gov/Government/2012-Net-Grand-List-by-Town/ebya-9ie6, Accessed July 30, 2015.
[74] South Western Regional Planning Agency, *South Western Region Housing Report*, October 2009.

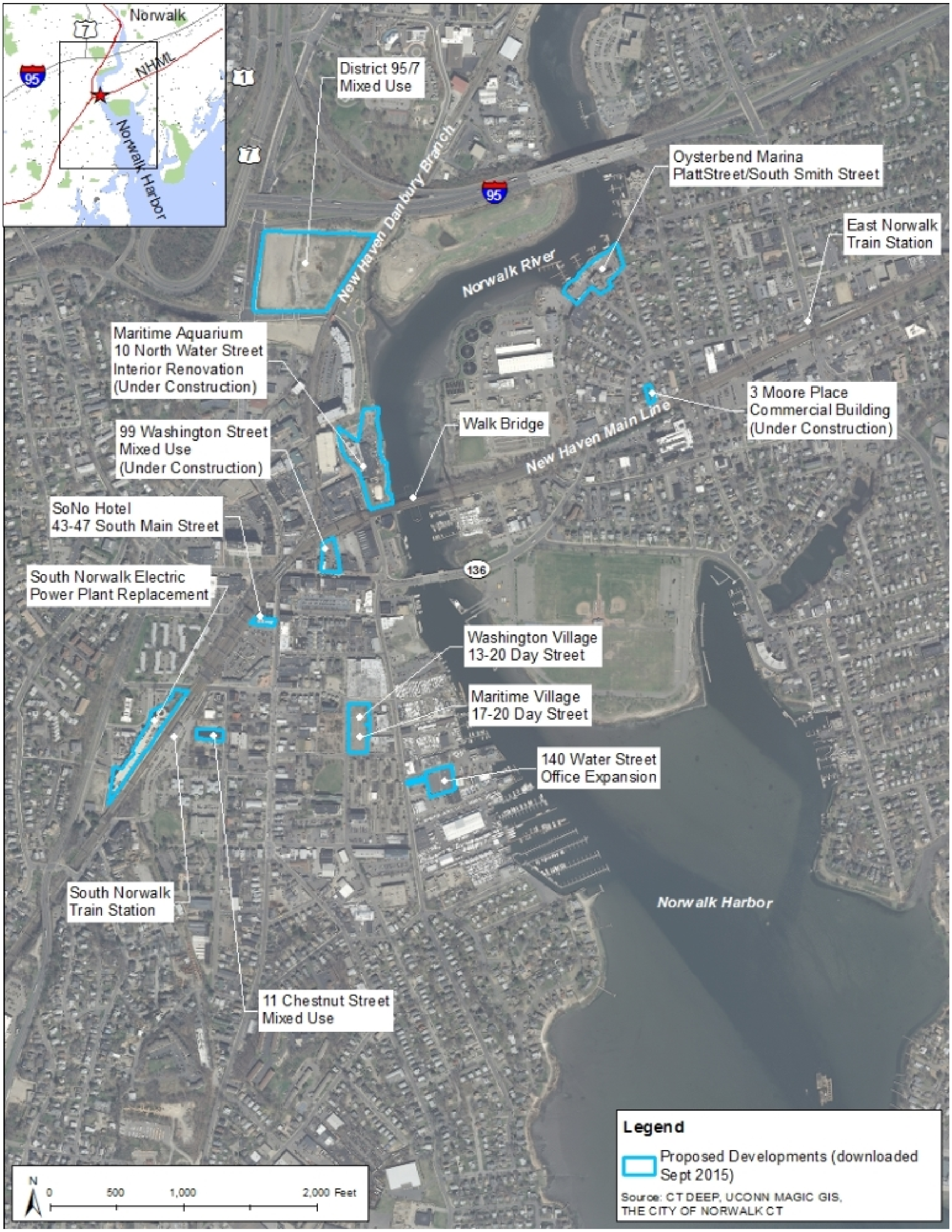

Figure 3-14—Proposed Developments in the Vicinity of Walk Bridge

The SoNo District has among the highest proportion of rental units (and non-resident landlords) in the city. The census tract that includes the SoNo District on the west side of the Norwalk River has 70 percent of the population in rental housing, and 40 percent of households comprised of families. The recent and proposed developments in the SoNo District target a more urban demographic, consisting of singles, younger couples without children, or empty nesters.[75]

Across the river, in the East Norwalk neighborhood, businesses include marine and industrial businesses within the neighborhood business zones, including Liberty Square, interspersed with residential neighborhoods. The East Norwalk neighborhood, separated from the SoNo District by the Norwalk River, has not experienced the redevelopment resurgence of South Norwalk. Residences are characterized by more single-family, lower-rise housing and fewer rentals than the housing across the river. The census tract that includes the East Norwalk neighborhood has 60 percent of the population in rental housing, with 50 percent of total households comprised of families.

3.8.2. Potential Impacts

No Build Alternative

Potential socioeconomic impacts of the No Build Alternative include the increasing operation and maintenance costs of the existing Walk Bridge and the costs of a disruption to rail service.

In the No Build Alternative, annual operations and maintenance (O&M) costs are expected to increase as the bridge ages, and may fluctuate year to year depending on the number of failures and emergency repairs. These costs do not include the costs to Metro-North associated with an unpredicted failure; Metro-North has reported maintaining additional staff to monitor the bridge's mechanisms during bridge openings.

In the No Build Alternative, failures of the existing bridge would be expected to continue and increase in frequency as the bridge ages. The NEC Commission reports that approximately 75 percent of the residents in Fairfield County commuting to Manhattan for work travel by rail.[76] When a failure of the bridge's movable mechanism occurs, it disrupts Metro North service on the NHL, one of the busiest rail lines in the country, as well as Amtrak service.

An April 2014 report from the NEC Commission, "*The Northeast Corridor and the American Economy*," estimated the economic impact of a one-day loss of the NEC rail network[77] due to a large-scale disruption.[78] The report used survey results regarding travel behavior responses to Superstorm Sandy, which resulted in the loss of most service along the NHL for almost two weeks in September and October 2013. When faced with an unexpected outage of rail service, approximately two-thirds of regular commuters found alternative means of commuting, likely resulting in increased roadway congestion. Of the approximately one-third of commuters who stayed home, 60 percent were able to telecommute and retain some productivity, while 40 percent lost all productivity. Applying this response associated with Superstorm Sandy, the report determined that a one day economic loss resulting from disrupted NEC commuter service on the entire rail network is approximately $83 million. Most of the commuter-related costs would be concentrated in the New York metropolitan area, which accounts for approximately 80 percent of the total commuters on the NEC. The report estimated that the one day economic loss associated with the loss of Amtrak service would range from $9 million to $13 million. The NEC

[75] City of Norwalk Mid-Harbor Development Committee, *Norwalk Mid-Harbor Planning Study*, August 2004, revised June 2005.
[76] The Northeast Corridor Infrastructure and Operations Advisory Commission, The Northeast Corridor and the American Economy, April 2014.
[77] The NEC rail network consists of the entire NEC railroad between Boston, MA and Washington, DC.
[78] The Northeast Corridor Infrastructure and Operations Advisory Commission, The Northeast Corridor and the American Economy, April 2014.

Commission concluded that an unexpected system-wide shutdown of the NEC could cost up to $100 million in productivity and transportation-related costs per weekday.[79]

A temporary shut-down of Metro-North service due to a failure of Walk Bridge would not be likely to impact the entire NEC, as it is primarily a commuter service to and from New York City. However, a temporary disruption to Amtrak service due to a bridge failure would produce adverse impacts on the entire NEC; a delay in one segment of the NEC network produces ripple effects along the entire network. In addition, a bridge failure would result in lost productivity for both commuters and inter-city passengers. While a failure of Walk Bridge would not result in the same degree of economic costs as described in the NEC Commission report, the NEC Commission report nevertheless points to the potential for continued failures of Walk Bridge to become a major impediment to the movement of people and goods on the NEC, with significant regional economic implications.

Norwalk is a bedroom community for New York City, and continued disruptions to service on the line could also affect the attractiveness of the area for commuters if the reliability of commuting by rail to destinations such as New York City is impacted. Perceptions of the convenience of Norwalk for commuters and businesses have contributed to the recent revitalization of the SoNo Area and resurgence in development, including recent construction of residential lofts and retail/office space in SoNo. The continued unreliability of the bridge could adversely affect this development resurgence.

Build Alternative

Investment in the replacement of Walk Bridge will generate short-term economic impacts (benefits) during the construction period and long-term economic impacts (benefits) after the replacement bridge is in operation.

Employment impacts can be estimated both as short-term employment impacts during the construction period and long-term employment impacts generated by the economic growth enabled by the project upon completion. Job creation is one measure of the short-term economic impact of construction spending, which also generates increases in personal income, retail sales, and gross regional product. Section 5.3.5 presents the anticipated short-term (construction-related) employment impacts, which differ by Build Alternative option.

Long-term economic impacts include changes to local real estate development, business activity, or access to the transportation network upon completion. Long-term economic impacts are anticipated to be the same regardless of Build Alternative option.

As indicated in Section 3.6, CTDOT will require the purchase of nine parcels in the Goldstein Place area for the construction of the Build Alternative. For purposes of this analysis, the purchase of these properties is considered a permanent impact, even though impacted businesses on the properties are anticipated to relocate rather than cease operations. The potential impacts associated with these displaced businesses and residences, including loss of property tax revenue, are measurable direct economic costs of the project.

The total assessed value of the properties to be acquired is approximately $3.6 million, based on the City's 2014 property valuations. In 2016, the combined annual property tax revenue from these parcels was approximately $91,000. The combined assessed value of these displaced properties comprised approximately 0.03 percent of the City's net taxable Grand List for real property (total aggregate

[79] The Northeast Corridor Infrastructure and Operations Advisory Commission, The Northeast Corridor and the American Economy, April 2014.

valuation of taxable real property in Norwalk), and the annual tax revenue from these affected properties also comprised approximately 0.03 percent of the City's total annual tax revenues in 2015-2016.[80] Assuming that these percentages remain constant through project construction, this loss of tax revenue over a four-year period will not represent a substantial proportion of the City's entire tax base. Upon completion of the project (approximately 2022), CTDOT intends to sell the parcels, returning them to the City's tax base.

The permanent access easement that will extend along the existing access road on Parcel 2/19/3 will be minimally intrusive, and the two maintenance easements located parallel to the railroad corridor on Parcels 2/19/2 and 2/19/3 will be limited in size to allow for periodic inspections and maintenance. CTDOT is refining the permanent easement requirements as design advances and in cooperation with the City of Norwalk.

Permanent direct economic benefits of the project will result from avoided disruption to rail service and avoided operations and maintenance costs associated with the existing Walk Bridge. The costs of a one-day outage on the NEC rail system are described in the review of potential impacts of the No Build Alternative. The project will have a beneficial, long-term economic impact on the region by increasing the reliability of rail service on the NEC, which is critical for the movement of people, goods, and services throughout the Washington to Boston metropolitan areas, as well as improving the reliability of the bridge for commercial navigation.

The Build Alternative, including improved marine conditions, is expected to support continued economic prosperity of the region and the local economy. Recent resurgence in revitalization of the SoNo downtown business community centers on the attractiveness of the area for businesses, commuters, and tourists. The potential for added amenities, such as a trail extension proposed along the east riverfront, will contribute to the attractiveness of the SoNo and the Norwalk River waterfront. The project is not expected to change the demographics of the local area, beyond the direct business and residential displacements. The established trend of higher rents and real estate prices is expected to continue, with recent developments continuing to serve a more commuter-oriented market, which will have a larger effect on the composition of the region.

With a new replacement bridge, CTDOT will be able to establish predictable O&M costs in its annual budget. With a new bridge, the annual O&M costs are anticipated to be lower than the O&M costs of the No Build Alternative.

Chapter 5 addresses the short-term economic impacts of the project. There would be differences among the three Build options relative to short-term economic impacts.

3.8.3. Mitigation

In accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, relocation services will be provided for affected and displaced businesses and residences, as addressed in Section 3.6. It is anticipated that displaced businesses will be compensated and CTDOT is investigating the availability of suitable sites for nearby relocation and maintenance of business operations and residences.

[80] The assessments as of October 1, 2014 are the most recent City of Norwalk property assessments and are used to calculate property taxes for Fiscal Year 2015-2016. Based on the total tax levy and the net taxable Grand List as reported in the City of Norwalk's Approved Operating Budget for Fiscal Year 2015-2016. http://www.norwalkct.org/DocumentCenter/View/8467.

3.9. Water Quality

3.9.1. Introduction, Regulatory Background, Methodology

This section describes the existing surface water, groundwater, and stormwater conditions of the project area and assesses impacts to water quality as a result of the Walk Bridge Replacement Project.

CTDEEP, mandated by the US Environmental Protection Agency (USEPA) via the Clean Water Act, regulates water quality standards for the state. The Connecticut Water Quality Standards provide guidance, policies and goals for maintaining or improving water quality within the state, including surface waters and groundwater. The City of Norwalk has an Aquifer Protection Agency (APA) that is responsible for regulating high risk land uses that occur within aquifer protection areas.

The National Pollutant Discharge Elimination System (NPDES) Stormwater Program is authorized by the Clean Water Act to control water pollution by regulating sources that discharge into waters of the United States. Connecticut is authorized to implement the NPDES Stormwater Program.

Information identifying water impairments and locations of NPDES permits was gathered from the USEPA My WATERS Mapper. Information on Total Maximum Daily Load (TMDL) for indicator bacteria in the Norwalk River north of the project area was obtained from "A Total Maximum Daily Load Analysis for the Norwalk River Regional Basin," released in 2005. Statewide TMDL information for bacteria south of the project area was obtained from the Norwalk Estuary TMDL report. TMDL information on Dissolved Oxygen (DO) in Long Island Sound was obtained from "A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound," released in 2000. "Northeast Regional Mercury Total Maximum Daily Load" provided information for reducing mercury levels in fish fresh waters of the Northeast.

3.9.2. Existing Conditions

Figure 3-15 presents water quality classifications in waters proximate to Walk Bridge.

Surface Water

CTDEEP developed a TMDL for indicator bacteria in the Norwalk River in 2005. In addition, high levels of both nitrogen and phosphorus have been a cause for water quality concern for the Norwalk River. Harbor Watch, in coordination with CTDEEP, has been conducting water quality testing throughout the Norwalk River watershed since 1998. Their latest report (2014) found that bacteria (*Escherichia coli*) exceeded the CTDEEP criterion for a Class B river, and every sampling station exceeded CTDEEP's single sampling maximum. Nutrient concentrations for both nitrogen and phosphorus exceeded CTDEEP's water quality standards as well.

The surface waters of the Norwalk River in this tidal location (as shown in Figure 3-15) are classified as Class SB coastal and marine surface waters. Class SB waters are classified as having designated uses for marine fish, shellfish and wildlife habitat, shellfish harvesting (for transfer to approved areas for purification prior to human consumption), recreation, industrial and other uses including navigation. Discharges into Class SB waters are restricted to those from public or private drinking water treatment systems, dredging and dewatering, and emergency and clean water discharges. This also includes cooling waters and discharges from industrial and municipal wastewater treatment facilities.

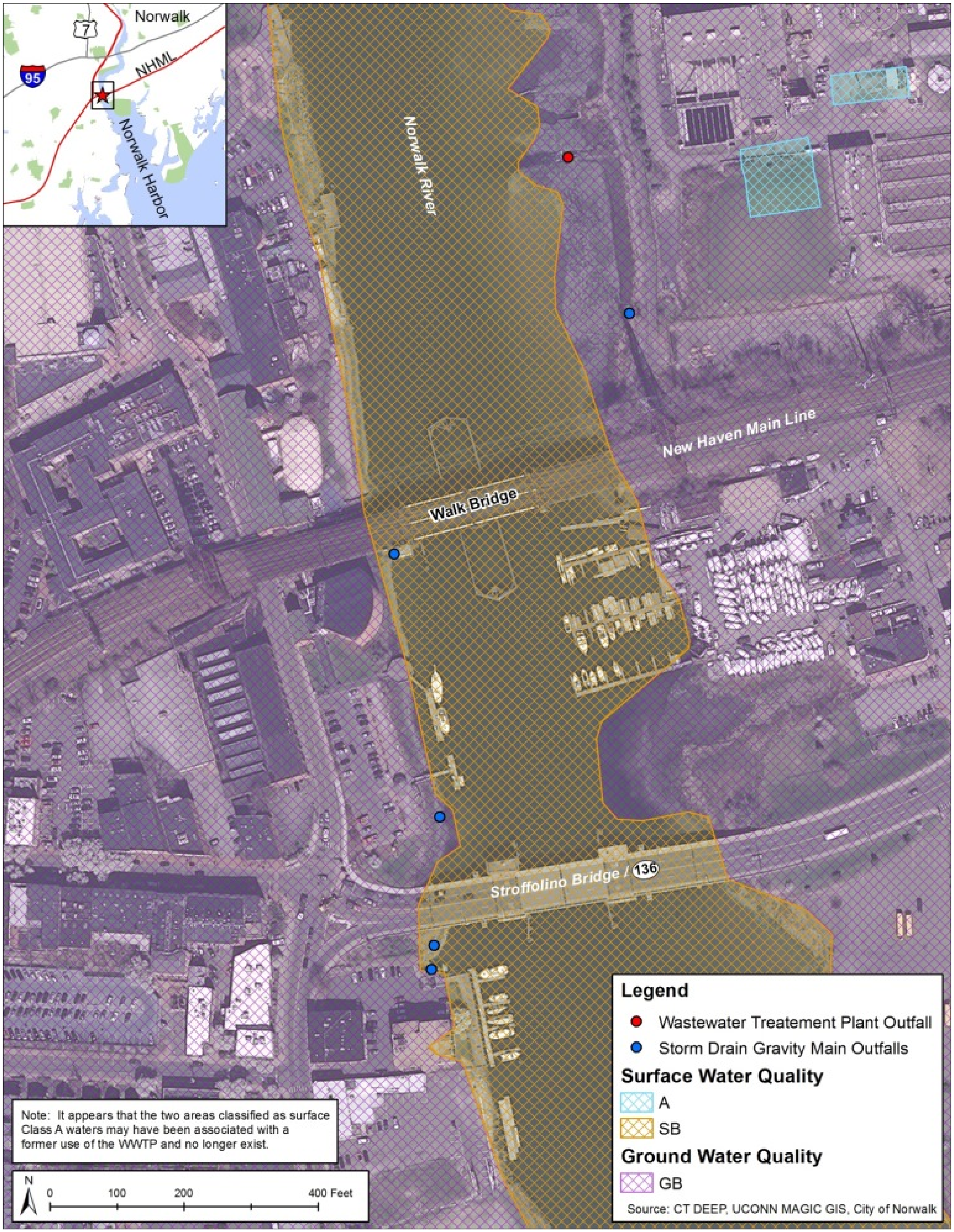

Figure 3-15—Water Quality Classifications in the Vicinity of Walk Bridge

Figure 3-15 also shows two areas classified as surface Class A waters associated with the WWTP located in the northeast quadrant of the bridge.[81]

Groundwater

Groundwater within the vicinity of Walk Bridge (as shown in Figure 3-15) is classified as Class GB. Class GB groundwater is classified as having designated uses for industrial process waters and cooling waters; base flow for hydraulically connected surface water bodies; and is presumed not suitable for human consumption without treatment. Discharges into Class GB groundwater zones are restricted to those from public or private drinking water treatment systems, dredging and dewatering, emergency and clean water discharges, and certain other biodegradable wastewaters subject to soil attenuation.

Norwalk has established two aquifer protection areas that require regulation of high risk land uses in an effort to reduce the possibility of contaminating the public drinking water supply. The Walk Bridge project site falls outside of both of these aquifer protection boundaries.

Per a review by the Connecticut Department of Public Health, the project site is not located within a public water supply source water area.

Stormwater

Several municipal and private stormwater conveyances discharging to the Norwalk River are located within the vicinity of the bridge (as shown in Figure 3-15). There is a storm sewer system in North Water Street that discharges through a pump station directly into the Norwalk River, located at the bridge near the aquarium's covered walkway. This stormwater does not receive any treatment before it enters the river.

In addition to runoff from streets, roofs, parking lots, and other typical urban sources and their associated contaminants, the Norwalk River receives contributions via the railroad right-of-way. Sources of runoff at Walk Bridge include the open deck bridge itself crossing over the Norwalk River, and the rail bed and ballast drainage systems. Typical contaminants from a railroad right-of-way include creosote, fuels, oils, other lubricants, heavy metal contaminants resulting from wear and tear, and soil erosion.

USEPA confirms water impairments in this stretch of the Norwalk River and into Norwalk Harbor due to pathogens (Enterococcus Bacteria and Fecal Coliform) and nutrients (Total Nitrogen and Nutrient/Eutrophication biological indicators). Under its General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit), Norwalk has taken steps to monitor and improve stormwater quality. In a report produced by Harbor Watch, storm drains leading to the Norwalk River and Norwalk Harbor were evaluated, indicating that bacteria (*Escherichia coli*) exceeded CTDEEP criterion for a Class B river. In addition to the municipal permit, two facilities in the Walk Bridge vicinity currently hold NPDES permits. The Norwalk WPCA's WWTP is authorized by a Major Individual Permit. King Industries, located just north of the I-95 Bridge on the west bank, is authorized by a Minor Individual Permit.

The Norwalk River is included on the "List of Connecticut Waterbodies Not Meeting Water Quality Standards" due to concentrations of indicator bacteria that exceed the Connecticut State Water Quality Standards. The TMDL for the Norwalk River was established for impairment north of the project site, from Route 1 north to the outlet of Little Pond and Ridgefield Pond in Ridgefield. The Norwalk estuary

[81]It appears that the two areas classified as surface Class A waters may have been associated with a former use of the WWTP and no longer exist.

was evaluated for indicator bacterial and five segments were deemed to be impaired for shellfishing practices per the State TMDL for indicator bacteria. A TMDL was produced for nitrogen in Long Island Sound, as it is the leading factor contributing to low DO concentrations in the Sound. A TMDL for Mercury concentrations in fish was produced for the Northeast Regional States; Connecticut adopted a goal of the lowest concentration, three times lower than nearly all the other northeast regional states.

3.9.3. Potential Impacts

No Build Alternative

It is expected that in the No Build Alternative, effects on water quality would not be altered from the current conditions at Walk Bridge. Current water input sources include drainage from the open deck bridge itself crossing over the Norwalk River, as well as the existing rail bed and ballast drainage systems. In the No Build Alternative, contaminants such as creosote, fuel, oil, other lubricants, heavy metal contaminants, and soil erosion would continue to affect water quality in the same manner as current conditions.

Build Alternative

The Build Alternative will include either seven elevated span sections, or six span sections with the use of the long span Vertical Lift Bridge option. These spans will consist of one moveable bridge span, and six fixed approach spans (five with the long span Vertical Lift Bridge option). The moveable bridge span will be open deck, while the approach spans will be closed concrete deck, ballast-filled tub sections. The open deck section will allow runoff to fall directly into the Norwalk River untreated via the same means as the existing bridge. It is anticipated that the approach spans on the west side of the movable span will include drainage at all four corners of each tub section, where stormwater will be collected and directed to the existing stormwater pump station located behind the IMAX theatre.

Stormwater collection from the approach spans on the east side of the movable span will function differently depending on the bridge option selected. With the Bascule Bridge option, the northern two tracks would be separated from the southern two tracks, allowing stormwater to be collected from the approach spans and conveyed through pipes toward the eastern abutment, and then collected in a catch basin between the two pairs of tracks. The catch basin would likely discharge to the north within the ROW toward the Norwalk WWTP. With both Vertical Lift Bridge options, the tracks would be similar to existing conditions and would not have a diverging alignment; therefore no space would be available for a catch basin. It is anticipated that stormwater from the approach spans would be collected and then piped through the east abutment, where it would be directed to the fill slope on the northeast side and released onto a riprap slope drain. With the long span Vertical Lift Bridge option, one less approach span would be needed on the east side, and therefore more water would discharge directly into the river, rather than collected and directed toward land.

With provisions for drainage containment, the Build Alternative will provide benefits and improved protections for water quality in the river. The land-based rail approach grades will be constructed on retained fill and sheet flow runoff will be directed to side slopes by the rail bed and ballast drainage system. Drainage swales may be used in locations where drainage requires conveyance, and can also provide water quality improvements, as compared with the No Build Alternative, where water quality improvements would not occur.

It is anticipated that the new bridge will be included in the existing General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4), the permitting umbrella for state transportation facilities in urbanized areas.

3.9.4. Mitigation Measures

The Build Alternative is anticipated to have no adverse impacts on water quality and therefore no mitigation is proposed. Elements of the proposed design are considered beneficial and will help protect water quality. Where applicable, both closed deck approach span sections and the retained fill approaches will implement methods to direct water off site and away from the river and incorporate BMPs to protect water quality. As design progresses, CTDOT will continue to explore opportunities to incorporate water quality protection measures into the final design of the Build Alternative.

3.10. Tidal Wetlands

3.10.1. Introduction, Regulatory Background, Methodology

This section describes tidal wetlands in the vicinity of Walk Bridge and assesses impacts to tidal wetlands as a result of the Walk Bridge Replacement Project.

The USACE administers Section 404 of the Clean Water Act, which regulates activities resulting in the disposal of dredged or fill material into waters of the United States, including wetlands. The Connecticut Tidal Wetland Act (CGS Sections 22a-28 through 22a-35) defines tidal wetlands as "those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marshes, swamps, meadows, flats, or other low lands subject to tidal action, including those areas now or formerly connected to tidal waters, and whose surface is at or below an elevation of one foot above local extreme high water; and upon which may grow or be capable of growing some, but not necessarily all, of" a list of specific plant species provided in the Act. Any construction activity proposed at or water ward of the high tide line requires authorization from CTDEEP's Office of Long Island Sound Programs (OLISP) prior to construction in accordance with the Tidal Wetlands Act. Compensation for unavoidable impacts to coastal resources is typically required.

As the means of determining coastal jurisdiction for the State of Connecticut, the High Tide Line (HTL) has served as the regulating boundary since 1987. In 2012, the limit for the state's major tidal waterbodies was revised to a fixed elevation called the Coastal Jurisdiction Line (CJL). The HTL, as defined by Section 404 of the Clean Water Act, remains the federal jurisdictional boundary for waters of the U.S. The HTL was determined to be the highest tide of record on the last calendar year using tidal data records from South Norwalk, Station ID 8468448. The CJL is determined for localities by CTDEEP. The CJL for the project location is 5.4 feet North American Vertical Datum of 1988 (NAVD88)[82].

Wetland investigations and delineations were conducted by Certified Soil Scientists and Environmental Scientists according to both the federal and State of Connecticut definitions. Federal wetland resources were delineated according to the USACE's 1987 Wetland Delineation Manual and the USACE's 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. Connecticut state tidal wetlands were delineated in accordance with CGS Section 22a-29.

[82] Connecticut Department of Energy and Environmental Protection, *Office of Long Island Sound Programs Coastal Jurisdiction Line Elevations.* Accessed September 2, 2015 from: http://www.ct.gov/deep/cwp/view.asp?a=2705&Q=511544&deepNAV_GID=1622

3.10.2. Existing Conditions

The Walk Bridge site is located in an area surrounded by tidal wetlands of varying sizes along the river's edge on all four quadrants of the bridge, as shown in Figure 3-16. From a review of historical information about the river, it appears that all of the shoreline at this location is highly altered. Much of the tidal wetland present on the west bank is constrained by the altered and steepened topography and occurs as numerous patches of narrow wetland fringe. Wider and more contiguous tidal wetlands occur on the eastern shore of the river where the majority of the intertidal area has a more gradual slope and thus, a wider zone more conducive for vegetated tidal wetlands.

The tidal wetlands in the project vicinity are vegetated with typical saltmarsh species, as shown on Table 3-6. There are a total of 22 tidal wetlands that were delineated in the surrounding areas of the project, a few of which are made up solely of small clumps of smooth cordgrass (*Spartina alterniflora*). There are areas in the project vicinity that are populated with common reed (*Phragmites australis*) particularly located in densities around the vicinity of the wastewater treatment plant outfall and around the higher elevation fringe portion of the tidal wetland in the southeast quadrant.

Northwest Quadrant

The tidal wetlands in this quadrant are vegetated with typical saltmarsh species that include smooth cordgrass (*Spartina alterniflora*), seaside goldenrod (*Solidago sempervirens*), marsh orach (*Atriplex patula*), water hemp (*Amaranthus cannabinus*) and high tide bush (*Iva frutescens*) with smooth cordgrass being the dominant species. There are a total of nine tidal wetlands that were delineated in the quadrant, a few of which are made up solely of small clumps of smooth cordgrass.

Southwest Quadrant

With the tidal wetlands in this quadrant, seaside goldenrod and high tide bush are common species with smooth cordgrass remaining the dominant species throughout. There are a total of nine tidal wetlands that were delineated in the southwest quadrant including two of which are located under the bridge itself.

Northeast Quadrant

Continuous tidal wetland vegetation extends along the entire shoreline in the northeast quadrant with smooth cordgrass contributing as the dominant species with seaside goldenrod and high tide bush also being present. There are areas in this quadrant that are populated with common reed (*Phragmites australis*) particularly located in densities around the vicinity of the wastewater treatment plant outfall.

Southeast Quadrant

One tidal wetland has been identified in the southeastern quadrant north of the Stroffolino Bridge with the dominant species in the southern portion consisting of smooth cordgrass, seaside goldenrod, saltmeadow grass, poison ivy and high tide bush. Groundsel tree (*Baccharis halimifolia*) is also present but not common. Common reed is present around the higher elevation fringe portion of this tidal wetland. Included in the northern part of the wetland is a portion of the bulkhead in the marina where a narrow,

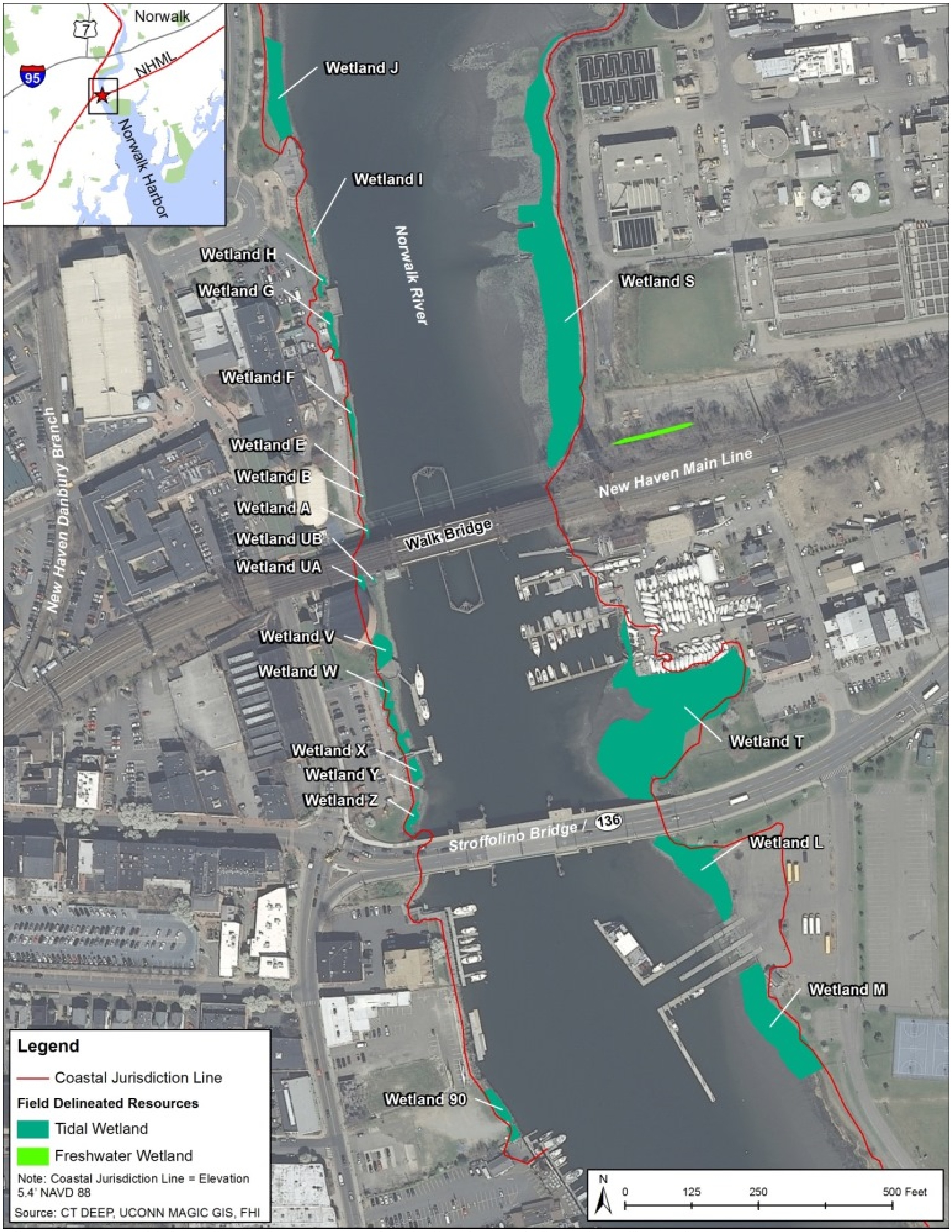

Figure 3-16—Tidal and Freshwater Wetlands in the Vicinity of Walk Bridge

Table 3-6–Tidal Wetland Designations

Wetland ID	Common Vegetation	Cowardin † Code	Acreage (sf)	Latitude	Longitude
Northwest Quadrant					
Wetland J	*Spartina alterniflora, Phragmites australis, Solidago sempervirens, Atriplex patula, Iva frutescens*	E2US	5,328	41° 6' 9.007" N	73° 24' 59.121" W
Wetland K*	*Spartina alterniflora*	E2US	3	41° 6' 7.581" N	73° 24' 58.571" W
Wetland I	*Spartina alterniflora*	E2US	115	41° 6' 7.372" N	73° 24' 58.359" W
Wetland H	*Spartina alterniflora, Atriplex patula, Iva frutescens*	E2US	425	41° 6' 6.487" N	73° 24' 58.051" W
Wetland G	*Spartina alterniflora, Atriplex patula, Iva frutescens*	E2US	1,007	41° 6' 5.851" N	73° 24' 57.984" W
Wetland F	*Solidago sempervirens Spartina alterniflora, Solidago sempervirens, Atriplex patula, Toxicodendron radicans, Iva frutescens*	E2US	1,035	41° 6' 4.311" N	73° 24' 57.522" W
Wetland E	*Solidago sempervirens*	E2US	27	41° 6' 2.821" N	73° 24' 57.197" W
Wetland B	*Spartina alterniflora*	E2US	30	41° 6' 2.496" N	73° 24' 57.078" W
Wetland A	*Amaranthus cannabinus, Solidago sempervirens, Iva frutescens*	E2US	143	41° 6' 1.920" N	73° 24' 56.995" W
Southwest Quadrant					
Wetland UA	*Solidago sempervirens, Spartina patens, Atriplex patula*	E2EM1	365	41° 6' 0.790" N	73° 24' 56.820" W

Wetland ID	Common Vegetation	Cowardin † Code	Acreage (sf)	Latitude	Longitude
Wetland UB	*Spartina alterniflora*	E2EM1	58	41° 6' 0.862" N	73° 24' 56.725" W
Wetland UC*	*Spartina alterniflora*	E2EM1	3	41° 6' 0.682" N	73° 24' 56.739" W
Wetland V	*Spartina alterniflora, Iva frutescens*	E2EM1	1,766	41° 5' 59.869" N	73° 24' 56.533" W
Wetland W	*Spartina alterniflora, Solidago sempervirens, Iva frutescens, Baccharis halimifolia, Morella pensylvanica*	E2EM1	2,266	41° 5' 58.747" N	73° 24' 56.350" W
Wetland X	*Spartina alterniflora, Solidago sempervirens, Iva frutescens*	E2EM1	730	41° 5' 57.606" N	73° 24' 55.711" W
Wetland Y	*Spartina alterniflora*	E2EM1	31	41° 5' 57.082" N	73° 24' 55.677" W
Wetland Z	*Spartina alterniflora, Solidago sempervirens, Atriplex patula*	E2EM1	748	41° 5' 56.807" N	73° 24' 55.638" W
Northeast Quadrant					
Wetland S	*Spartina alterniflora, Iva frutescens, Solidago sempervirens*	E2EM1	36,982	41° 6' 10.608" N	73° 24' 52.754" W
Southeast Quadrant					
Wetland T	*Spartina alterniflora, Solidago sempervirens, Spartina patens, Phragmites australis, Iva frutescens, Baccharis halimifolia*	E2EM1	39,839	41° 5' 59.343" N	73° 24' 50.441" W

Wetland ID	Common Vegetation	Cowardin † Code	Acreage (sf)	Latitude	Longitude
Wetland L	*Spartina alterniflora, Spartina patens, Distichlis spicata, Juncus gerardii, Solidago sempervirens, Phragmites australis, Iva frutescens*	E2EM1	8,926	41° 5' 54.754" N	73° 24' 48.000" W
Wetland M	*Spartina alterniflora, Juncus gerardii, Solidago sempervirens, Phragmites australis*	E2EM1	12,214	41° 5' 53.780" N	73° 24' 47.531" W
South of Stroffolino Bridge					
Wetland 90	*Spartina alterniflora, Iva frutescens*	E2EM1	1,847	41° 5' 51.350" N	73° 24' 58.850" W

*Indicates a wetland not shown on the Tidal Wetland Figure.
† Cowardin Code: E2US – Estuarine Intertidal Unconsolidated Shore; E2EM1 – Estuarine Intertidal Emergent Persistent (Cowardin, et al.,1979)

broken strip of high tide bush and smooth cordgrass is present. Two tidal wetlands are located south of the Stroffolino Bridge, one north and one south of the municipal boat ramp. The wetland north of the municipal boat ramp includes smooth cordgrass, saltmeadow grass, saltgrass (*Distichlis spicata*), blackgrass (*Juncus gerardii*), seaside goldenrod, poison ivy and high tide bush, and a small stand of common reed. Vegetation in the wetland south of the municipal boat ramp includes smooth cordgrass, seaside goldenrod, blackgrass and common reed.

South of Stroffolino Bridge

One additional tidal wetland that lies within the project area is a small isolated patch of coastal vegetation that is located on the shore of an undeveloped parcel on the west bank of the Norwalk River south of the Stroffolino Bridge. This tidal wetland patch is vegetated with smooth cordgrass in the herbaceous layer and hightide bush in the shrub layer.

Functions and Values

Regardless of the variation in water regime of the vegetated tidal wetlands, the functions and values of the vegetated tidal wetland resources are relatively similar. Smooth cordgrass dominated salt marshes are one of the most valuable habitat types in the estuarine environment and perform many functions including fish, shellfish and wildlife habitat, sediment/toxicant retention, nutrient removal, shoreline stabilization and production export. Production export is a principal function performed by tidal marshes. Additionally, the root system and structure of the vegetation in the tidal wetlands can help to stabilize the shoreline as well as to retain sediments and toxicants. Although the tidal wetlands in the vicinity of Walk Bridge have the potential to perform these functions, they are relatively narrow fringes of vegetation along the river, which somewhat limits their overall capacity to perform those functions when compared to wider, more extensive salt marshes.

The primary value that the tidal wetlands and river in the project vicinity provide is the opportunity for recreation. There are City parks on the east and west sides of the river in the vicinity of Walk Bridge that provide public access for fishing, bird watching ("birding"), walking and boating. The Norwalk Harbor Loop Trail that is adjacent to the river in the northeast quadrant also provides walking and birding opportunities for the public. Fishermen were observed along the shores of the northwest quadrant, while rowers and recreational boats were observed on the river. Additionally, both the Maritime Aquarium educational research vessel and the ferry boat for Sheffield Island are docked in the southwest quadrant, and a marina is located in the southeast quadrant.

3.10.3. Potential Impacts

No Build Alternative

In the No Build Alternative, the bridge would not be replaced. Thus, there would be no impacts to tidal wetlands.

Build Alternative

As a result of the Build Alternative, impact to portions of existing vegetated tidal wetlands along the shore of the Norwalk River will occur. Both temporary and permanent impacts to these wetlands are anticipated. Temporary impacts are reversible impacts to the resource that will return to pre-disturbance conditions once the construction activities are completed, as described in Chapter 5. Permanent impacts are the irretrievable loss of or irreversible change to the resource (e.g., habitat, or the biota that live within them). Permanent impacts are discussed as follows and are presented in Figure 3-17 and Figure 3-18.

Based on the current design, the installation of the new bridge abutments and the new pile-supported bridge piers will permanently impact vegetated tidal wetlands. Work to be conducted along the shoreline will consist primarily of railway abutment improvements and contractor access. The resulting impacts from this work will include expansion of the earthen embankments on the north side of the eastern bridge abutment and the installation of a precast modular retaining wall on the east side of the river, and gravel and stone contractor work area to be created under the existing bridge on the west side (between the IMAX and Maritime Aquarium). The contractor work area will be maintained in place through the duration of the project. This gravel fill work area will be removed landward to the CTDEEP-regulated CJL upon completion of the project. The permanent impact associated with this fill area will be the loss of intertidal vegetation (patches of *Spartina alterniflora*) and the loss of associated estuarine invertebrates due to smothering from the fill.

With the Bascule Bridge option, the eastern approach to the replacement bridge would be widened to accommodate a temporary run-around alignment (if used) on the north side of the bridge. With both Vertical Lift Bridge options, the eastern approach to the replacement bridge would not be substantively widened. With the Bascule Bridge option, both with and without the run-around alignment, a retaining wall would be installed to minimize the extent of the side slope in this location, thus reducing the overall footprint of the eastern abutment expansion.

Figure 3-17—Potential Impacts to Tidal Wetlands

Figure 3-18—Potential Impacts to Tidal Wetlands South of Stroffolino Bridge

With the Bascule Bridge option, approximately 3,100 sf of vegetated tidal wetlands would be permanently lost as a result of various bridge design components, including: contractor staging/access, high towers, the pedestrian/bike path connection, contractor trestle piles, and an IMAX emergency egress walkway, the latter of which could potentially impact a vegetated tidal wetland due to shading.

Either Vertical Lift Bridge option would result in slightly less permanent impact to tidal wetlands (approximately 2,500 sf) and slightly less temporary impact to tidal wetlands (approximately 2,400 sf) than the Bascule Bridge option. This difference would be due to differences in the footprint within a vegetated tidal resource.

3.10.4. Mitigation Measures

Since no eel grass beds will be impacted by the Build Alternative, no subtidal vegetated wetland mitigation is anticipated for the project. It is anticipated that the loss of vegetated intertidal wetlands will be mitigated through the restoration of degraded tidal wetlands dominated by common reed (*Phragmites australis*), currently existing along the river, proximal to but outside of the project's immediate vicinity.

As an initial step to identify potential tidal wetland restoration sites, CTDOT conducted a detailed investigation of Phragmites-dominated tidal wetlands in the vicinity of the project, shown in Figure 3-19. Based upon that investigation, approximately 24,190 sf of priority tidal wetlands are available for mitigation measures along the Norwalk River. Using a mitigation ratio of 4:1 for permanent impacts and 1:1 for temporary impacts, approximately 19,630 sf of tidal wetland area is needed for mitigation for the Bascule Bridge option, and approximately 16,120 sf of tidal wetland area is need for the two Vertical Lift Bridge options. Table 3-7 presents a summary of the mitigation requirements for the Build Alternative options. Based upon anticipated permanent and temporary impacts, and using a 4:1 mitigation to impact factor, there are sufficient locations in the project vicinity to provide nearby compensation.

Table 3-7–Tidal Wetland Impacts and Proposed Mitigation

	Permanent Impacts			Temporary Impacts		
	Permanent Impact (sf)	**Mitigation Ratio**	**Mitigation Requirements (Permanent) (sf)**	**Temporary Impact (sf)**	**Mitigation Ratio**	**Mitigation Requirements (Temporary) (sf)**
Bascule	3,100	4:1	12,400	2,700	1:1	2,700
Vertical Lift (8A and 11C)	2,500	4:1	10,000	2,400	1:1	2,400
	Totals			**Priorities for Tidal Wetland Restoration**		
	Total Mitigation Requirements (sf)	**Total With 30% Contingency Factor (sf)**	**Tidal Wetland Mitigation Needs (sf)**	**Restoration Site**	**Priority Tidal Wetland Site Available Area (sf)**	**Surplus Compensation Area Remaining (sf)**
Bascule	15,100	19,630	19,630	PA-2, PA-3	24,191	4,561
Vertical Lift (8A and 11C)	12,400	16,120	16,120	PA-2, PA-3	24,191	8,071

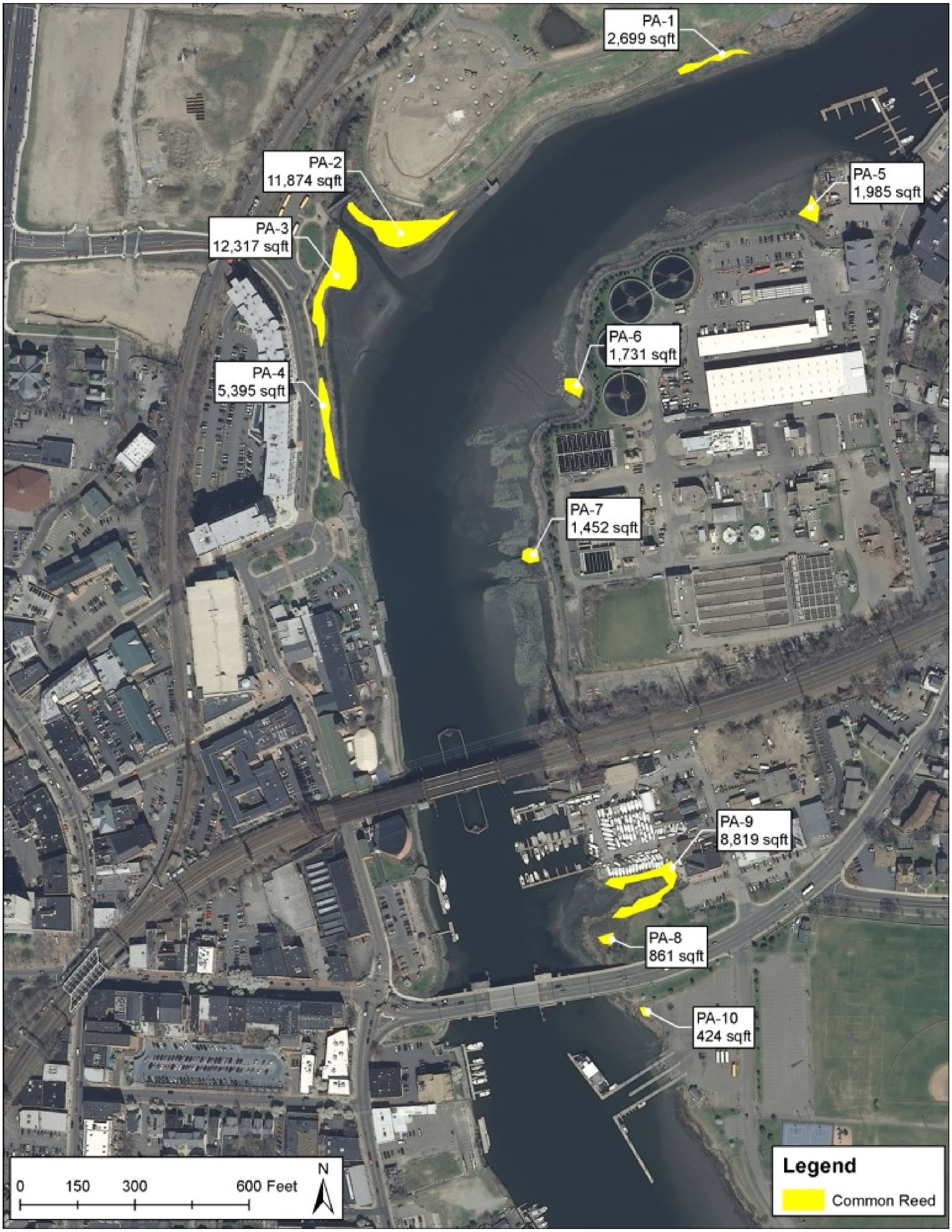

Figure 3-19 — Potential Tidal Wetland Restoration Mitigation Locations

In coordination with CTDEEP OLISP and USACE, CTDOT will develop a compensatory mitigation plan for the project, such that the proposed mitigation package is approved by OLISP and USACE by the time the permit applications are submitted to the regulatory agencies for review.

3.11. Freshwater Wetlands

3.11.1. Introduction, Regulatory Background, Methodology

This section describes the project area's freshwater wetlands and assesses impacts to freshwater wetlands[83] as a result of the Walk Bridge Replacement Project.

The USACE administers Section 404 of the Clean Water Act which regulates activities resulting in the disposal of dredged or fill material into waters of the United States, including wetlands. CTDEEP administers the Connecticut Inland Wetlands and Watercourses Act (CGS Sections 22a-36 through 22a-45) which defines a wetland as land, including submerged land, not regulated pursuant to Sections 22a-28 through 22a-35 (tidal wetlands), inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey.

Wetland investigations and delineations were conducted by Certified Soil Scientists and Environmental Scientists according to both the federal and State of Connecticut definitions and directives as stated in the Tidal Wetlands Section.

3.11.2. Existing Conditions

Due to the highly developed and disturbed nature of much of the project area, there is only one freshwater wetland located within the vicinity of the bridge, as shown in Figure 3-16. The wetland is located in the northeast quadrant of the bridge at approximately the toe of slope of the railroad embankment. This wetland does not meet the federal definition of a jurisdictional wetland, as it does not contain predominantly hydrophytic vegetation and has formed in what is likely an excavated drainage ditch. Because the wetland contains hydric soils, it meets the state criteria of an inland wetland.

The wetland is very small, approximately eight feet wide, and covers an area of approximately 1,200 sf, and is located in a slight depression receiving hydrology by overland flow. Vegetation within this wetland is dominated by non-native, invasive species. The tree layer is dominated by eastern cottonwood (*Populus deltoides*), tree of heaven, and Norway maple. Tree of heaven and Norway maple saplings along with multiflora rose (*Rosa multiflora*) and a non-native bush honeysuckle (*Lonicera* spp.) were noted in the shrub layer. Poison ivy (*Toxicodendron radicans*) and Japanese honeysuckle (*Lonicera japonica*) were noted as well. The herbaceous layer is sparse due to the heavy shading created by the tree canopy, and from saplings and shrubs. Garlic mustard (*Alliaria petiolata*) and an unidentified goldenrod species were noted also in the wetland.

3.11.3. Potential Impacts

No Build Alternative

In the No Build Alternative, the bridge would not be replaced. There would be no impacts to freshwater wetlands.

[83] In the context of this evaluation, freshwater wetlands and inland wetlands are used interchangeably.

Build Alternative

In the Build Alternative, a small state–regulated wetland will be lost as a result of construction work associated with the eastern bridge abutments. This state-regulated inland wetland/watercourse resource serves as a drainage ditch to the north of the railroad alignment between the Norwalk River and Fort Point Street. As presented in Figure 3-17, this will result in approximately 600 square feet (sf) of direct, permanent impact to this resource, the primary function of which is to convey stormwater flows to the Norwalk River.

Similar impacts to the state-regulated inland would occur with the Bascule Bridge option and both Vertical Lift Bridge options.

3.11.4. Mitigation Measures

Compensatory mitigation for the loss of this state regulated small freshwater wetland resource will be accomplished through selection from various options which include the following: restoration or replacement in-kind; out-of-kind wetland creation; invasive species removal; or any combination of these.

3.12. Floodplains

3.12.1. Introduction, Regulatory Background, Methodology

This section describes existing floodplains in the vicinity of Walk Bridge and assesses the potential impacts to floodplains as a result of the Walk Bridge Replacement Project, in accordance with Floodplain Management for State Agencies,[84,85] Executive Order 11988, Floodplain Management, as amended by Executive Order 13690, Establishing a Federal Flood Risk Management Standard. Additionally, both federal and state wetland regulations address the protection of floodplains. Federal regulations protecting floodplains include Section 404 of the Clean Water Act. State regulations protecting floodplains include CGS Sections 22a-28 through 22a-35 and CGS Sections 22a-36 through 22a-45.

A hydraulic model of the existing conditions was developed for the Norwalk River to simulate the water surface elevations that occur at the bridge. The model accounts for the varied widths and depths of the Norwalk River and Norwalk Harbor and the three crossings of the Norwalk River that have river obstructions (bridge supports): the Stroffolino Bridge, the Walk Bridge, and the I-95 Bridge. The model area begins near the mouth of the Norwalk River just south of the Stroffolino Bridge and extends north to the head of the tide, approximately 7,400 feet upstream of Walk Bridge.

3.12.2. Existing Conditions

Walk Bridge is located within the tidal reach of the Norwalk River near the river's mouth into Long Island Sound. As such, the bridge is influenced by both riverine events and coastal storm surges. The bridge is approximately 500 feet upstream of the Stroffolino Bridge and approximately 3,300 feet downstream of the I-95 Bridge.

Based on the FEMA Flood Insurance Rate Map (FIRM) (July 8, 2013), and as shown in Figure 3-20, Walk Bridge is located in Zone AE, defined as the 100-year floodplain or as areas subject to inundation by the 1-percent-annual-chance flood event. Just south of the Stroffolino Bridge is the boundary of Zone

[84] Connecticut General Statutes 25-68b through 25-68h
[85] Sections 25-68h-1 through 25-68h-3 of the Regulations of the Connecticut State Agencies

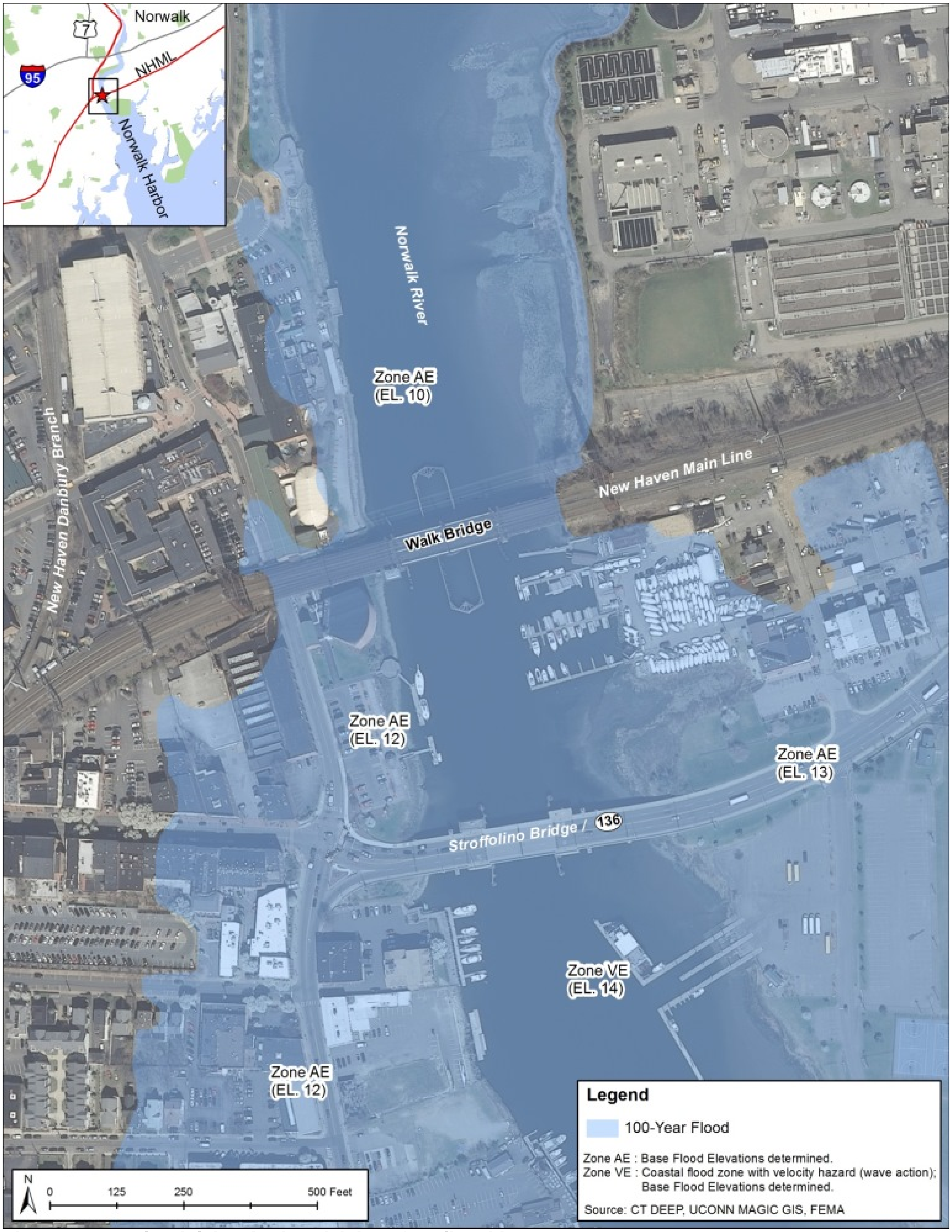

Figure 3-20—Floodplains in the Vicinity of Walk Bridge

VE, defined as areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Upstream of Walk Bridge, the 100-year flood elevation is Elevation 10.0 (NAVD88); immediately downstream of Walk Bridge, the 100-year flood elevation is Elevation 12.0 (NAVD88). For reference, the elevation of the existing bridge when closed (at its lowest point) is approximately Elevation 18.0+/- (NAVD88).

3.12.3. Potential Impacts

No Build Alternative

The No Build Alternative would not result in any improvements to the existing conditions at Walk Bridge, and as such, would not alter the current extents or flood storage capacity of the floodplain. The current hydrologic opening of the river channel would stay the same and existing flow rates, channels, and directions would remain unaltered.

Build Alternative

As shown in Figure 3-21, most of the substructure elements located between the proposed westernmost pier and the east abutment will fall within the 100-year floodplain. As a structure over a watercourse, the project also has the potential to affect flood flows due to changes to the hydraulic opening of the bridge.

Permanent beneficial impacts to the floodplain are anticipated from the removal of the existing bridge and replacement with the new bridge. The proposed hydraulic opening is anticipated to lessen hydraulic constraints and reduce upstream flooding.

Construction of new permanent project elements located within the 100-year floodplain include the new piers, the egress walkway for the IMAX Theater, the abutment for the run-around alignment (Bascule Bridge option only), and the pedestrian/bike north-south connection. Floodplain impacts would result in approximately 15,000 sf of impacts with the Bascule Bridge option and 19,500 sf of impacts with either Vertical Lift Bridge option. However, it is anticipated that flood storage loss will be negligible relative to the overall coastal floodplain. In addition, storage capacity will be increased with the Build Alternative (both options) by reducing the hydraulic constriction at the crossing. Further, the removal of the large existing granite pivot pier and rest piers will regain flood storage volume within the floodplain. These elements, accompanied by dredging to increase the navigation channel width, will provide improved channel hydraulics through the bridge span.

For activities that take place in a floodplain or change the hydraulics characteristics of a water course, a Flood Management Certification with CTDEEP is needed to verify that all elements of the project, including construction and operation, will comply with Connecticut's and FEMA floodplain management standards and criteria. CTDOT will apply for Flood Management Certification during the permitting phase of the project, in coordination with the application for Tidal Structures Dredge and Fill Permit and the 401 Water Quality Certification.[86]

3.12.4. Mitigation Measures

Based upon the hydraulic improvements anticipated with the project, no mitigation is proposed. As stipulated in EO 11988, and in accordance with Section 404 of the Clean Water Act and CT Flood

[86] Connecticut Department of Energy and Environmental Control. *Flood Management Certification An Environmental Permitting Fact Sheet*. Accessed February 2016 from: http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324172&deepNav_GID=1643.

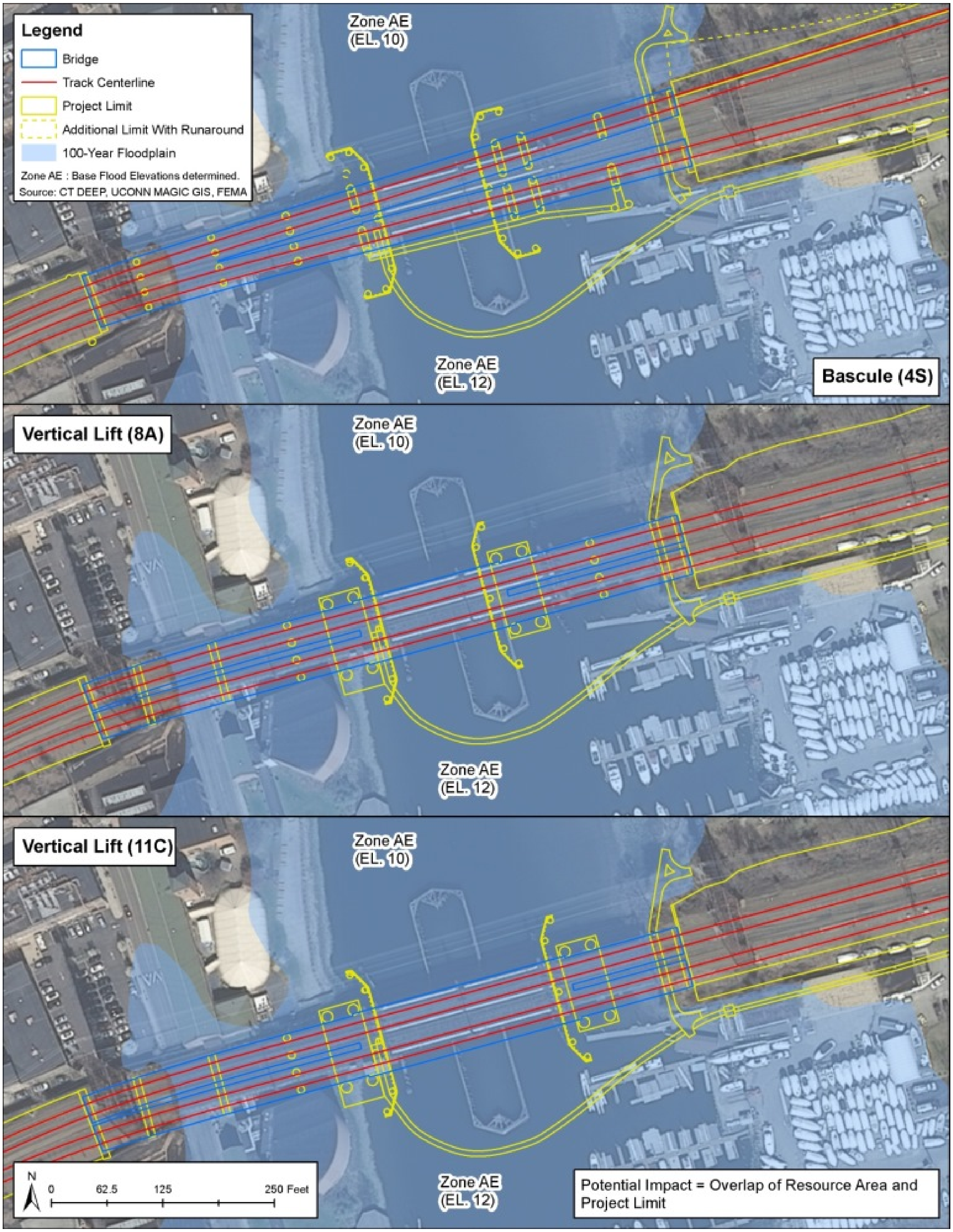

Figure 3-21—Potential Impacts to Floodplains

Management regulations, work proposed in the floodplain will be conducted with every effort to minimize any adverse effects, including flood storage loss and flood path obstruction.

3.13. Terrestrial Resources, Species, and Critical Habitats

3.13.1. Introduction, Regulatory Background, Methodology

This section assesses impacts to terrestrial (upland) ecology as a result of the Walk Bridge Replacement Project. Terrestrial ecology includes soils, geology, vegetation, and animals.

The Fish and Wildlife Coordination Act[87] requires federal agencies, and any entity requiring any federal permit or license, to consult with the federal and state agencies responsible for fish and wildlife resource management, regarding projects which could affect these resources. For the Walk Bridge Replacement Project, these agencies include the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA), and CT DEEP. The Endangered Species Act (ESA) of 1973[88] requires federal agencies (and others) to avoid actions that would jeopardize threatened or endangered species or their critical habitats. Section 7 of the ESA describes the steps for informal and formal consultation with USFWS, for terrestrial and freshwater species, or with NMFS, for marine species and diadromous fish species. The Migratory Bird Treaty Act (MBTA)[89] provides for the preservation and maintenance of stocks of migratory birds, including their body parts (feathers, plumes etc.), nests, and eggs. Federal-aid transportation projects that are likely to result in a "take" of birds protected under the MBTA may require take permits from the USFWS.[90] The Bald and Golden Eagle Protection Act[91] provides for the protection of Bald Eagles and Golden Eagles by prohibiting the taking, possession and commerce of these birds except under certain specified conditions.[92]

Some additional species in the state are afforded protection under the State of Connecticut Endangered Species Act.[93] No critical habitats were identified by regulatory personnel for upland, terrestrial biota. Information regarding terrestrial resources, species, and critical habitats was obtained from published literature and review of available on-line natural resource mapping, including soils mapping maintained by the Natural Resource Conservation Service (NRCS), and CTDEEP surficial and bedrock geologic maps for Norwalk, CT. Literature and on-line web-based resources review was augmented with direct observations made during field work and site visits to the project area.

3.13.2. Existing Conditions

Geology and Soils

Bedrock underlying the project area is composed of gneiss and schist formations[94]. Gneiss is defined as an alternating banded or foliated, typically coarse-grained, metamorphic rock often containing feldspar,

[87] 16 USC 661-667
[88] 16 USC 1531 et seq.
[89] 16 USC 703-712
[90] Take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities." Construction activities that are most likely to result in takes of migratory birds include, but are not limited to, clearing or grubbing of migratory bird nesting habitat during the nesting season when eggs or young are likely to be present and bridge cleaning, painting, demolition, or reconstruction when bird nests are present.
[91] 16 USC 668-668d
[92] Under the Bald and Golden Eagle Protection Act, a taking includes pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing.
93 CGS Chapter 495 – Endangered Species"
[94] Rodgers, *Bedrock Geologic Map of Connecticut*.

quartz, and mica, but composition may vary locally. Schist is also a metamorphic rock, often containing mica and hornblende, and is more strongly foliated (i.e., has well-developed parallelism of the minerals present) than gneiss[95].

Various surficial geologic mapping of Norwalk CT, available on-line[96] depict the surficial geology bordering the Norwalk River east of Water Street and west of Smith Street as "Artificial Fill." This mapping is consistent with on-line soils information provided by the NRCS, which depicts mapped soil units adjacent to the Norwalk River as Udorthents-Urban land complex (306), Urban land (307) and Udorthents, smoothed (308). Udorthents-Urban land complex consists of moderately well drained to excessively drained soils that have been disturbed by cutting or filling, and areas that are covered by buildings and pavement. Urban land consists mostly of sites for buildings, paved roads, and parking lots. Udorthents, smoothed consist of very deep, excessively drained to moderately well drained soils that have been altered by cutting and filling[97].

Further west of Water Street, and further east of Smith Street, the Quaternary Geologic Map of Norwalk CT depicts the surficial geology to consist of material of glacial fluvial origin. These materials were deposited by glacial streams, lakes, and ponds that formerly occurred in the low lying valleys and other lowlands of Connecticut during the time of the last glaciation. They contain deposits that are generally well-sorted but range in textures from course gravels to fine sands, silt and clays.

Terrestrial Vegetation and Habitats

The majority of the terrestrial habitat within the vicinity of Walk Bridge consists of maintained landscapes associated with municipal parks, the grounds of the Maritime Aquarium buildings and associated parking lots. Most of the undeveloped lands in the project area are maintained as mowed lawn with planted tree, shrub, and herbaceous ornamental accents. In addition to lawn and landscape plantings, various characteristic plants of terrestrial habitats include a mix of native plant species, naturalized plant species, and non-native and invasive plants species.

Characteristic native vegetation noted growing in the uplands includes red cedar (*Juniperus virginiana*) and black cherry (*Prunus serotina*) in the tree layer, bayberry (*Morella carolinensis*), and staghorn sumac (*Rhus typhina*) in the shrub layer; seaside goldenrod (*Solidago sempervirens*), various grasses (e.g., *Setaria sp.*, *Panicum virgatum* and *Echinochloa crus-galli*) in the herbaceous layer; and Virginia creeper (*Parthenocissus quinquefolia*) and poison ivy (*Toxicodendron radicans*) in the liana layer.

Naturalized vegetation noted growing in the project area includes Austrian pine (*Pinus nigra*) and white mulberry (*Morus alba*), in the tree layer, and Queen Anne's lace (*Daucus carota*), curly dock (*Rumex crispus*), butter and eggs (*Linaria vulgaris*), common mullein (*Verbascum thapsus*) and chicory (*Cichorium intybus*) in the herbaceous layer.

Typical non-native, invasive plants that occur in the project area include tree of heaven (*Ailanthus altissima*) and Norway maple (*Acer platanoides*) in the patchy tree layer. In the shrub layer, typical invasive plants include autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), beach rose (*Rosa rugosa*) and one of the invasive bush honeysuckles (*Lonicera spp.*). Characteristic non-native invasive plants in the herbaceous layer include common reed (*Phragmites australis* - non-native haplotype), common mugwort (*Artemisia vulgaris*), Japanese knotweed (*Fallopia japonica*), garlic

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[95] Bates and Jackson, *Dictionary of Geological Terms.*
[96] http://www.CTECO.uconn.edu
[97] http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

mustard (*Alliaria petiolata*), while Oriental bittersweet (*Celastrus orbiculatus*) and porcelainberry (*Ampelopsis brevipedunculata*) were noted in the liana layer.

Similarly, and specifically within the railroad ROW, terrestrial vegetation growing along the side slopes or at the toe of slope is composed of a mix of native, naturalized, and non-native invasive species. Eastern cottonwood (*Populus deltoides*) and red maple (*Acer rubrum*) co-occur with Norway maple and tree of heaven in the tree layer. A bush honeysuckle species and multiflora rose are dominant in the shrub layer, Garlic mustard is dominant in the herbaceous layer, and poison ivy and Oriental bittersweet are co-dominant in the liana layer. The ROW embankment and adjacent areas can be characterized as a ruderal landscape, consisting of marginal or degraded urban land that is minimally maintained and dominated by spontaneous vegetation, consisting of a mix of species that grows and reproduces without human care or intent.

Characteristic Terrestrial Fauna

The most prevalent terrestrial biota noted within upland habitats are birds. Ruderal landscapes within the project area are typically frequented by urban adapted species such as rock pigeon (*Columba livia*), mourning dove (*Zenaida macroura*), European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), American crow (*Corvus branchyrhynchos*), common grackle (*Quiscala quiscula*), and house sparrow (*Passer domesticus*).

Song sparrows (*Melospiza melodia*), gray catbird (*Dumetella carolinensis*), American robin, and northern cardinal (*Cardinalis cardinalis*) frequent the shrubby areas, especially along the railroad ROW. The large open lawn expanses, such as in Veteran's Park located southeast of the bridge, attract birds of wide open spaces. These birds include mourning doves, European starlings, house sparrows, common grackles, red-winged blackbirds, various gulls, and Canada geese; the latter of which may form large flocks in late fall or winter and frequent the open fields to graze on the lawn grasses. The large open expanses of lawns such as at Veteran's Park may be frequented by flocks of winter visiting birds such as horned lark (*Eremophila alpestris*), dark-eyed junco (*Junco hyemalis*), and Savannah sparrows (*Ammodramus savannarum*). Other species, particularly gulls and shorebirds, may congregate on the open lawn areas of Veteran's Park as well, especially during rainy weather or coastal storms.

Few reptiles and amphibians likely find suitable feeding, breeding, or cover habitat within the ruderal landscapes of the project area. Exceptions may be those species that are well-adapted to urban settings, or that may be able to disperse long distances along the linear railroad corridor. An example would be the eastern garter snake and, even more likely, the Dekay's brown snake, which is reportedly found in landscapes highly altered by humans[98].

Mammals expected to occur within the uplands of the project area with regularity include urban and human-adapted generalist species such as raccoon (*Procyon lotor*), skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), gray squirrel (*Sciurus caolinensis*), house mouse (*Mus musculus*), and Norway rat (*Rattus norveigicus*). These species are all expected to occur within the vegetated margins within the railroad ROW. Red fox (*Vulpes vulpes*), and eastern cottontail (*Sylvilagus floridanus*) may also occur within the railroad ROW. A variety of former rangeland and woodland species, such as white-tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*), is becoming increasingly common within the green spaces of urban areas in the northeast, including Connecticut. Both species are likely to occur within Oyster Shell Park, located northwest of the bridge, and other green spaces of Norwalk. These species may use the vegetated railroad ROW as dispersal corridors.

[98] Hammerson, *Connecticut Wildlife*

3.13.3. Potential impacts

No-Build Alternative

In the No-Build Alternative, the bridge would not be replaced. There would be no impacts to geologic resources, characteristic vegetation, or characteristic wildlife.

Build Alternative

The Build Alternative will have minor impacts on the natural terrestrial communities/habitat. The minor impacts would occur with the Bascule Bridge option and both Vertical Lift Bridge options, and would be associated largely with the loss of narrow, ruderal upland habitat patch, which contains a high composition of invasive plant species, that has developed along the railway sideslopes.

Geologic Resources

The Build Alternative will not impact native upland soils, prime farmland soils, statewide important farmland soils, locally important farmland or other valued surficial or bedrock geologic resources. The expansion of the bridge approach on the east side of the river may necessitate the import of suitable backfill material that will replace existing urban soils and udorthents.

Characteristic Vegetation

In the Build Alternative, existing upland vegetation will be lost due to clearing and grubbing during construction work along both bridge approaches. The entire area within the limit of disturbance will be cleared, resulting in the removal of existing vegetation and stumps. This removal is considered a permanent impact (i.e., loss of woody plant coverage within the project area). Although the existing trees and shrubs will be permanently removed, this is not anticipated to be a significant negative ecological impact due to the limited extent of the trees being removed, the largely non-native community composition, and the poor quality of the habitat affected (largely ruderal habitat that grew atop a filled slope).

Loss of herbaceous coverage will be temporary, since upon completion of the bridge approach widening construction activity, all exposed bare soil areas will be stabilized via re-seeding.

Characteristic Fauna

The Build Alternative will have no significant adverse impacts on avian species of conservation concern. The small amount of vegetation altered by the project will not negatively impact breeding or foraging bird species of conservation concern populations. Removal of trees growing in the upland adjacent to the east abutment will eliminate a Black-crowned Night-Heron (*Nycticorax nycticorax*) roost displacing at least one individual from this location and forcing it to seek an alternative roosting location. This species is not included on the list of species associated with the state or federal Endangered Species Act, but is still protected from unregulated take under the Migratory Bird Treaty Act.

The Build Alternative will have no adverse impacts on reptile or amphibian species and no important large-mammal habitat will be impacted by the project. The limited amount of potential small-mammal habitat altered by the project will not have a negative impact on local populations of mammalian species, all of which are generalist species that are well-adapted to urban conditions and live in proximity to humans.

3.13.4. Mitigation Measures

Soil stabilization within the project area will be conducted as a requirement of the Construction General Permit and to protect the water quality of the Norwalk River. Approved seed mixes for coastal locations will be used to return herbaceous cover to areas of disturbed soil. Invasive species control / removal will be provided as needed during the site stabilization.

3.14. Aquatic Resources, Species, and Critical Habitats

3.14.1. Introduction, Regulatory Background, Methodology

This section describes the project area's aquatic resources and assesses impacts to aquatic resources, species, and critical habitats as a result of the Walk Bridge Replacement Project. Aquatic resources include marine fisheries, shellfish, estuarine/marine birds, mammals, and critical aquatic habitats. Endangered and Threatened aquatic species are addressed in Section 3.15.

NMFS serves as the regulating authority providing conservation recommendations on Essential Fish Habitat (EFH), pursuant to the Magnuson-Stevens Fishery Conservation and Management Act and 50 CFR 600 Subpart J. NMFS and USFWS serve as the regulating authorities governing Critical Habitat pursuant to the Section 4 of the ESA and 50 CFR 226. Critical Habitat includes areas that are currently occupied by these species, areas that provide the physical and biological features vital to the conservation of these species, and areas that may require special management considerations or protections.

CTDEEP, through the Connecticut Comprehensive Wildlife Conservation Strategy (CWCS), now known as the Connecticut Wildlife Action Plan, has identified 11 unique wildlife habitats in the state. Though different than the NMFS and USFWS definitions, these areas also are deemed Critical Habitat by CTDEEP.

The U.S. Environmental Protection Agency (USEPA) provides regulatory guidance for the protection of aquatic resources through the Clean Water Act. Section 404 of the Clean Water Act regulates shellfish beds relative to dredge or fill material in waters of the U.S. Shellfish habitat is protected at the state level through the Structures, Dredging, and Fill Act (CGS Section 22a-359 through 22a-363f) and the Tidal Wetlands Act (CGS Section 22a-28 through 22a-35). The National Shellfish Sanitation Program (NSSP), recognized by the U.S. Food and Drug Administration (FDA) and the Interstate Shellfish Sanitation Conference (ISSC), provides the regulatory guidance for the sanitary control of shellfish produced and sold in the United States for human consumption. The Connecticut Department of Agriculture, in accordance with the NSSP, has established classifications for shellfish growing areas in an effort to minimize health risks.

Submerged Aquatic Vegetation (SAV) is regulated through Section 404 of the Clean Water Act.[99] USACE is the federal permitting authority for activities involving the disposal of dredged or fill material in SAV, with oversight by USEPA through the Section 404(b)(1) Guidelines.[100] SAV is protected at the state level through the Connecticut Coastal Management Act (CGS Sections 22a-90 through 22a-111) and the Connecticut Tidal Wetlands Act.

The presence of EFH designations was identified using GIS data available from the NMFS Essential Fish Habitat online mapper. Federally defined Critical Habitat was evaluated using both GIS data provided by

[99] Section 404 of the Clean Water Act establishes protection of the nation's waters, including special aquatic sites (SAS). SAS includes vegetated shallows, also known as Submerged Aquatic Vegetation.
[100] Section 404(b)(1) Guidelines For Specification of Disposal Sites for Dredged or Fill Material, Subpart E, Special Aquatic Sites.

NMFS and the USFWS Critical Habitat online mapper. Connecticut defined Critical Habitat was evaluated using GIS data provided by CTDEEP and review of the CT Coastal Resources Map. Benthic resources were evaluated using GIS data on shellfish provided by CTDEEP. Fish, wildlife, and shellfish species were observed and noted during site inspections and field evaluations. Experts were consulted on the presence of submerged aquatic vegetation at the project location.[101] Harbor Watch, a program of Earthplace operating under the guidance of CTDEEP, has been conducting trawling surveys since 1990 and provides data on fish and crustacean presence in Norwalk River and Norwalk Harbor.

3.14.2. Existing Conditions

Long Island Sound, often regarded as Connecticut's largest and most important natural resource, is an estuary with a coastline that stretches more than 600 miles and covers an area of 1,320 square miles. Long Island Sound provides habitat for countless varieties of animals, including more than 120 species of finfish. The Norwalk River is the largest natural resource present within the project area providing commercial and recreational boat users as well as avian and aquatic species access to and from Long Island Sound via Norwalk Harbor. Located at a critical point where the freshwater ecosystem meets the marine ecosystem, the Norwalk River serves as habitat to an extensive community of biota consistent with tidal riverine systems feeding into the Long Island Sound Estuary. Several species of plants, fish, birds, invertebrates, and mammals use this resource for food, shelter, and nursery grounds, making this an important component of the Long Island Sound Estuary.

The importance of this area for spawning and migration is further evident based upon regulatory time-of-year work restrictions. Consultation with CTDEEP Inland Fisheries Division indicates that anadromous fish migration periods exist in Norwalk River/Harbor from April 1st through June 30th, and winter flounder reproduction periods exist in Norwalk River/Harbor from February 1st through May 15th. In addition, the USACE standard permit conditions impose a dredging time-of-year restriction in tidal waters from October 1st through January 15th.

Field investigations have documented the presence of schools of Atlantic menhaden (*Brevoortia tyrannus*), and local fisherman have stated that they had caught striped bass (*Morone saxatilis*) in the vicinity as well. The Norwalk River is also a known migratory route for diadromous species such alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), and the American eel (*Anguilla rostrata*). The Harbor Watch program's latest data from 2014 trawling of juvenile benthic marine fish species produced collections of winter flounder (*Pseudopleuronectes americanus*), northern sea robin (*Prionotus* carolinus), cunner (Tautogolabrus adspersus), hogchoker (Trinectes maculatus) and northern pipefish (*Syngnathus fuscus*) within the Walk Bridge project vicinity.

As presented in Table 3-8 and shown in Figure 3-22, EFH is designated for ten species in the area inclusive of Walk Bridge (and continuing further upstream) and includes varying life stages for each species. In addition to these ten species, five additional species (listed in Table 3-8) have designated EFH reaching the Stroffolino Bridge and continuing south to include Norwalk Harbor and Long Island Sound. Since this structure is not a physical barrier, rather a regulatory boundary, it is likely that these species also use the adjacent area in the Walk Bridge vicinity at various stages of their life cycles.

[101] Professor Charles Yarish, Department of Ecology & Evolutionary Biology and Department of Marine Sciences, University of Connecticut, Stamford Campus.

Table 3-8—Essential Fish Habitat in the Vicinity of Walk Bridge

EFH at Walk Bridge		Additional EFH South of Stroffolino Bridge	
Species	Life Stage	Species	Life Stage
Winter Skate (*Leucoraja ocellata*)	Juvenile, Adult	Pollock (*Pollachius virens*)	Juvenile, Adult
Little Skate (*Leucoraja erinacea*)	Adult	Ocean Pout (*Macrozoarces americanus*)	Adult
Summer Flounder (*Paralichthys dentatus*)	Juvenile	Window Pane Flounder (*Scophthalmus aquosus*)	Eggs, Larvae, Juvenile, Adult
Black Sea Bass (*Centropristis striata*)	Juvenile	Winter Flounder (*Pseudopleuronectes americanus*)	Eggs, Larvae, Juvenile, Adult
Scup (*Stenotomus chrysops*)	Eggs, Larvae, Juvenile, Adult	Red Hake (*Urophycis chuss*)	Eggs, Juvenile, Adult
Longfin Inshore Squid (*Loligo pealeii*)	Eggs, Juvenile, Adult		
Atlantic Mackerel (*Scomber scombrus*)	Eggs, Larvae, Juvenile, Adult		
Bluefish (*Pomatomus saltatrix*)	Juvenile, Adult		
Atlantic Butterfish (*Peprilus triacanthus*)	Eggs, Larvae, Juvenile, Adult		
Atlantic Herring (*Clupea harengus*)	Juvenile, Adult		

Source: National Oceanic and Atmospheric Administration, *Essential Fish Habitat Mapper v3.0*. Accessed August 24, 2015 From: http://www.habitat.noaa.gov/protection/efh/habitatmapper.html

The waters in and around the Walk Bridge project site, consisting of Norwalk River and Norwalk Inner Harbor, serve as habitat for a number of other benthic species. The Harbor Watch program inventoried crustacean collections and found the presence of common mud snail (*Ilyanassa obsoleta*), eastern mud snail (*Ilyanassa obsolete*), black fingered mud crab (*Panopeus herbstii*), blue crab (*Callinectes sapidus*), common slipper shell (*Crepidula fornicata*), Atlantic oyster drill (*Urosalpinx cinerea*), shore shrimp (*Palaemonetes* spp.), and sand shrimp (*Crangon septemspinosa*). In the immediate vicinity of Walk Bridge, field observations of ribbed mussels (*Geukensia demissa*), American oyster (*Crassostrea virginica*) and hard-shelled clam (*Mercenaria mercenaria*) provided direct evidence of benthic habitat utilization by bivalves. Other shellfish expected to occur within the river channel include quahog (*Mercenaria mercenaria*), blue mussel (*Mytilus edulis*), and softshell clam (*Mya arenaria*). Various other aquatic invertebrate species observed or expected to be present in the Norwalk River proximate to Walk Bridge include various amphipods, isopods, fiddler crabs (*Uca* spp.), shore crabs, various marine polychaete worms, pea crabs (*Pinnotheres[Tumidotheres] maculatus.*), spider crabs (*Libinia* spp.), tunicates, barnacles (*Balanus* spp), jellyfish and bryozoans.

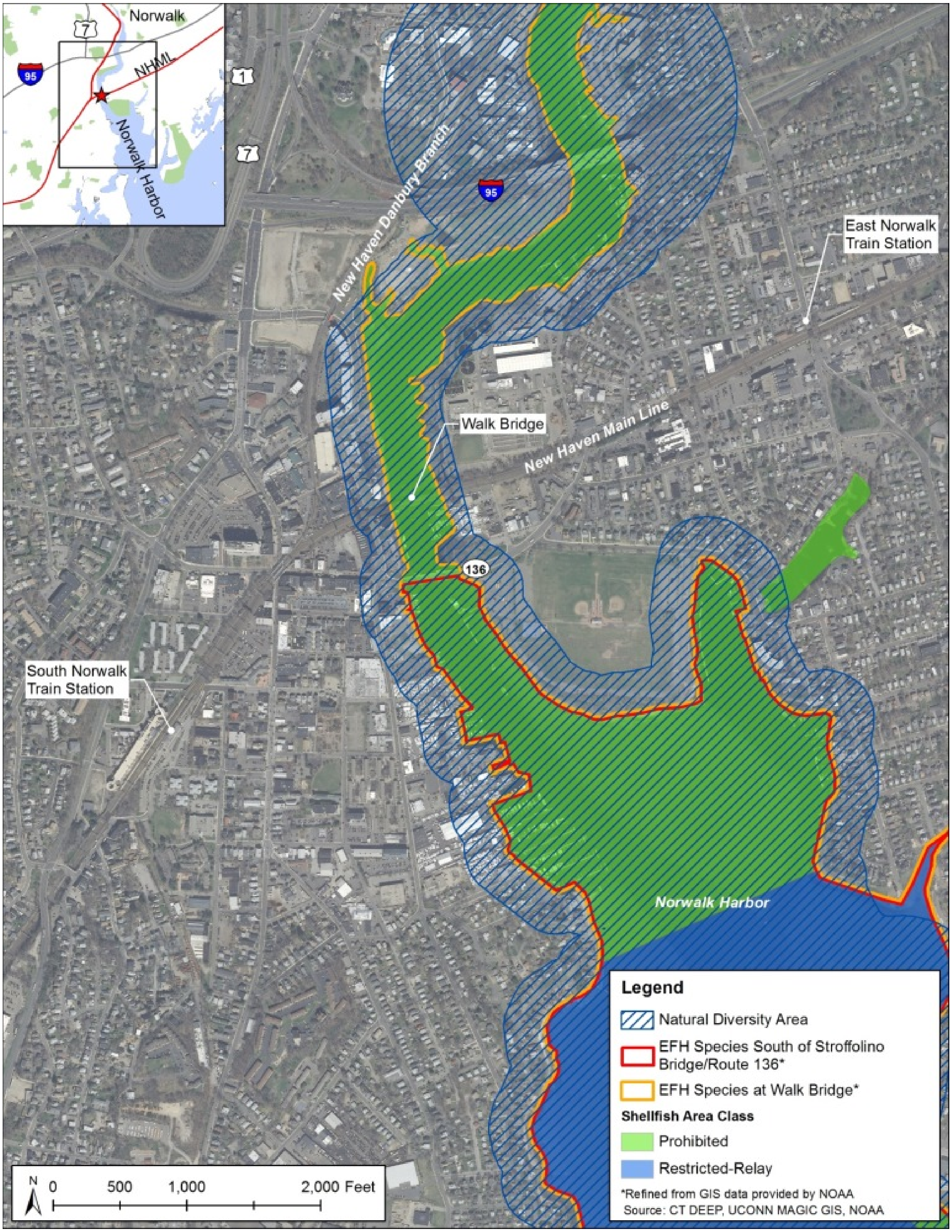

Figure 3-22—Aquatic Resources in the Vicinity of Walk Bridge

The Norwalk River is a State-designated natural shellfish bed. As defined by the Connecticut Department of Agriculture, and pursuant to the NSSP, the waters in and around the Walk Bridge are classified as "Prohibited," as shown in Figure 3-22.[102] Shellfish may not be harvested from Prohibited areas except for seed oystering or depletion of the areas. As shown on Figure 3-22, the area beginning in Norwalk Harbor and extending south is classified as "Restricted-Relay" indicating the aquaculture practices are allowed for relay or transplant activities in conformance with NSSP criteria.[103]

SAV refers to rooted, vascular plants that grow completely submerged experiencing only brief periods of exposure, typically associated with tides. Submerged aquatic vegetation provides important habitat for many marine and estuarine fauna. Historic accounts show the presence of common eelgrass (*Zostera marina*) in Norwalk Harbor; however, experts confirm that currently, there is no presence of common eelgrass, widgeongrass (*Ruppia maritima*), or any other non-algae submerged aquatic plant species in and around the Norwalk Harbor area.[104]

Marine macroalgae, commonly called seaweeds, are rootless, macroscopic, mainly benthic plants found from intertidal to subtidal regions of coastal environments. The more common seaweeds likely found in the project vicinity include green algae (phyla *Chlorophyta*) and brown algae (phyla *Phaeophyta*), both of which occupy the shallower areas; whereas red algae (phyla *Rhodophyta*) are mostly found at deeper depths. The marine algae diversity in Long Island Sound includes over 70 species of seaweeds with representatives from all three phyla. Common examples of green algae include sea lettuce (*Ulva lactuca*), hollow green weed (*Enteromorpha intestinalis*), and green fleece (*Codium fragile*). Typical brown algae include knotted wrack (*Ascophyllum nodosum*), rockweeds (*Fucus spp.*), and kelp (*Laminaria spp.*). Red algae that would be typical include dulse (*Rhodymenia palmata*), sea oak (*Phycodrys rubens*), Irish moss (*Chondrus crispus*), graceful red weed (*Gracilaria foliifera*), and Dumont's red weed (*Dumontia incrassata*). In the vicinity of Walk Bridge, the substrates and water conditions affect the types of seaweeds that are found at the site. Observed at the project area were sea lettuce, rock weed, and knotted wrack, although several other species are likely present. The seaweeds are typically found in association with boulders or larger cobbles that may or may not be embedded in the sediment, while sea lettuce predominates in unconsolidated sediment areas between the boulder and cobble. Many of the seaweeds are only visible during limited seasonal conditions.

Due to its proximity to Norwalk Harbor and Long Island Sound, the area surrounding the project site is home to a number of aquatic bird species, including several species of waterfowl, wading birds, shorebirds, gulls, terns, raptors, and other field and stream species. The waters and shorelines around Walk Bridge offer desired habitat for many of these species. Common waterfowl to this area include Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), and double-crested cormorants (*Phalacrocorax auritus*). Other waterfowl regularly observed nearby in the Norwalk River include mute swans (*Cygnus olor*), American black duck (*Anas rubripes*), American wigeon (*Anas americanus*), gadwall (*Anas strepera*), common merganser (*Mergus merganser*), and hooded merganser (*Lophodytes cucullatus*). Long-legged wading birds common to this area include great egrets (*Ardea alba*), snowy egrets (*Egretta thula*), great blue heron (*Ardea herodias*), and black-crowned night-heron (*Nycticorax nycticorax*). Shorebirds recorded in the vicinity include killdeer (*Charadrius vociferous*), semipalmated plover (*Charadrius semipalmatus*), and the spotted sandpiper (*Actitis macularia*). Furthermore, great

[102] Prohibited areas are identified as growing areas that are adjacent to a sewage treatment plant or a point source outfall with public health significance. Additionally, Prohibited areas may indicate that a pollution source may unpredictably contaminate the growing area, the growing area is contaminated with fecal waste, or the concentration of biotoxin is sufficient to cause a public health risk. Prohibited areas may also be designated areas where there has been no current sanitary survey.
[103] Restricted-Relay is a classification used to identify a growing area where harvested stock is then relayed to waters classified as Approved or Conditionally Approved for natural cleansing.
[104] Paul Stanton, Fitzgerald & Halliday, Inc., "Replacement of the Walk Bridge, Norwalk, Connecticut (State project 0301-0040), Summary of Research and Data Collection Efforts," Memorandum to Christian Brown and Kevin Slattery, HNTB, December 10, 2014.

black-backed gull (*Larus marinus*), herring gull (*Larus argentatus*), and ring-billed gull (*Larus delawarensis*) frequent the area as well. Osprey (*Pandion haliaetus*) and belted kingfishers (*Megaceryle alcyon*) also have been observed using this part of the Norwalk River.

Typical aquatic/marine mammals are not anticipated to frequent this area due to habitat conditions and species habitat preferences; however a few species, such as the harbor seal (*Phoca vitulina*), have been known to enter Connecticut coastal tributaries at times during winter months. Other urbanized terrestrial mammals that at times associate with the aquatic environment in nearby areas include raccoon (*Procyon lotor*), Norway rat (*Rattus norveigicus*), and white-tailed deer (*Odocoileus virginianus*).

There are three marine turtle species that have been reported in Long Island Sound and may enter waters such as these during the summer months: the green sea turtle (*Chelonia mydas*), Kemp's ridley turtle (*Lepidochelys kempii*), and the leatherback sea turtle (*Dermochelys coriacea*). Section 3.15 presents information on marine turtles that may be found in the project vicinity.

There are no federally defined or Connecticut defined Critical Habitat areas in the immediate vicinity of Walk Bridge. There are five designated Connecticut Critical Habitat areas south of Walk Bridge, consisting of one estuarine intertidal marsh[105] and four estuarine beachshore[106] areas. The estuarine intertidal marsh is located over a mile from Walk Bridge, at the northern edge of Manresa Island in Norwalk Harbor, on the northern side of Longshore Avenue. The four estuarine beachshore areas are located over two miles south of Walk Bridge, and are associated with the islands just outside Norwalk Harbor (Betts Island, Grassy Island, Chimon Island, Crow Island, Copps Island, Shea Island, and Sheffield Island).

3.14.3. Potential Impacts

No Build Alternative

In the No Build Alternative, the bridge would not be replaced. There would be no impacts to aquatic wildlife, fish, shellfish or aquatic habitat over existing conditions.

Build Alternative

The Build Alternative will result in both permanent and temporary impacts to aquatic resources. The Bascule Bridge option and both Vertical Lift Bridge options have the potential to impact both tidal wetland habitats and their associated species. Some impacts will be temporary and will be minimized during construction using BMPs, as described in Chapter 5, while other impacts will be permanent due to the elements of the replacement bridge. Permanent impact areas have been minimized during these initial design stages to reduce the permanent impact to those resources.

Benthic Invertebrate fauna

Impacts to the vegetated tidal wetlands could result in the loss of associated fauna due to burial, including such characteristic species as the rough periwinkle (*Littorina saxatilis*), marsh fiddler crab (*Uca pugnax*), various amphipods, isopods, and numerous insects. Likewise, dredging and installation of piles could directly impact characteristic fauna of the intertidal flats such as the mud snail (*Nassarius obsoletus*), the green crab (*Carcinus maenas*), and the ribbed mussel (*Modiolus demissus*). Some loss of these

[105] Intertidal marsh is defined as regularly or irregularly flood marshes influenced by water with varying salinity.
[106] Beachshore is defined as windswept and wave washed sandy beaches and their associated sand dunes.

characteristic species would be expected. Characteristic fauna of the subtidal areas include the blue crab (*Callinectes sapidus*), prawns (*Palaemonetes* spp.), and a number of estuarine fish such as northern pipefish (*Syngnathus fuscus*), northern searobin (*Prionotus carolinus*), blackfish (*Tautoga onitis*) and winter flounder (*Pseudopleuronectes americanus*), the latter estuarine fish species under the purview of the New England Fisheries Management Council.

Direct removal of suitable benthic substrate via dredging for channel work could impact both benthic invertebrate communities and EFH by changing the ambient depths and bathymetry. Together, changes to these two habitat attributes may render the impact areas unsuitable to various species of management concern. However, the area proposed for channel alignment work will be minor and primarily focused on shallower areas associated with the existing protective fender systems and piers. As a result, impacts to the benthic substrate will be minor in the Build Alternative regardless of which bridge option is implemented. Recolonization of the newly exposed substrate by the benthic community after dredging is anticipated and is a factor not only of site-specific basin characteristics (e.g., wave or tidal energy, bathymetry, water chemistry, etc.) but also of substrate requirements of the larvae of recolonizing species.[107]

Removal of benthic sediment through dredging also tends to reduce structural complexity atop the substrate surface, and may result in the release of hydrogen sulfide to the water column which can temporarily prevent the settlement of larval benthic organisms. Additionally, removal of the existing fender system will contribute toward temporary structural habitat loss. Structural complexity provides smaller species with living space, increased food abundance, and refuge from predators. Certain demersal fish species often prefer one substrate over another for feeding or spawning. Therefore, the loss of substrate complexity may produce a short term effect of discouraging recruitment of benthic invertebrates, which in turn, are the food of many demersal fish. In the permanent condition, however, the proposed fender system for the replacement bridge will provide structural cover back to the river in the same area.

In general, both prey and fish species diversity increases with habitat complexity, therefore, the more structurally complex the marine habitat, the greater the organism diversity. However, since the areas proposed to be dredged lie within the existing protective fender and navigation channel, a uniquely biologically diverse bottom substrate is not expected relative to other areas of the river and estuary. Therefore, impact to marine resources due to direct removal of the benthic habitat is expected to be minimal. Regionally, it is considered to be a small-scale and very limited impact to the system in comparison to the system as a whole. Since no submerged vascular aquatic vegetation (SAV) occurs within or proximal to the disturbance areas, no removal of undisturbed SAV areas (e.g., eelgrass beds) will occur as a result of the Build Alternative, including any of the three Build options.

Fisheries Resources / EFH

There will be very minor impacts to EFH at the project site, consisting of minor changes in water depth to widen the channel bottom in the subtidal estuarine area under the bridge. Aside from limited vegetated wetlands in the intertidal zone, no other EFH, such as eel grass beds, tidal creeks, marsh pans, oyster reef, etc., will be lost due to the Build Alternative. Although there is the potential for temporary impacts to surface water quality in the immediate vicinity of the bridge during the in-water portion of construction, these potential impacts will be minimized through the use and implementation of BMPs. An EFH Assessment Checklist will be completed for the Build Alternative as part of the state and federal

[107] Rhoads, D.C. and J.D. Germano. Interpreting Long-Term Changes in Benthic Community Structure: A New Protocol. *Hydrobiologia* 142: 291-308. 1986.

permitting process. The EFH Assessment will contain the specific detailed information on potential impacts to EFH and trust resources as a result of the Build Alternative, and will identify measures that will be implemented to minimize adverse impact to EFH.

Aquatic Habitats

Based on the current design, the installation of the new bridge abutments and the new pile-supported bridge piers represent a permanent impact to tidal resources. Impacts include expansion of the earthen embankments on the north side of the eastern bridge abutment, installation of a precast modular retaining wall, and creation of a gravel filled contractor work area. As previously cited in Section 3.10.3, the work area will be removed upon completion of the project. Impact associated with this fill area includes the loss of benthic invertebrates due to smothering from the gravel fill.

The Build Alternative will result in the permanent loss of approximately 900 sf of intertidal flat due to various new bridge footprint components and associated activity, including pier shafts, fenders, and submarine conduit components and, with the Bascule Bridge option, the IMAX egress walkway. Additionally, approximately 1,600 sf of subtidal habitat will be permanently lost as a result of the replacement bridge pier shafts and fenders with the Bascule Bridge Option. The loss of subtidal habitat would be less for the two Vertical Lift Bridge options with the short span Vertical lift Bridge option (Option 8A) impacting approximately 1,400 sf and the long span Vertical Lift Bridge option (Option 11C) impacting 1,200 sf.

Additional impact is anticipated due to proposed dredging to increase the width and depth of the existing Federal Navigation Channel in the immediate vicinity of Walk Bridge. Dredging to increase the navigation channel will impact approximately 25,400 sf of subtidal habitat, and 300 sf of intertidal habitat (regardless of the Build Alternative option), by removal of the benthic communities in these areas and by increased water depths. Subtidal impacts are considered to be temporary impacts, as dredging will still result in the retention of subtidal habitat. Water depth will increase within the dredge footprint, resulting in the conversion of approximately 300 sf of intertidal habitat to subtidal habitat, and slightly increasing the depth of the 25,400 sf subtidal areas within the dredging footprint. Tidal flow and wave patterns/direction are expected to remain unaltered as a result of the project.

Due to the urban nature of the Norwalk River estuary, there is potential for the dredge area to contain contaminated sediment. Sediment impacted by chemical constituents will be dredged, managed, and disposed of in accordance with state and federal regulations. CTDOT will conduct a sampling program during final design to characterize the river sediments at the bridge site, including proposed impact areas. If elevated levels of pollutants of concern are discovered, appropriate handling and permitting clearances will be followed to protect aquatic resources. Potential impacts to intertidal flats and subtidal areas are shown in Figure 3-23 for the Bascule Bridge option and the two Vertical Lift Bridge options.

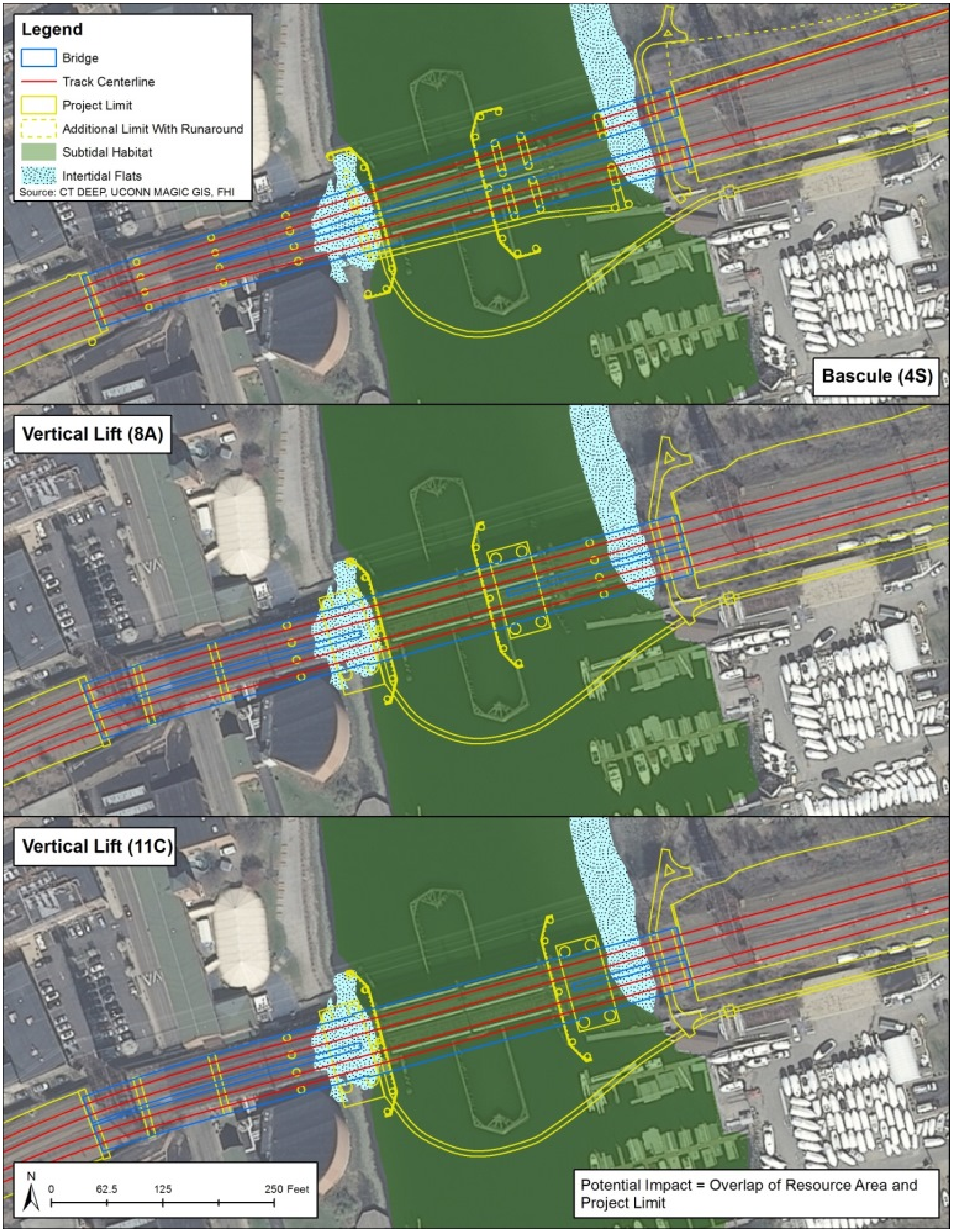

Figure 3-23—Potential Impacts to Subtidal and Intertidal Resources

3.14.4. Mitigation Measures

Table 3-9 summarizes potential impacts to intertidal and subtidal habitat and presents required mitigation. Compensation of intertidal habitat impacts will be provided by tidal wetland restoration, and compensation of subtidal habitat impacts will be provided through removal of the existing bridge piers and reclamation of habitat.

To offset the permanent impact of lost subtidal benthic habitat, the existing west rest-pier, existing east rest-pier, and the existing center-pivot pier will be removed, thereby restoring the footprint of these piers to available benthic habitat. This will result in the reclamation of approximately 3,600 sf of estuarine subtidal unconsolidated channel bottom habitat. Since the area of existing piers is greater than the area of proposed drilled shaft piers, a gain of subtidal habitat is anticipated. Intertidal habitat that is not vegetated will be replaced upon the removal of the contractor fill material and will become recolonized with marine invertebrates.

To avoid or minimize impacts (loss of fish and shellfish resources) from the proposed dredging, dredging will occur outside the seasonal time of year restrictions typically imposed by the CTDEEP OLISP and National Marine Fisheries Service (NMFS), which in turn depend on the sensitivity of the resident fauna of economic and conservation concern. Typically, dredging occurs during late fall and winter months. During this time period, most fisheries resources of economic and ecologic concern will have left the estuary for warmer offshore waters, and resident shellfish metabolism is greatly reduced which lowers their susceptibility to water turbidity. Additional avoidance measures will be evaluated to ensure the protection of the fisheries resources that may be present in Norwalk Harbor, including the stipulation of no construction blasting, the mechanical removal of select existing bridge components, separation and removal of sediment-laden water, and the preparation of a detailed Stormwater Pollution Prevention Plan (SWPPP) to be followed during construction.

Since impact to EFH is not expected to be substantial, EFH mitigation is not anticipated for the project. However, this will be verified through coordination with the regulatory agencies during the permitting phase of the project.

Table 3-9 — Resource Impacts and Mitigation Methods

	Intertidal Habitat (Flat)			Subtidal Habitat (Bridge Elements)			Subtidal Habitat (Dredging)		
	Bascule	Vertical Lift (8A)	Vertical Lift (11C)	Bascule	Vertical Lift (8A)	Vertical Lift (11C)	Bascule	Vertical Lift (8A)	Vertical Lift (11C)
Permanent Impacts									
Permanent Impact (sf)	900	900	900	1,600	1,400	1,200	25,400	25,400	25,400
Mitigation Ratio	4:1	4:1	4:1	1:1	1:1	1:1	1:1	1:1	1:1
Mitigation Requirements (Permanent) (sf)	3,600	3,600	3,600	1,600	1,400	1,200	25,400	25,400	25,400
Mitigation Requirements (Permanent) With 30% Contingency Factor (sf)	4,680	4,680	4,680	2,080	1,820	1,560	N/A	N/A	N/A
Temporary Impacts									
Temporary Impact (sf)	7,750	7,700	7,700	10,250	8,400	8,400	0	0	0
Mitigation Ratio	1:1	1:1	1:1	1:1	1:1	1:1	1:1	1:1	1:1
Mitigation Requirements (Temporary) (sf)	7,750♦	7,700♦	7,700♦	10,250♦	8,400♦	8,400♦	0	0	0
Totals									
Total Mitigation Requirements (sf)	3,600*	3,600*	3,600*	1,600*	1,400*	1,200*	N/A	N/A	N/A
Mitigation Needs (sf)	4,680	4,680	4,680	2,080	1,820	1,560	0	0	0
Mitigation									
Compensation Means	Tidal Wetland Restoration	Tidal Wetland Restoration	Tidal Wetland Restoration	Removal of Existing Piers	Removal of Existing Piers	Removal of Existing Piers	Removal of Existing Piers	Removal of Existing Piers	Removal of Existing Piers
Available Compensation Area (sf)	4,561★	8,071★	8,071★	3,600	3,600	3,600	1,520	1,780	2,040
Surplus Compensation Area Remaining (sf)	961	4,471	4,471	1,520	1,780	2,040	0	0	0

N/A: Not Applicable.
♦: Temporary Intertidal and Subtidal Impacts Mitigated In-Place (Restoration).
*: Only Permanent Impacts Require Compensation.
★: Surplus From Tidal Vegetated Wetland Compensation.

3.15. Endangered, Threatened, and Special Concern Species

3.15.1. Introduction, Regulatory Background, Methodology

This section identifies Endangered, Threatened, and Special Concern species (collectively referred to as listed species) in the project area and assesses impacts of the Walk Bridge Replacement Project upon the listed species.

Section 7 of the ESA[108] requires all federal agencies to consult with NMFS for marine and diadromous species, or with the USFWS for fresh-water species and inland flora and fauna.

Listed species were identified and evaluated using state and federal consultation protocols, via a review of existing data sets and literature, and direct observation. For federally protected species, the NMFS Protected Resources Division was consulted in December 2014. For state regulated species, the CTDEEP Natural Diversity Database (NDDB) was consulted in November 2014. Section 7 ESA applicability was determined via on-line screening using the USFWS Information for Planning and Conservation (IPaC) tool (September 2015). Additional review of available existing data sets, unpublished reports, and resource mapping was conducted, including the Harbor Watch Report on Juvenile Benthic Marine Fish May-October 2014 (benthic invertebrates, fish trawl data), CTDEEP Marine Fisheries Reports (marine fisheries resources), *eBird*,[109] and the CT Breeding Bird Atlas[110] (avian resources).

Field reviews were conducted to assess the potential habitat suitability for state listed species known to occur within the project area. Additionally, direct observations of some state listed species made during field work within the project area supplemented information that was available in the literature or obtained via resource agency consultation.

3.15.2. Existing Conditions

As shown in Figure 3-22, the Norwalk Harbor to approximately the head of navigation is identified by CTDEEP's NDDB as a general location of Federal and State listed species and significant natural communities.

Federally Listed Species

NMFS identified the following federally-listed Threatened species that may occur within the Norwalk River:

- Atlantic sturgeon (*Acipenser oxyrhynchus*) – Gulf of Maine Distinct Population Segments (DPS) and the Northwest Atlantic Ocean DPS, and
- Loggerhead sea turtle (*Caretta caretta*) – Northwest Atlantic Ocean DPS.

NMFS identified the following federally-listed Endangered species that may occur within the Norwalk River:

- Shortnose sturgeon (*Acipenser brevirostrum*);

[108] 16 U.S.C. Section 1536(a)(2)
[109] http://ebird.org/ebird/hotspot/L284164
[110] Bevier, *Connecticut Breeding Bird Atlas*

- Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*): New York Bight DPS, Chesapeake Bay DPS, Carolina DPS, South Atlantic DPS;
- Kemp's ridley sea turtle (*Lepidochelys kempi*);
- Green sea turtle (*Chelonia mydas*); and
- Leatherback turtle (*Dermochelys coriacea*).

The USFWS identified a number of migratory bird species of conservation concern and two federally-listed threatened species that may occur within the region, inclusive of the Walk Bridge project area. The two federally listed threatened species area as follows:

- Northern long-eared bat (*Myotis septentrionalis*); and
- Red knot (*Calidris canutus rufa*).

The following provides additional information on listed species.

Sturgeon

Sturgeons once supported a substantial commercial fishery, but like other anadromous species, their populations have plummeted due to industrial use of rivers beginning in the 1800s and due to overfishing. Only remnant populations of the Shortnose sturgeon and the Atlantic sturgeon remain throughout their former range. This has prompted the enactment of state management measures to protect these species under the ESA. Today, the lack of fish passage facilities at dams and poor habitat conditions remain as impediments to the re-establishment of many sturgeon populations.[111]

Shortnose Sturgeon. Shortnose sturgeon occur in most major river systems along the eastern seaboard of the United States, with greater abundance estimates assigned to populations from major rivers south of the Gulf of Maine. Shortnose sturgeon spend most of their lives in freshwater, but may periodically visit saltwater in estuaries or stay in freshwater throughout their lives.[112] They travel upstream into faster-moving freshwater river reaches to spawn. Due to the shallow nature of the water and higher salinity range in the project area, the presence of spawning habitat and habitat for early life stages and juveniles within the project area is highly unlikely. Adults, on rare occasions, may potentially migrate through the project area at discrete times of the year.

Atlantic Sturgeon. Atlantic sturgeon spend most of their lives in estuarine or marine environments. The presence of spawning habitat and habitat for early life stages and juveniles is highly unlikely at the site, as spawning primarily occurs in fresh water habitats, and juvenile sturgeon remain in freshwaters until adults. Tagging and genetic data show that adults may travel widely once they leave their river breeding sites, and they return to their natal river when they are ready to spawn.[113] Adult Atlantic sturgeon may potentially migrate through the site at discrete times of the year, primarily spring and early summer.

[111] Fiedland, *Status of Fisheries Resources* http://www.nefsc.noaa.gov/sos/spsyn/af/sturgeon/sturg.pdf
[112] Musick, *Sturgeons. Family Acipenseridae*
[113] NOAA, Status Review, 2007.

Marine Turtles

The frequency of occurrence of marine turtles in Long Island Sound (LIS) inshore waters depends on the species. The three endangered sea turtles reported by NMFS to occur within LIS typically enter LIS waters during the months of May to October.[114] The federally threatened Green sea turtle and Kemp's ridley sea turtle are the species most frequently encountered in LIS waters, while the occurrence of the leatherback sea turtle is very uncommon. All three turtles nest on sandy beaches of more southerly locales (i.e., outside of New England and the New York Bight). Therefore, the presence of these species in LIS occurs as post breeding vagrants.

Other Species

USFWS identified the northern long-eared bat (*Myotis septentrionalis*) and the red knot (*Calidris canutus rufa*) as having known distributional ranges that include the project area, but USFWS indicated that no critical habitat had been designated within the project area.

Per the USFWS review, there are 24 bird species of conservation concern with known distributional ranges overlapping the project area. This list includes a variety of songbirds, shorebirds, waterfowl, and other avifauna known to breed in or migrate through the region inclusive of the project area. All have federal protection under the MBTA or the Bald and Golden Eagles Protection Act.

State Listed Species

Field observation identified the following state-listed special concern, threatened, or endangered species that occur within the Norwalk River area:

- Common loon (*Gavia immer*): Special Concern;
- Great egret (*Ardea alba*): Threatened;
- Common tern (*Sterna hirundo*): Special Concern;
- Peregrine falcon (*Falco peregrinus*): Threatened;
- Horned lark (*Eremophila alpestris*): Endangered; and
- Savannah sparrow (*Passerculus sandwichensis*): Special Concern

The site's avifauna represent a diversity of taxa and include six listed on CTDEEP's list of special concern, threatened, or endangered species. The state-listed species reported to occur in or adjacent to the project area are as follows: common loon (*Gavia immer*), great egret (*Ardea alba*), common tern (*Sterna hirundo*), peregrine falcon (*Falco peregrinus*), horned lark (*Eremophila alpestris*), and savannah sparrow (*Passerculus sandwichensis*).[115] Most of these represent passage migrants during the spring and fall seasons, or winter non-breeding residents. The state special concern common tern and the state threatened great egret were observed feeding within the Norwalk River in the project area during a May 2015 field visit. Both of these species nest at known and monitored offshore locations outside of the project area,[116] but can be expected to visit the Norwalk River during the breeding season from time to time to forage.

[114] CTDEEP, *Connecticut Comprehensive Wildlife Conservation Strategy*
[115] Listed species accounts were confirmed both by direct observation by environmental scientists and catalogued sightings from nearby Veteran's Park available here: http://ebird.org/ebird/hotspot/L284164
[116] Bevier, *CT Breeding Bird Atlas*

CTDOT and CTDEEP have also acknowledged that a peregrine falcon was observed nesting on "High Tower 529," located within the project area, in April 2015. The peregrine falcon is listed as a state threatened species.[117]

3.15.3. Potential Impacts

No Build Alternative

In the No Build Alternative, the bridge would not be replaced. Thus, there would be no impacts to Endangered, Threatened, or Conservation Concern species.

Build Alternative

No impacts to listed species are anticipated in the Build Alternative. This determination applies to all three Build options, as detailed in the following paragraphs.

In a November 17, 2014 response to a request for project review, CTDEEP NDDB stated that no negative impacts to known state-listed species were anticipated as a result of the project. However, this response was revised by CTDEEP NDDB in a February 5, 2016 letter to CTDOT, informing CTDOT that the state threatened Peregrine Falcon was observed nesting on "High Tower 529." This species is protected by state laws which prohibit killing, harming, taking, or keeping them in one's possession. Loss of the high tower will displace the nesting location for the falcon. CTDOT intends to remove the falcon nesting site during the non-breeding period. No permanent impact to this species is anticipated from the Build Alternative.

The state special concern common tern and the state threatened great egret were observed feeding within the Norwalk River within the project area during a field visit conducted on May 28, 2015. Both of these species nest at known and monitored offshore locations outside of the project area but can be expected to visit the Norwalk River during the breeding season from time to time to forage. No permanent impacts to these species are anticipated from the Build Alternative.

The USFWS identified the federally threatened red knot as having a distributional range within the project area. However, this species is unlikely to be encountered in the project area during any time of year. It is a rare to uncommon coastal migrant in Connecticut. The few individuals that do occur from time to time in Connecticut during migration are known to occur on offshore barrier beaches and sand spits along the coast and the mud flats that typically form behind them. It is even rarer in the western portion of CT's Long Island Sound shoreline.[118] No permanent impact to this species is anticipated due to the Build Alternative, and no temporary impact is expected as a result of construction activity.

Tree clearing to expand the width of the bridge approach on the east side of the Norwalk River will result in the removal of tall trees from within the railroad ROW. The USFWS IPaC screening tool identified the federally threatened northern long-eared bat as having a distributional range that includes the project area. In general, tree clearing within the range of the northern long-eared bat is a potential concern for the conservation of this species. However, pursuant to the Final 4(d) Special Rule under authority of the Endangered Species Act, USFWS would not require surveys to determine the presence of northern long-eared bat if the project site does not occur within one-quarter-mile from a known hibernaculum or contain

[117] CTDEEP, List of Special Concern, Threatened, and Endangered Species
[118] Zeranski and Baptist, 1990. *Connecticut Birds*

a maternity roost site.[119] The USFWS defers to the state wildlife resource agencies for information on hibernacula and maternity site locations. CTDEEP NDDB did not identify northern long-eared bat as occurring within the project area. As of February 1, 2016, the known northen long-eared bat hibernaculum located nearest to Norwalk is in Greenwich County, CT.[120] Based upon this information, it may be concluded that the project would result in a "not likely to effect" determination for the northern long-eared bat. FTA will request USFWS concurrence with this conclusion via a hard copy letter for documentation to accompany project permit application filings.

Pursuant to the MBTA and the Bald and Golden Eagles Protection Act, any activity which results in the "take" of migratory birds or eagles is prohibited unless authorized by USFWS. According to the USFWS IPaC report generated for the project, there are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Therefore, FTA is required to analyze potential project impacts to these bird species and implement appropriate conservation measures. However, the Build Alternative is not likely to have any negative effects on the relevant species identified by USFWS, because these species either do not occur in the project area, or are only transient migrants within the project area and would avoid construction activity. Therefore, no takes of these species are anticipated.

3.15.4. Mitigation Measures

If deemed applicable by state or federal regulatory agencies, CTDOT will install a peregrine falcon nesting box on another high structure in the area. Additionally, BMPs will be implemented, which include specific measures for the avoidance and minimization of impact to peregrine falcons. For example, BMPs may include avoiding construction during nesting season, or if that is not feasible, implementing construction phasing such that construction activities proximal to the nest are deferred until after the nesting season.

There are no other permanent mitigation measures to Endangered, Threatened, or Special Concern species habitat anticipated for the Build Alternative. However, in-water work for any pier demolition, pile-driving, and dredging activities are often subject to temporal or seasonal restrictions which are often made conditions of the requisite environmental permits. Additional site-specific measures may be imposed by regulatory agencies during the permitting phase of the project. At this time, no permanent, indirect impact to the 24 migratory bird species whose distributional ranges overlap the project area are anticipated, therefore, no mitigation for those species is proposed.

3.16. Consistency with Connecticut Coastal Management Act

3.16.1. Introduction, Regulatory Background, Methodology

This section reviews policies of Connecticut's coastal management program, and presents a preliminary consistency assessment to determine the anticipated effects of the Walk Bridge Replacement Project on coastal resources.

Pursuant to Section 307 of the Coastal Zone Management Act, federal agency actions, including federally-funded projects and federal permit activities, affecting any coastal use or resource in Connecticut must be consistent with Connecticut's approved coastal management program (15 CFR

[119] Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat, Final Rule, 81 FR 9, 1900 (January 14, 2016) (amending 50 CFR Part 17).
[120] CTDEEP, "Northern long-eared bat Areas of Concern in Connecticut to Assist with Federal Endangered Species Act Compliance," February 1, 2016.

930.30 through 930.46). These policies are contained in the Connecticut Coastal Management Act (CCMA) and codified in CGS Sections 22a-90 to 22a-111.

The coastal zone in Connecticut includes both the coastal area and the coastal boundary. CGS Section 22a-94(a) defines the coastal area as the land and water within the westerly, southerly and easterly limits of the state's jurisdiction in Long Island Sound; and 36 towns within the state.[121] The towns border either Long Island Sound or the tidal portions of the Housatonic, Quinnipiac, Connecticut, and Thames rivers. CGS Section 22a-94(b) defines the coastal boundary as a line within the coastal area which is defined as the interior contour elevation of the 100-year coastal flood, or a 1,000-foot linear setback measured from the MHW mark in coastal waters, or a 1,000-foot setback measured from the inland boundary of tidal wetlands, whichever is farthest inland.

CCMA identifies 125 policies which guide federal, state, and municipal planning, development, acquisition, and regulatory activities. CCMA policies are divided into three broad categories: coastal resource policies, applying to uses occurring in or affecting any coastal resource category; coastal use policies, pertaining to major uses and activities independent of their location within the coastal area; and governmental process policies, pertaining to intergovernmental coordination and long range-planning. CCMA has identified twelve coastal resources within the land and water areas of the coastal boundary that must be preserved and enhanced consistent with state regulations. Coastal resources potentially affected by a project could be on-site, adjacent, or further removed from the project site.

Coastal land and water resources within the coastal boundary were identified through a review of the 1979 Coastal Resources Map prepared by CTDEEP's Coastal Area Management Program,[122] with verification through on-site inspections and field delineation.

3.16.2. Existing Conditions

The entire city of Norwalk is included within the coastal area. As shown in Figure 3-24, the project limits are located within the coastal boundary.[123] The CJL and coastal resources located in the immediate vicinity of Walk Bridge including tidal wetlands, intertidal flats, and freshwater wetlands, are shown in Figure 3-16. The coastal flood hazard area (100-year flood) is shown in Figure 3-20, and shellfish area class is shown in Figure 3-22. The Norwalk River at the site of Walk Bridge is designated a coastal water, and Norwalk Harbor is designated as an estuarine embayment.

The following coastal resources are not located within the immediate project area: beaches and dunes, bluffs and escarpments, islands, rocky shorefront, and nearshore/offshore waters, and shorelands. Per the 1979 CT Coastal Resources Map, modified bluffs and escarpments are located south of the project area in South Norwalk; and islands, beaches and dunes, and nearshore waters are located within Norwalk Harbor as it flows into Long Island Sound. Impacts to these coastal resources are not anticipated, due to their distances from Walk Bridge and the minimization measures and BMPs that will be implemented into waterway construction activities.

[121] Connecticut towns within the coastal area include: Greenwich, Stamford, Dairen, Norwalk, Westport, Fairfield, Bridgeport, Stratford, Shelton, Milford, Orange, West Haven, New Haven, Hamden, North Haven, East Haven, Branford, Guilford, Madison, Clinton, Westbrook, Deep River, Chester, Essex, Old Saybrook, Lyme, Old Lyme, East Lyme, Waterford, New London, Montville, Norwich, Preston, Ledyard, Groton, and Stonington.
[122] CTDEEP, Coastal Area Management Program, Coastal Resources, 1979, U.S. Geological Survey, Norfolk South Quadrangle.
[123] The configuration of the Coastal Boundary shown on Figure 3-24 has been modified slightly by CTDEEP OLISP. Per CTDEEP, "the coastal boundary is a hybrid of the original 1:24,000 version maps prepared by CTDEEP consistent with CGS Section 22a-94(d) (Coastal Area) and the revised boundary mapping undertaken by twenty-two coastal towns prepared pursuant to CGS Section 22a-94(f). This layer therefore does not replace the legal maps and may not be used for legal determinations."

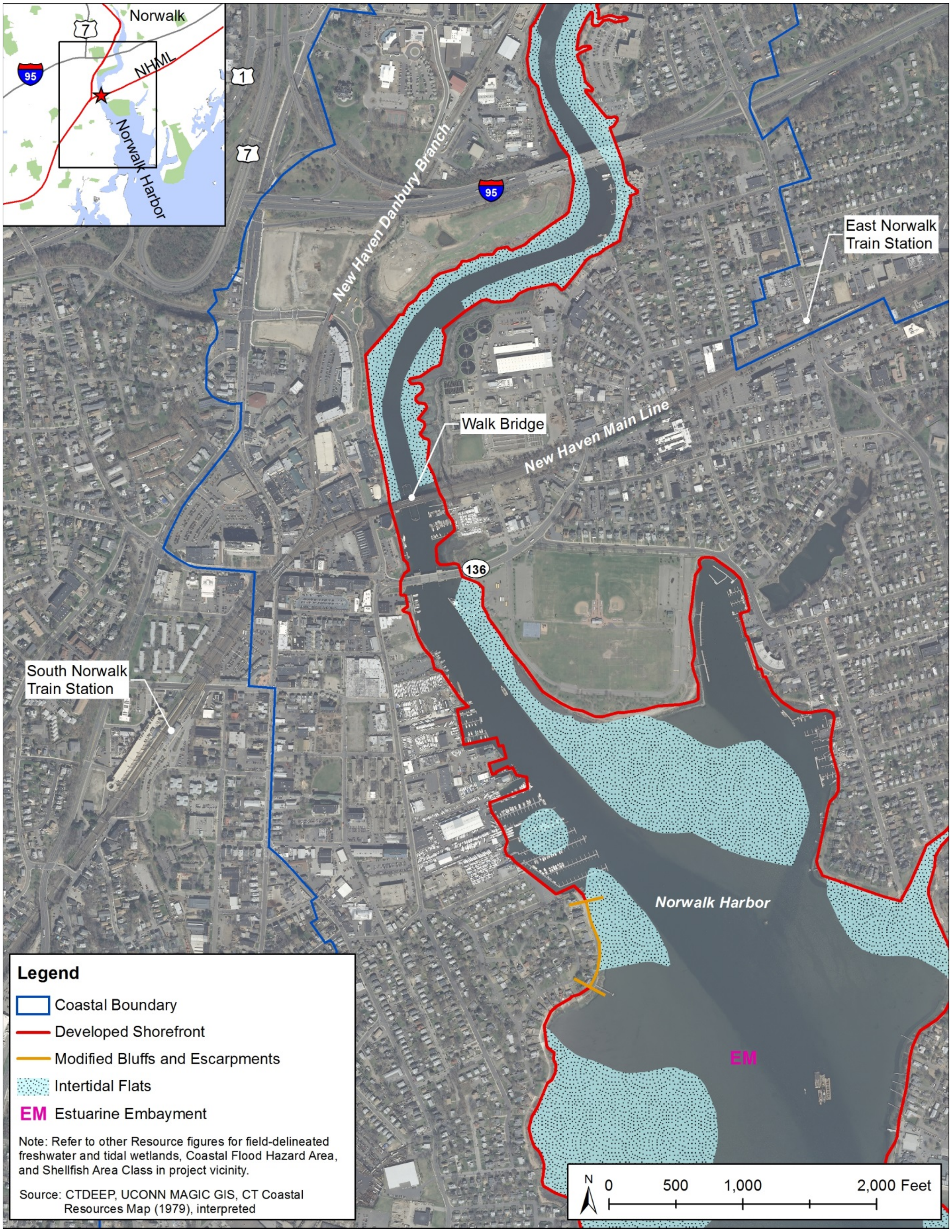

Figure 3-24—Coastal Boundary in the Vicinity of Walk Bridge

3.16.3. Preliminary Consistency Determination

No Build Alternative

Routine bridge maintenance activities in the No Build Alternative would potentially impact coastal land and water resources on a temporary basis. Protective measures would be used to minimize impacts and mitigation would be required for unavoidable impacts, in accordance with environmental permits.

The No Build Alternative would not incorporate measures to improve the resiliency of Walk Bridge. Further, in the No Build Alternative, a top of the pivot pier and the mechanical equipment in its vicinity would be lower than the design elevation requirement of 15 feet (NAVD88), as determined by EO 13690, and would be impacted by inundation levels of all categories of hurricanes.[124] As a result, the No Build Alternative would not be fully consistent with the Coastal Hazard Area policy to "manage coastal hazard areas so as to insure that development proceeds in such a manner that hazards to life and property are minimized."[125]

The No Build Alternative would not improve the reliability of Walk Bridge. Due to the age of the existing structure, it is anticipated that bridge failures would continue and the frequency of failures would increase. Over time, the condition of the existing bridge could adversely affect the viability of recreational and commercial water-dependent uses along the Norwalk River, particularly uses north of the bridge. Adverse impacts to these uses would be inconsistent with the Developed Shorefront policy of promoting the use of the existing developed shorefront areas for marine-related and other water-dependent uses. Section 3.17 further addresses the potential impact of the Build Alternative upon water-dependent uses and facilities.

The No Build Alternative would be inconsistent with Legislative policies relative to improving transportation facilities, maintaining marine-related uses, enhancing the federal navigational channel.

Build Alternative

This section presents a preliminary assessment of the Build Alternative relative to CCMA goals and policies for federal and state agencies, and CCMA policies on coastal resources, coastal uses, and potentially adverse impacts upon coastal resources. This assessment is applicable regardless of the selected option of the Build Alternative.

During final design, CTDOT will request formal Coastal Consistency Review as part of its application for a Structures, Dredge and Fill, and Tidal Wetlands Permit from CTDEEP. The project's consistency with water-dependent uses and assessment of potential adverse impacts to water-dependent uses and opportunities are addressed in Section 3.17 and Section 5.3.12.

CTDOT is designing the project to avoid and/or minimize adverse impacts to coastal resources, and to provide mitigation where resource impacts cannot be avoided. CTDOT is developing mitigation measures in coordination with CTDEEP and the USACE. Mitigation measures will be refined as project design advances. Minimization and mitigation measures will be incorporated into federal and state permits obtained prior to construction start.

[124] Refer to Section 4.2 for additional information.
[125] CGS Section 22a-92a-92(b)(2)(F)

Coastal Resource Policies

Coastal resource policies focus on protecting and preserving the quality of the resources, insuring that development minimizes disturbances and maintains existing functions and values. Table 3-10 presents a preliminary consistency assessment of the Build Alternative relative to coastal land and water resources located in the project vicinity.

Coastal Uses

Coastal use policies focus on insuring that development of the land and water resources of the coastal area is consistent with the capability of the resources to support development, preservation, or use without significantly disrupting the natural environment or economic growth. Table 3-11 identifies State statutorily-defined coastal uses and assesses whether coastal uses applicable to the Build Alternative could be impacted by project construction and operation.

Policies on Potential Adverse Impacts on Coastal Resources

Table 3-12 lists State statutorily-defined potential adverse impacts on coastal resources and assesses whether the adverse impact could be applicable to the Build Alternative. It presents a preliminary assessment of potentially adverse impacts on coastal resources. Section 3.17 provides an assessment of the potential of the project to adversely impact water-dependent uses and opportunities.

Summary

The Build Alternative will result in unavoidable impacts to tidal wetlands, intertidal and subtidal habitat, coastal access, water-dependent uses, and historic resources. There would be minor differences in the amount of impacts to tidal wetlands and habitat among the three Build options.

In coordination with CTDEEP, the City of Norwalk, and stakeholders, CTDOT is developing mitigation strategies to compensate for these impacts. Section 3.10 describes considerations for mitigation for tidal wetland impacts; Section 3.17 describes consideration for mitigation for impacts to water-dependent uses and coastal access; and Section 3.22 describes proposed mitigation for impacts to cultural resources. Chapter 5 presents mitigation strategies for compensating for permanent and temporary impacts during the construction period. CTDOT will continue to refine resource mitigation strategies in coordination with the City and regulatory agencies. CTDOT will continue to work with CTSHPO, the City, and historic stakeholders to develop mitigation measures to address adverse impacts to historic resources, including impacts to visual resources.

The Build Alternative will enhance coastal resources and coastal uses. The improved vertical and horizontal clearances of the replacement bridge will improve conditions in the Norwalk River for commercial and recreational boaters, as well as enhance the federal navigation channel and Norwalk Harbor. The resiliency of the replacement bridge will be a substantial improvement from existing conditions, as the elevations of key bridge structures will substantially improve the bridge's resistance to coastal flooding and severe weather events. The project will enhance coastal recreation and coastal access by providing opportunities to link to the Norwalk Harbor Loop Trail on the east side of the Norwalk River.

By incorporating the proposed mitigation for unavoidable impacts and refining the design to minimize impacts, the Build Alternative, inclusive of the three Build options, is consistent with CCMA's policies for the protection of coastal resources and policies on development of those resources.

Table 3-10–Preliminary Consistency Assessment: Coastal Resources

Coastal Resource	Demonstration of Consistency
General Coastal	The project will be constructed in accordance with policies established to protect wetlands, watercourses, and water resources; and insure water pollution control and flood control.
Coastal Hazard Area	The project will minimize the potential for infrastructure damage due to severe flooding. The replacement bridge will be located above the required elevation for critical actions (mechanical systems), per EO 13690, and will provide sufficient freeboard. Elevations of key bridge elements in both Build Alternative options would substantially improve the bridge's resistance to severe weather events.
Coastal Waters, Estuarine Embayments	The project will not alter current circulation patterns. In-water work will minimize impacts to coastal waters. Prior to demolition of the existing bridge, debris shields will be installed on the bridge to prevent debris from falling into the river. Per CTDEEP OLISP, unconfined dredging is limited to the allowable work window between October 1 and May 31st; additional seasonal limitations could apply pending CTDEEP OLISP, NMFS, and USACE review. In-water work scheduled to occur outside of the work window will be conducted using cofferdams, turbidity curtains, sheeting, geotextile encapsulation or other enclosures.
Developed Shorefront	The project will promote the use of the developed shorefront for marine-related uses, through the bridge's increased reliability and the improved navigation channel. Project construction will be staged to minimize disruption to existing marine-related uses. CTDOT and CTDEEP will investigate opportunities with the City of Norwalk to mitigate construction-related impacts to water-dependent uses by providing substitute locations for public access to the waterfront. Section 3.17 provides additional information.
Freshwater Wetlands & Watercourses	The project will cause minimal impacts to the freshwater wetlands. One small wetland will be affected by the Build Alternative (both options). Mitigation for the wetland impacts will be determined in coordination with CTDEEP and USACE prior to the submission of permit applications. Compensatory mitigation includes restoration or replacement in-kind; out-of-kind wetland creation; invasive species removal; or any combination of these, as determined by in coordination with CTDEEP.
Intertidal Flats	The project will permanently impact intertidal flats, and permanently and temporarily impact subtidal habitat and intertidal habitat. The project will offset permanent subtidal habitat losses through the removal of the existing Walk Bridge piers; since the footprint of the Build Alternative (both options) will be smaller than the area of existing piers, a gain of subtidal habitat is anticipated. The project design will minimize intertidal flat impacts, and maintain existing functions, including natural flows, depth, slope, sedimentation and nutrient storage functions in intertidal flats. Compensation for intertidal habitat that cannot be mitigated through removal of existing bridge piers will be evaluated for out-of-kind methods such as invasive species removal in tidal wetlands.
Shellfish Concentration Areas	The project will protect shellfish concentration areas by containing excavation for piers within drilled shafts to minimize turbidity and by limiting open-water dredging to CTDEEP and NMFS allowable work windows. Prior to demolition, debris shields will be installed on the bridge to prevent debris from falling into the river. Additional measures may include the separation and removal of sediment-laden water, from pier and foundation work and implementation of project BMPs.
Tidal Wetlands	The Build Alternative will permanently and temporarily impact vegetated tidal wetlands. The Vertical Lift Bridge would have less adverse effects to tidal wetland than would the Bascule Bridge due to the location of the piers. The project will restore degraded, invasive species-dominated saltmarsh at locations along the Norwalk River to mitigate for permanent impacts to tidal wetlands. CTDOT will coordinate with CTDEEP and USACE to develop an acceptable mitigation approach prior to the submission of permit applications.

Table 3-11–Preliminary Consistency Assessment: Coastal Uses

Coastal Use/Activities	Demonstration of Consistency
General Development	CTDOT will coordinate with the City of Norwalk, USCG, USACE, and CTDEEP to minimize disruptions to marine users and to minimize adverse impacts to coastal resources, while also maintaining rail service in coordination with Metro-North and Amtrak. CTDOT will obtain federal and state permits prior to construction start. Permit conditions will include mitigation to minimize impacts to coastal resources.
Boating	The project will improve conditions for boating uses by raising the vertical clearance of the replacement bridge, thereby limiting the number of bridge openings required for boaters; and by widening the horizontal clearance, thereby improving navigability in this portion of the Norwalk River and overall conditions for large and small vessel users. The construction of the Build Alternative will impact rowers and boaters due to necessary horizontal and vertical restrictions and channel closures. CTDOT will coordinate channel closures with the City of Norwalk, USCG, USACE, and waterway users to the maximum extent possible. In cooperation with USCG, USACE, the City of Norwalk, and the Norwalk Harbor Management Commission, CTDOT will continue to work with commercial and recreational marine users, including rowing groups and ferry and vessel operators, to develop mitigation strategies to address impacts to marine users during the project construction period.
Coastal Recreation & Access	The project will enhance coastal recreation and access by providing bicycle and pedestrian connections to extend the Norwalk Harbor Loop Trail on the east side of the Norwalk River. CTDOT is coordinating with the City of Norwalk and stakeholders to identify locations to provide substitute sites for public access to the Norwalk River.
Coastal Structures & Filling	The project will not significantly change circulation or sedimentation patterns in the Norwalk River. Hydraulic studies indicate the proposed water surface elevations and floodplain storage volumes will not increase from existing conditions. Dredging will be conducted within CTDEEP- and NMFS-allowable work windows to minimize impacts to aquatic resources, and as directed by federal and state regulatory authorities through the project permits. Following the completion of construction, the gravel and stone contractor work area on the west bank of the Norwalk River will be removed landward to the CTDEEP-regulated CJL. CTDOT will develop mitigation plans to compensate for impacts in coordination with CTDEEP, USCG, and USACE.
Cultural Resources	The project will adversely impact historic resources, including the demolition and replacement of historic Walk Bridge and historic Fort Point Street Bridge. CTDOT is working with CTSHPO, the City of Norwalk, and historic stakeholders to develop mitigation measures to address adverse impacts to historic resources. A Memorandum of Agreement will be developed to address impacts to above- and below-ground historic resources.
Dredging & Navigation	The project will require dredging to align the new bridge horizontal clearance with the existing navigation channel. Approximately 4,100 cy of dredging will be required in Option 4S and Option 8A, and approximately 4,900 cy of dredging will be required in Option 11C. The project's wider horizontal clearance will improve the channel alignment between the Stroffolino and Walk Bridges, thereby enhancing the federal navigation channel. To protect aquatic resources, dredging will be restricted to CTDEEP- and NMFS-authorized work windows, and in accordance with federal and state permits. The majority of sediment excavation, including excavation for new piers, fenders, and contractor trestles and bulkhead, will be contained within drilled shafts to minimize turbidity and adverse impacts to habitat. All sediment removed from the waterway will be managed at a construction area prior to off-site disposal.
Energy Facilities	The project will require the removal of the two existing high towers on either side of existing Walk Bridge which carry Eversource Energy high voltage power over the Norwalk River. Eversource Energy will be responsible for relocating its lines and the associated environmental evaluations and permits. CTDOT is coordinating with Eversource to determine the best options for replacing the utility functions from engineering, cost, environmental, and historical

Coastal Use/Activities	Demonstration of Consistency
	perspectives. The Eversource power relocation will undergo a separate environmental evaluation and permitting process, which will include opportunities for public review and comment.
Flooding & Erosion	The project's critical actions (mechanical system) will be located in compliance with EO 13690. Elevations of key bridge elements will be raised to substantially improve the bridge's resistance to coastal flooding and severe weather events. The removal of the existing bridge and replacement with a new bridge will not increase flooding and will create benefits: the new hydraulic opening will lessen hydraulic constraints and reduce upstream flooding; the wider navigation channel will improve channel hydraulics; and the removal of the existing granite pivot pier and rest piers will add flood storage volume. These benefits would accrue in all three Build Alternative options.
Fuels, Chemicals, & Hazardous Materials	The project will require removal of river sediments through excavation and dredging. Removed sediment will be managed at a construction staging site prior to off-site disposal in accordance with permits. Sediment requiring management from confined and unconfined excavation and dredging total approximately 15,100 cy for the Bascule Bridge option and approximately 16,700 cy of sediment for the two Vertical Lift Bridge options. CTDOT is conducting sediment testing and will investigate disposal options, including upland, off shore, or in-water (confined aquatic disposal [CAD]) methods. CTDOT will conduct removal activities via a clamshell bucket system to minimize the potential for recontamination of the water body. CTDOT will conduct due diligence on acquisition parcels prior to developing the parcels as construction laydown/staging areas. Any storage fuels, chemicals and/or hazardous materials will be located within contained, secure facilities at elevations above the 500-year floodplain.
Facilities & Resources which are in the National Interest	Walk Bridge meets the definition of a facility which is in the national interest: it is a critical piece of infrastructure on the NHL and within the NEC. The project is located within resources which are in the national interest, including tidal wetlands, shellfish areas, and the federally maintained navigation channel.
Intergovernmental Coordination	CTDOT will coordinate the design and construction of the project with USCG, USACE, CTDEEP, and other agencies, as well as Metro-North and Amtrak, to minimize disruption to rail and marine transportation and maximize protection of coastal resources, including mitigating for resource impacts which cannot be avoided. CTDOT will coordinate with CTDEEP, City of Norwalk, and stakeholders to provide mitigation of impacts to environmental resources, including tidal wetlands and water-dependent uses.
Open Space & Agricultural Lands	The project will include provisions for a north-south pedestrian and bicycle connection with the Norwalk Harbor Loop Trail along the eastern shore of the Norwalk River. CTDOT will continue dialogues with the City of Norwalk and stakeholders regarding pedestrian/bicycle connections on the west side of the river in the vicinity of the bridge.
Ports & Harbors	The project will improve Norwalk Harbor by widening and improving the navigation channel, improving the reliability of the bridge, and improving the viability of key infrastructure within the harbor. In the long term, the project will enhance future economic development opportunities in the Harbor. In coordination with CTDEEP, the City of Norwalk, and stakeholders, CTDOT will explore opportunities to compensate for construction period impacts to water-dependent uses.
Solid Waste	The project will generate solid waste through the demolition of the existing bridges, and replacement of railroad ties, soils and ballast. Additionally, following testing of removed sediment, some of the material may be classified as solid waste. CTDOT will manage the disposal of construction waste and hazardous waste in accordance with CTDEEP's Construction and Demolition Materials Management protocol and federal and state regulations.
Transportation	Through an alternatives analysis, CTDOT determined that rehabilitation is not a viable option to meet the project purpose and need. The replacement project will improve the rail corridor. The project is being designed to minimize adverse impacts on coastal resources; unavoidable impacts will be mitigated. The project will enhance coastal access and recreation by providing opportunities for bicycle connections along the Norwalk River. The project will enhance the

Coastal Use/Activities	Demonstration of Consistency
	navigation channel and will not produce tidal and circulation restrictions.
Water-dependent Uses	In coordination with the City of Norwalk, CTDEEP, and local stakeholders, CTDOT is evaluating ways to mitigate construction-related impacts to water-dependent uses. Section 3.17 further assesses water-dependent uses and facilities.

Table 3-12–Preliminary Consistency Assessment: Potential Adverse Impacts on Coastal Resources

Coastal Resource	Preliminary Assessment
Characteristics and Functions of Resources	The project is not expected to degrade beaches and dunes, rocky shorefronts, or bluffs and escarpments, all of which are distant from the project site. The project will mitigate impacts to tidal wetlands through the restoration degraded saltmarsh along the Norwalk River, including restoration of their functions and values. In coordination with CTDEEP and USACE, CTDOT will develop a mitigation approach for compensating for impacts prior to the submission of permit applications.
Coastal Flooding	The project will not alter the existing shoreline configuration; the replacement bridge will be located in approximately the same location as the existing structure. All options of the Build Alternative would improve the bridge's resiliency to coastal flooding by locating the key bridge structures at elevations to withstand significant weather events. Construction of new permanent project elements within the coastal floodplain would result in approximately 15,000 sf of impact in the Bascule Bridge and approximately 19,500 sf of impact in the Vertical Lift Bridge (both options). Relative to the overall coastal floodplain, this loss would be negligible. The removal of the existing bridge and replacement with a new bridge will not increase coastal flooding and will create benefits: the new hydraulic opening will lessen hydraulic constraints and reduce upstream flooding; the wider navigation channel will improve channel hydraulics; and the removal of the existing granite pivot pier and rest piers will add flood storage volume. The benefits would accrue in all three options of the Build Alternative.
Coastal Waters Circulation Patterns	The project will not alter the characteristics of the Norwalk River/Harbor at the location of the bride, including existing circulation patterns.
Drainage Patterns	The project will not alter existing drainage patterns.
Patterns of Shoreline Erosion & Accretion	The project will not alter natural erosion and accretion patterns.
Visual Quality	The project will impact tidal wetlands adjacent to the bridge, impacting natural features at the bridge site. The project will restore degraded, invasive species-dominated saltmarsh at locations along the Norwalk River outside the immediate project vicinity. The restored saltmarsh areas will substantially improve views of these locations along the riverbank.
Water Quality	The project is not expected to degrade water quality through significant introduction of hazardous materials or alteration of temperature, pH, dissolved oxygen or salinity. CTDOT will evaluate sediments at the project site. CTDOT will implement water quality protection measures during in-water work activity, in coordination with federal and state regulatory authorities and as required by federal and state permits.
Wildlife, Finfish, Shellfish Habitat	The project will permanently and temporarily impact subtidal habitat and intertidal habitat. The project will offset permanent losses through the removal of the existing Walk Bridge piers; since the footprint of the Build Alternative (all three options) will be smaller than the area of existing piers, a gain of subtidal habitat is anticipated. The project design will maintain existing functions of the habitat areas, and will not alter the characteristics of aquatic species or habitat components. CTDOT will use mitigation measures to minimize potential impacts to wildlife, finfish, and shellfish habitat, including restricting in-water work to CTDEEP-and NMFS-allowable work windows.

3.17. Water-Dependent Uses

3.17.1. Introduction, Background and Methodology

This section discusses water-dependent uses, coastal access areas, and public trust lands in the vicinity of Walk Bridge along the Norwalk River. It identifies potential impacts of the Build Alternative on those uses and areas, and mitigation strategies to offset unavoidable impacts. It also provides a preliminary consistency assessment of the project relative to the Connecticut Coastal Management Act's (CCMA's) policies on water-dependent uses.

CCMA defines water-dependent uses as "those uses and facilities which require direct access to, or location in, marine or tidal waters and which therefore cannot be located inland" [CGS Section 22a-93(16)]. Examples of water-dependent uses include marinas, recreational and commercial fishing and boating facilities, finfish and shellfish processing plants, waterfront dock and port facilities, shipyards and boat building facilities, water-based recreational uses, navigation aids, basins and channels, industrial uses dependent upon water-borne transportation, and uses which provide general public access to marine or tidal waters.

The Connecticut Public Trust Doctrine defines public trust lands as the submerged lands and waters located waterward of the coastal mean high water line; public trust lands include open water, rocky shore, and public beach.[126]

The City of Norwalk regulates the development of land, including the provision of public access to the waterfront, within the coastal zone through its Building Zone Regulations (as amended, January 29, 2016).

Coastal access and public trust lands in Norwalk have been identified through CTDEEP's Connecticut Coastal Access Guide, a website listing of coastal access sites in Connecticut.[127] Information on marine-based uses in the city was provided by the Norwalk Harbor Management Commission.[128]

3.17.2. Existing Conditions

Figure 3-25 identifies the water-dependent uses and waterfront facilities located in the vicinity of Walk Bridge and north of Walk Bridge to the head of the navigation channel, as provided by the Norwalk Harbor Management Commission.

CTDEEP's Coastal Access Guide identifies 32 public trust lands in the city of Norwalk, many of which are located along the Norwalk River in proximity to Walk Bridge. Upriver from Walk Bridge, public trust lands include locations at St. Ann's Club, Norwalk Rowing Club Association, and Oyster Shell at Heritage Park. Downriver from Walk Bridge, public trust lands include Constitution Park, Veterans Park and public boat slips and moorings, and Calf Pasture Beach, which is located approximately 1.5 miles south of Walk Bridge. Public trust lands also include the Harbor Loop Trail, located on the water's edge of the WWTP property; and riverfront walkways at condominiums and office developments located upriver and downriver from Walk Bridge.[129]

[126] CTDEEP, Connecticut Coastal Access Guide, http://www.lisrc.uconn.edu/coastalaccess/publictrust.asp. Copyright 1998-2013. Accessed 2/18/2016.
[127] http://www.lisrc.uconn.edu/coastalaccess/publictrust.asp.
[128] Anthony Mobilia, Norwalk Harbor Management Commission, "Norwalk Harbor Management Request," Personal Communication, to S.Walker, HNTB, 1/9/2016.
[129] Riverfront walkways located on the properties of condominiums and office developments are not shown in the figure.

Figure 3-25—Water-Dependent and Waterfront Uses in Norwalk Upper Harbor

Water-dependent uses abutting and within immediate proximity to Walk Bridge include the City of Norwalk WWTP, located northeast of the bridge; Coastwise Boatworks, SoNo Wharf Marina, and Maritime Rowing Club, located southeast of the bridge; docking facilities of the Maritime Aquarium at Norwalk and the Norwalk Seaport Association (Sheffield Island Ferry), located southwest of the bridge; and the Maritime Aquarium and Park, located northwest of the bridge. Water-dependent uses upstream of Walk Bridge include King Industries, Norwalk Marine Contractors, United Marine Boat Yard, Devine Brothers, Norwalk Boat Club, O&G Industries, Shore Points Marina, Connecticut Boat Club, and Greylock Marina.

3.17.3. Potential Impacts

No Build Alternative

The No Build Alternative would include routine maintenance and repair of Walk Bridge, which could necessitate periodic full or partial closure of the navigation channel. Impacts to water-dependent uses would be relatively short-term, however. It is not anticipated that routine maintenance activities would require the acquisition of parcels for construction access and staging or materials storage.

Over time, the No Build Alternative could adversely impact existing water-dependent uses. As indicated in Section 3.2, the USCG could continue to implement the ongoing reduced bridge opening schedule in the No Build Alternative. Navigation channel closures or partial closures due to bridge emergency repairs and failures would be expected to continue. Both scenarios would adversely impact some of the water-dependent uses proximate to and upriver from Walk Bridge.

In the No Build Alternative, CTDOT would not provide opportunities for pedestrian and bicycle connections from the WWTP waterfront walkway extending south along the Norwalk River in East Norwalk.

Build Alternative

As indicated in Section 3.6, the Build Alternative will require the acquisition of 11 Goldstein Place (Parcel 31/25), currently occupied by Coastwise Boatworks, for construction staging and waterfront access. Existing water-dependent uses that will be displaced include the marina, dock, and 53 boat slips. Additionally, water-based recreational uses, such as the Maritime Rowing Club's use of the dock as a scull launching facility, will be displaced. Impacts to water-dependent uses would be the same in all three Build Alternative options.

CTDOT will purchase the site and use it for a construction staging and laydown area through the duration of project construction. Following the completion of construction, CTDOT intends to sell the acquisition parcels. The future land use could change from existing conditions. While CTDOT will encourage the reversion of the parcel to a marina or similar use, current state statutes do not mandate the use and development of the parcel upon resale. Additionally, land use development is contingent upon multiple factors, including real estate market conditions.

Based on current zoning and CCMA policies, it is likely that upon resale, 11 Goldstein Place will revert to water-dependent uses. The parcel currently is zoned for uses in the Industrial Zone No. 1 district (Article 70 of the City of Norwalk Building Zone Regulations), which allows for water-dependent uses, including marinas, water-based public and private recreational uses, and docks and port facilities. Further, Article 70 specifies that new developments on lots adjacent to the Inner Harbor shall provide public access to the waterfront. Additionally, properties located within the coastal zone boundary are subject to municipal coastal site plan review, wherein developers must demonstrate consistency with CCMA policies, including its policies regarding water-dependent uses.

Section 5.3.12 presents potential impacts to water-dependent uses during the construction period.

3.17.4. Mitigation Measures

The navigation improvements of the Build Alternative will be a benefit for water-dependent uses, particularly for upriver commercial marine users and vessels with restricted maneuverability. This positive impact helps to mitigate the short term effects of constrained marine passage during construction. Additionally, the City zoning and waterfront use and development policies have strong coastal use protections to provide for access to the coast and some water-dependent uses in riverfront parcels in the Inner Harbor.

Some of the upriver water-dependent uses will require Norwalk River access through the project site during construction and upon completion. CTDOT is constrained in the actions it can take to mitigate all impacts, particularly regarding the disposition of the acquired water-dependent use and affected upriver users. CTDOT will continue to work with CTDEEP, the City, the Norwalk Harbor Management Commission, and affected water-dependent uses, including recreational and commercial marine users, to identify solutions and to help develop and facilitate options to meeting user needs. Section 5.3.12 identifies options to address temporary and permanent impacts to marine users and water-dependent uses impacted by the project.

The Build Alternative will facilitate expansion of the coastal access network along the Norwalk River. Although the existing bridge and railroad ROW do not impact existing continuous waterfront pathways or access to areas south of the railroad, CTDOT will accommodate an eastern path connection of the Norwalk Harbor Loop Trail, extending south from the WWTP walkway, as shown in Figure 3-10. Along the west side of the Norwalk River, CTDOT will work with the City of Norwalk to investigate pedestrian and bicycle connections in the vicinity of the replacement bridge. These opportunities for pedestrian and bicycle connections are a reasonable form of waterfront and access mitigation. Further, they facilitate the goals and vision of the Norwalk Master Plan of Conservation and Development, the Norwalk Pedestrian and Bikeway Transportation Plan (2012), the Norwalk Trail Study - Maritime Link (2014), and the Mid-Harbor Planning Study (2005).

3.17.5. Consistency Assessment

Table 3-13 lists State statutorily-defined potential adverse impacts on future water-dependent uses and opportunities and evaluates the Build Alternative relative to these potential impacts. Impacts would be the same in all three Build options. The focus of the preliminary assessment is on the proposed use of 11 Goldstein Place, an existing water-dependent use.

Table 3-13—Preliminary Consistency Assessment: Potential Adverse Impacts on Water-Dependent Uses and Opportunities

Potential Adverse Impact	Preliminary Assessment
Locating a non-water-dependent use at a site physically suited for, or planned for location of a water-dependent use.	To demolish the existing bridge and construct the replacement bridge, CTDOT will require access to the waterfront for construction staging, equipment loading, and material transfer. The project will require the acquisition of a parcel currently zoned for industrial uses and occupied by water-dependent uses. It is estimated that the parcel will be used for project construction for approximately three to five years, at which time it will be sold. Based on existing zoning and state coastal policies, it is likely that the parcel, or a portion thereof, will return to water-dependent uses.
Replacing an existing water-dependent use with a non-water-dependent use.	The project will replace a commercial marina and community rowing facility, a water-dependent use, with another water-dependent use: access to the waterfront for demolition of the existing bridge and construction of the replacement bridge. At the completion of the project, CTDOT will sell the parcel. Per the Norwalk Building Zone Regulations, provisions for public access to the waterfront are required for new development on lots adjacent to the water.
Siting a non-water-dependent use which would substantially reduce or inhibit existing public access to marine or tidal waters.	Use of 11 Goldstein Place for the project constitutes a water-dependent use, as CTDOT requires access to the waterfront for demolition and construction activities. During the construction period, public access to the waterfront via 11 Goldstein Place, an active construction site, will be necessarily restricted as a public safety issue. CTDOT will require the contractor to comply with the safety provisions of its Bureau of Engineering and Construction, including developing a public control plan to protect the public during construction, including establishing a continuous separation between the construction zone and public areas. Restricted public access to 11 Goldstein Place is anticipated for the duration of the project construction.

3.18. Parklands, Public Recreation, and Community Facilities

3.18.1. Introduction, Regulatory Background, Methodology

This section describes existing parklands, public recreation areas, and community facilities in the project areas and assesses the impacts to these resources from the Walk Bridge Replacement Project. Community facilities are defined as facilities that provide services to the public and gathering places and cultural centers, such as museums and arenas. Private recreation, public marina uses, and public trust lands are addressed in Section 3.17. Public parking facilities are addressed in Section 3.3.

Federal protection of publicly owned and accessible parklands and recreation areas is provided under Section 4(f) of the U.S. Department of Transportation Act, for federally funded transportation projects, and under Section 6(f) of the U.S. Land and Water Conservation Fund (LWCF) Act, for LWCF-funded parks. Chapter 9 contains the Section 4(f) Evaluation for the Walk Bridge Replacement Project. Section 6(f) protection requires approvals under LWCF for conversion of grant-assisted properties to uses other than public outdoor recreation.

In 1987, Connecticut enacted legislation to establish a state heritage park system.[130] State heritage parks were to be established as urban cultural parks "without boundaries" (unlike conventional state parks) that integrate historical sites and attractions with estuaries and other natural resources. The Heritage Park

[130] Connecticut State Legislature, Public Act 87-340, *An Act Creating a Statewide Heritage Park System*, 1987, codified at CGS Sections 23-10h and 23-10i.

concept envisions a nontraditional form of state park, expanding on traditional park elements to coordinate the historical and cultural sites in a city or region in a cohesive way (such as through visitor services, educational programming, marketing, signage, and other infrastructure), to create a more comprehensive picture of the historic significance and cultural assets linked by a common social, historical, or economic theme. Recent legislation enacted in 2014 streamlines the establishment of the State Heritage Parks statewide.[131]

Public parklands, recreation areas, and community facilities in the vicinity of Walk Bridge were identified through a variety of resources including: CTDEEP GIS data clearinghouse,[132] the City of Norwalk GIS website,[133] and the NRVT website.[134]

Publicly owned and accessible parks and recreation areas were identified in consultation with CTDOT and Norwalk City officials, including staff from the Recreation and Parks, Planning and Zoning, Economic Development, Redevelopment Agency, and Public Works Departments to review locations of City-owned and controlled parks and publicly accessible recreation areas and trails.

3.18.2. Existing Conditions

Parklands and Public Recreation Areas

Figure 3-26 and Table 3-14 present parklands, publicly accessible trails, and recreation areas around Walk Bridge. Table 3-14 lists the parklands and recreation facilities subject to protection under Section 4(f) and Section 6(f).

The City-owned Norwalk Heritage Park was created as part of the original State Heritage Park grant. It includes the NRVT where it extends along the west side of the Norwalk River north of the Maritime Aquarium property. The Norwalk Heritage Park was created as a waterfront development project incorporating the city's maritime history and the city's aquarium and museums. The park was envisioned to include an amphitheater, boardwalk, fishing piers, boat docks, artwork, and children's playgrounds that will draw visitors to the area's attractions. North of the Maritime Aquarium and employee parking lot, it includes a pavilion, a pier that can be used by visitors for fishing on the water,[135] and educational signage (Figure 3-27). Further to the north, the NRVT has been dedicated as the Spc. Wilfredo Perez Trail in honor of a local serviceman and includes a memorial plaque where it extends north along North Water Street, across from the Maritime Yards development. Approximately 1,500 feet upstream from Walk Bridge, the park includes a playground (Figure 3-28) and Oyster Shell Park, part of the original Heritage Park grant, a waterfront park that includes a central plaza and a series of trails that connect with the NRVT.

The NRVT project aims to build 38 miles of multi-purpose trail connecting Calf Pasture Beach in Norwalk to Rogers Park in Danbury for walkers, hikers, cyclists, and, in some cases, equestrians. The NRVT system currently exists on both sides of the Norwalk River in the vicinity of Walk Bridge. The City's Harbor Loop Trail, a publicly-accessible path and part of the NRVT system, continues north along the opposite river bank where it extends through the WWTP property north of the bridge. This trail

[131] Connecticut State Legislature, Public Act No. 14-43, *An Act Concerning the Heritage Parks Advisory Boards*, 2014.
[132] Connecticut DEEP GIS Data, Open Space, DEEP Property and Parcels, http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707. Accessed July 27, 2015.
[133] City of Norwalk GIS, Open Space, http://host.cdmsmithgis.com/norwalkct/. Accessed July 27, 2015.
[134] Norwalk River Valley Trail, "Trail Maps-Norwalk: Norwalk Sections South of Deering Pond-Existing and Planned," http://www.nrvt-trail.com/trail-maps-norwalk.aspx. Accessed July 27, 2015.
[135] CT DEEP's Connecticut Coastal Access Guide refers to the park as "Maritime Aquarium Park" or "Maritime Aquarium Pavilion."

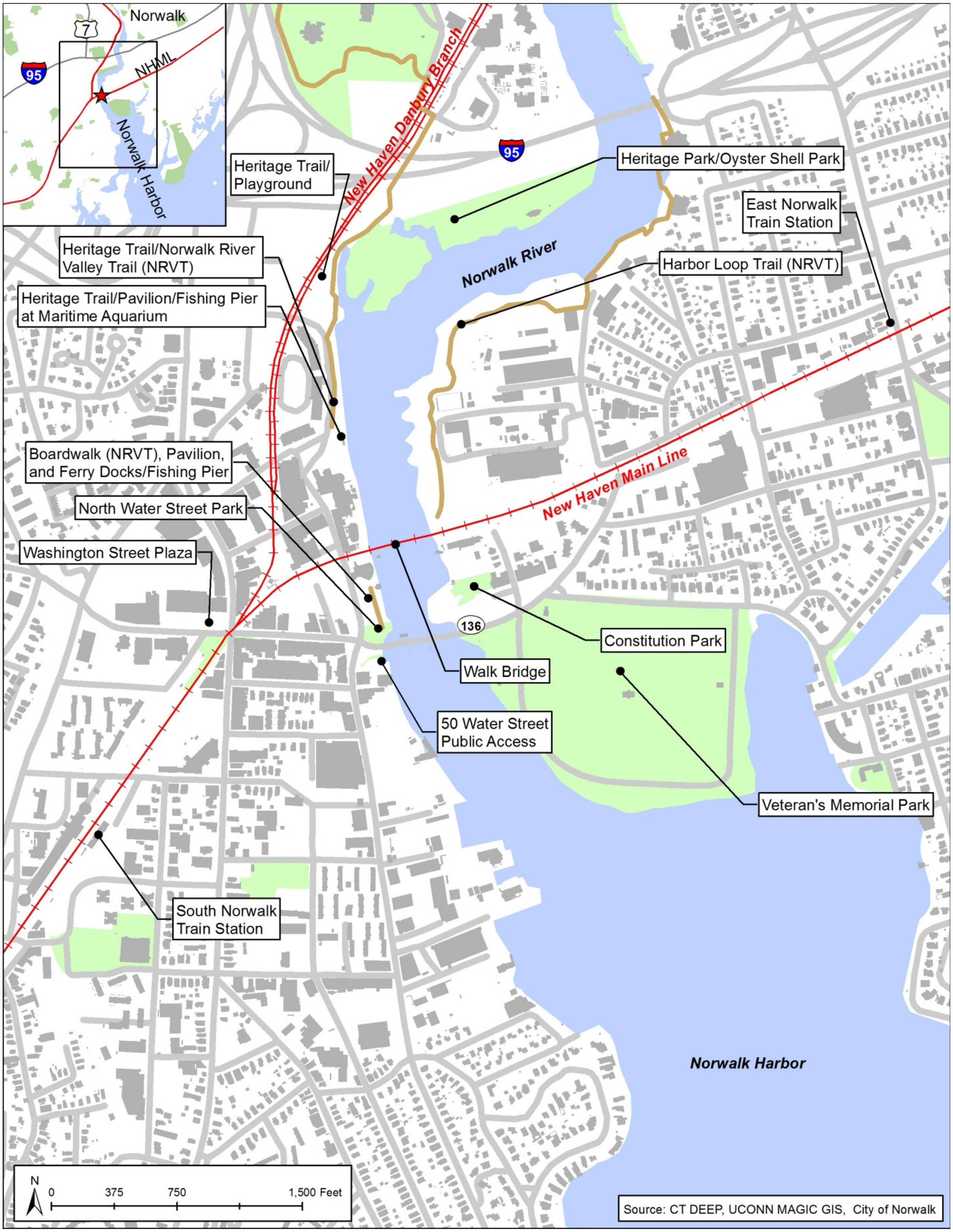

Figure 3-26—Parklands and Public Recreation Areas in the Vicinity of Walk Bridge

segment[136] runs north along the eastern bank of the river from Walk Bridge north beyond the I-95 Bridge over the Norwalk River. Walk Bridge and the Maritime Aquarium/IMAX Theater occupy the area of the missing link in this continuous NRVT/Harbor Loop Trail system.

South of the IMAX Theater, the City's publicly accessible recreational areas includes North Water Street Park, a field on the river's edge 400 feet south of the bridge adjacent to the Stroffolino Bridge. The City-owned areas south of the IMAX Theatre include the ferry landings used by the aquarium and the Sheffield Island Cruises. Directly adjacent to the IMAX Theater, a ferry dock within the property leased by the Maritime Aquarium berths aquarium cruises. Another dock adjacent to the aquarium dock serves the Norwalk Seaport Association's Sheffield Island Ferry. Between the public parking lot on North Water Street and the ferry docks are a recently constructed pavilion, fishing pier, and boardwalk/walkway that are part of the NRVT, which connects across the Stroffolino Bridge to the Harbor Loop Trail to the north and trails within Veterans Park to the south (Figure 3-29, Figure 3-30, and Figure 3-31).

Table 3-14—Parklands and Public Recreation Areas in the Vicinity of Walk Bridge

Parkland and Public Recreation Areas	Federal Protections	
	Potential Section 4(f)	Section 6(f)
Heritage Trail/Pavilion and Fishing Pier at Maritime Aquarium	Yes	No
Heritage Trail/Norwalk River Valley Trail	Yes	No
Heritage Trail/Playground	Yes	No
Heritage Trail/Oyster Shell Park	Yes	Yes
Norwalk River Valley Trail/Harbor Loop Trail	Yes	No
Ferry docks for Maritime Aquarium/Norwalk Seaport Association Sheffield Island Cruises	No	No
North Water Street Park	Yes	No
50 Water Street Public Access	No	No
Washington Street Plaza	Yes	Yes
Constitution Park	Yes	No
Veteran's Memorial Park	Yes	No

[136] CT DEEP's Connecticut Coastal Access Guide refers to the trail here as known as the WWTP Waterfront Walkway.

Figure 3-27—View of Heritage Trail/Spc. Wilfredo Perez Trail/Memorial and pavilion/fishing pier north of Maritime Aquarium, looking east

Figure 3-28—View of Heritage Trail/Playground, looking east

Figure 3-29—View of boardwalk/pavilion adjoining IMAX Theater, ferry docks, and North Water Street Park, looking south

Figure 3-30—View of ferry docks and IMAX Theater, looking northeast

Figure 3-31—View of ferry docks and North Water Street Park, looking southeast

On the southwestern side of the Stroffolino Bridge is the 50 Water Street Public Access (also referred to as SoNo Harbor Associates' Waterfront Overlook). This privately owned public access waterfront[137] walkway allows visitors to walk, fish, and view the west side of the Norwalk Harbor.

Oyster Shell Park and Washington Street Plaza received LWCF grants and are also protected under Section 6(f) of the LWCF.

Approximately 1,000 feet west of Walk Bridge, the Washington Street Plaza adjoins the rail corridor where it extends over the Washington Street and South Main Street intersection. The Washington Street Plaza, a hardscaped area with rows of trees on the north side of Washington Street, occupies the area between the street and the building at 50 Washington Street. Approximately 450 feet south of Walk Bridge, Constitution Park, a small municipal park, occupies the eastern bank of the river northeast of the Stroffolino Bridge. Veterans Memorial Park occupies the southeast river bank, on the southeast side of the Stroffolino Bridge, approximately 900 feet downstream of Walk Bridge. Veteran's Memorial Park includes a public marina, boat launch site, a playground, ball fields, and a multi-use path overlooking Norwalk Harbor.

Community Facilities

Figure 3-32 and Table 3-15 present community facilities in the vicinity of Walk Bridge.

Walk Bridge crosses through the campus of the Maritime Aquarium, a non-profit organization that leases land from the city, along the western bank of the Norwalk River. The aquarium's main entrance and facilities are located adjacent to the northwest quadrant of the bridge, and an enclosed walkway located under the bridge connects the aquarium with the IMAX Theater. There are also emergency egress stairwells exiting from the southern end of the aquarium building and the IMAX Theater in close proximity to the bridge.

[137] Public access was granted by the developer as part of the permitting process. According to the Norwalk Recreation and Parks Department, the City of Norwalk owns an easement for the boardwalk alongside the dock areas.

Figure 3-32—Community Facilities in the Vicinity of Walk Bridge

Table 3-15—Community Facilities in the Vicinity of Walk Bridge

Community Facilities
Maritime Aquarium at Norwalk/IMAX Theater
SoNo Switch Tower Museum
Norwalk Post Office
South Norwalk Branch Library
Norwalk Police Department
Norwalk Police Department Marine Division
Side by Side Charter School
Columbus-Magnet School
Norwalk WPCA Wastewater Treatment Plant
Maritime Rowing Club
Norwalk Fire Department Station 3
Norwalk Fire Department Marine Division

The Norwalk Water Pollution Control Authority (WPCA) Wastewater Treatment Plant (WWTP) is located approximately 750 feet to the northeast of the Walk Bridge. The bridge and the treatment plant are separated by a vacant lot.

The SoNo Switch Tower Museum, a tourist attraction owned by the state, adjoins the railroad bridge at the Washington Street and South Main Street intersection. The museum is open to the public free of charge and displays information on the railroad's switch tower.

The Norwalk United States Post Office branch and South Norwalk Branch Library are located on Washington Street approximately one-quarter-mile west of Walk Bridge. The Norwalk Police Department is located on Monroe Street approximately one-half-mile southwest of Walk Bridge. The Marine Division of the City Police Department is located on the docks in the Norwalk River at 100 Water Street.

The Norwalk Fire Department Station 3 is located on Route 136 approximately one-half-mile east of the Walk Bridge. The Norwalk Fire Department Marine Division is located at City Dock at Veteran's Memorial Park.

The Columbus-Magnet School and the Side by Side Charter School are the nearest educational facilities to Walk Bridge.

3.18.3. Potential Impacts

No Build Alternative

In the No Build Alternative, the missing links in the Norwalk River Valley Trail would remain at the current location of Walk Bridge and the IMAX Theater on both sides of the Norwalk River.

Build Alternative

In the Build Alternative, CTDOT will provide accommodations for a pedestrian and bicycle north-south connection to the Harbor Loop Trail on the east side of the river. The project will help to complete the missing link in the NRVT/Harbor Loop Trail system at Walk Bridge, as described in Section 3.4. In addition, tidal wetland restoration may be located adjacent to or within the boundaries of Oyster Shell Park, as shown in Figure 3-19. Both the NRVT/Harbor Loop Trail and wetlands restoration were envisioned as part of waterfront improvements in the City of Norwalk's Oyster Shell Park Master Plan, [138] so the trail and wetlands restoration are consistent with Section 6(f) requirements for the property to remain as a public outdoor recreation use. Further, any use of Oyster Shell Park for wetland restoration will not be considered a conversion of use from recreation; therefore, there will be no impacts under Section 6(f).

The only direct impacts to public parks and recreation areas might be the result of this trail/wetland mitigation construction. This pedestrian/bicycle trail would either connect to Fort Point Street or Goldstein Place, or would continue south along the river to connect to Constitution Park. The latter option would involve impacts on Constitution Park, but would provide long-term recreational benefits, by connecting greenways along the river. CTDOT has prepared the necessary level of Section 4(f) documentation for the project's use of public parks, recreation areas, and historic resources. Chapter 9 consists of the Section 4(f) Evaluation for the project, which also documents the project's use of historic resources. The long-term recreation impacts of the project would be beneficial, by providing accommodations for a north-south pedestrian/bicycle connection with the Harbor Loop Trail on the east side of the Norwalk River.

Displacement of the private marina and Maritime Rowing Club is discussed in Section 3.17. The Maritime Aquarium's emergency egress stairwell located on the south side of the building may need to be permanently relocated to the east side of the building. Coordination with aquarium officials is ongoing, and details will be developed as design advances.

Construction period impacts to parklands, public recreation, and community facilities are addressed in Section 5.3.13.

3.18.4. Mitigation

Provision of a north-south pedestrian/bicycle connection on the east side of the Norwalk River is proposed to be incorporated into the Build Alternative as a mitigation measure, and will represent an improvement over existing conditions. CTDOT will coordinate with the City of Norwalk regarding plans for trail and wetland restoration improvements within City parks for consistency with the City's plans.

3.19. Visual Resources

3.19.1. Introduction, Regulatory Background, Methodology

The NEPA and CEPA regulations require consideration of the aesthetic or visual effects of projects on the human, natural, and cultural environment. Pursuant to Section 4(f) of the U.S. Department of Transportation Act, the visual effects on publicly owned parks and recreation areas and historically significant cultural resources must be considered in undertaking transportation improvements. Visual effects on historically significant cultural resources must also be evaluated pursuant to Section 106 of the National Historic Preservation Act.

[138] City of Norwalk, Oyster Shell Park Master Plan, prepared for the City of Norwalk by BSC Group, May 17, 2006. Accessed November 9, 2015. http://ct-norwalk.civicplus.com/DocumentCenter/Home/View/1659.

The potentially affected areas for visual impacts, defined as areas where the high towers are visible, were identified using Google mapping, as shown in Figure 3-33.

The visual assessment was performed using photographs taken on site walkovers from different perspectives. The visual assessment identified visual resources and considered context, including natural areas, historical significance of the bridge/railroad and adjoining buildings and districts, and publicly accessible parks and recreational areas and tourist attractions. Street views in Google mapping were used to identify views from parks, nearby bridges, and other landmarks. The visual impact assessment also considered input from the public and cultural resource agencies on the importance of retaining the visual character of the existing bridge structure and approaches, specifically the high towers and stone abutment and walls.

3.19.2. Existing Conditions

The visual assessment evaluated views from the trains on the railroad and views of the railroad. Photographs showing views from and of the bridge and the railroad are shown in Figure 3-34 through Figure 3-46 (located at the end of this section).

Views from the Train on Walk Bridge

Views from the train are shown in Figure 3-34, Figure 3-35, Figure 3-36, and Figure 3-37. Views from train passengers at the project site include the developed waterfronts, which are markedly different on each side of the Norwalk River. The train extends on elevated track through the more urbanized business district, comprised of multi-story buildings, of South Norwalk and on elevated embankment through lower-rise residential and commercial areas in East Norwalk.

The views of the South Norwalk waterfront include the industrial, brick facades of the Maritime Aquarium and other multi-story, commercial buildings (Figure 3-34, Figure 3-35, Figure 3-36, Figure 3-38, Figure 3-39, and Figure 3-43). The buildings in East Norwalk immediately adjacent to the railroad in the project area consist of predominantly lower-rise, smaller buildings. On the east riverbank, the waterfront includes commercial and marine uses, including marinas south of the bridge (Figure 3-38).

The wooden fenders of the Walk Bridge pivot pier dominate the view of the river in the center of the crossing, extending more than 100 feet upstream and downstream of the center span (Figure 3-41). To the south, the relatively low profile of the Stroffolino Bridge, a concrete bascule bridge that carries Route 136 over the Norwalk River, forms a prominent horizontal element spanning the river (Figure 3-35). The South Norwalk water's edge is lined with wooden piers and docks, and stone-lined riprap along the river bank (Figure 3-35 and Figure 3-36). The dock areas for the Sheffield Island Cruises and the Maritime Aquarium are visible along the waterfront. On the East Norwalk side, wooden docks and boats associated with a private marina (Coastwise Boatworks) extend nearly halfway into the river, with the white recreational boats prominent in warmer months (Figure 3-38). The recreational craft and rowers associated with the adjoining Water Sports Center of the Maritime Rowing Club are also visible during the boating season in the river and adjoining the railroad embankment. Beyond the marina uses, the natural areas within Constitution Park, on the east bank of the Norwalk River near the Stroffolino Bridge, are visible (Figure 3-40).

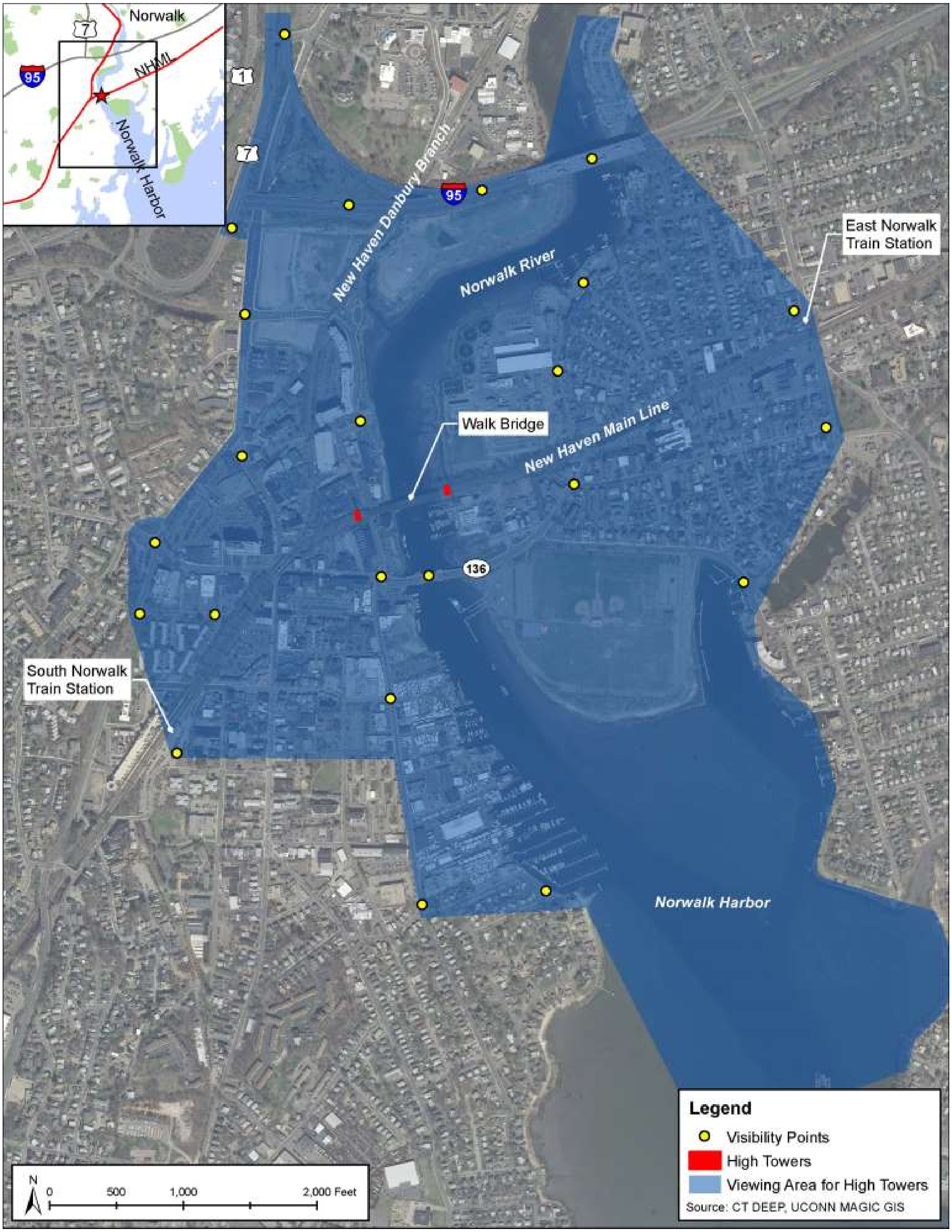

Figure 3-33—Visibility Area of High Towers

To the northwest, the waterfront uses within the Maritime Aquarium property (restricted to use by patrons) that are visible from the elevated tracks include picnic tables, enclosed exhibit areas, and a walkway along the riverbank, that extends north to the aquarium employee parking area and adjoining paved access road (with access past the parking lot restricted by fencing) (Figure 3-36). On the northeast, the Norwalk Wastewater Treatment Plant occupies the waterfront area to the north of the tracks, but, to a large degree, views of the facility are screened by trees during the growing season. The river banks on both sides include more natural areas further to the north beyond the developed waterfront, with marshes or rocky natural shorelines extending to the water's edge (Figure 3-43).

To the west, in South Norwalk, the elevated track extends through the heart of the SoNo District and provides views of upper stories of buildings that closely adjoin the track in several locations. The tracks directly adjoin brick former industrial buildings, considered to be historically significant, that have been preserved and restored. Other adjoining buildings (IMAX Theater and the new Ironworks SONO mixed use development) have been designed to match the brick facades of adjoining historic buildings (Figure 3-39). The elevated tracks extend between the restored former Norwalk Company building, now the site of the Maritime Aquarium, and the IMAX Theater (Figure 3-34). West of North Water Street, the elevated tracks extend between the historic Norwalk Lock Building (Figure 3-37) and the new Ironworks SONO building.

In East Norwalk, to the east of the marina, views from the railroad right-of-way consist of lower-rise industrial uses and businesses, where the railroad extends on embankment, continuing east over Fort Point Street.

Views of the Railroad

The Norwalk River itself is an important element of the visual environment at Walk Bridge, and vistas of the bridge are available along the river corridor for almost a mile downstream of the bridge (Figure 3-33).

Distinctive visual elements of the bridge, which was listed in 1986 on the National Register of Historic Places as the Norwalk River Railroad Bridge, include the four green/brown steel Warren trusses over the river. The circular drum girder of the swing span is visible from the navigational channels when the bridge swings open (Figure 3-41).

The two high towers and the lower OCS are eligible for the National Register as contributing elements to the overall New York, New Haven & Hartford Railroad line (linear historic resource) or as components of the New Haven Railroad Electrification, a National Civil and Electrical Engineering Landmark. The two high towers form the most visually prominent bridge elements, defined by steel lattice, extend approximately 234 feet from the rail embankment, and support a series of power transmission lines suspended from the tops of the towers. These flanking towers are prominent from vantage points as far as one mile away within Norwalk Harbor to the south, and can be seen at least one-quarter to one-half mile away in the more developed areas of Norwalk, where buildings partially obstruct views (Figure 3-33). The high towers are set back from the river on both sides of the river. These towers overshadow a lower set of black lattice towers carrying the OCS, immediately adjoining the Walk Bridge (Figure 3-34, Figure 3-38, Figure 3-39, Figure 3-40, and Figure 3-43).

The white bridge control house adjoins the south side of the bridge above the west rest pier near the river bank (Figure 3-41). The bridge piers are stone-faced, and the wooden fendering, particularly for the center pier, is visible above the waterline (Figure 3-41).

Viewers of Walk Bridge include marine traffic on the river and harbor, including commercial freight barges, ferries, rowers, sailboats, motorboats, and other recreational users. From the south, on the east bank of the river, the bridge is visible from users of Coastwise Boatworks and adjoining Maritime Rowing Club (Figure 3-38). On the west bank of the river, vistas are available from dock areas and piers of the Maritime Aquarium and Sheffield Island Cruises (Figure 3-39). Vistas of Walk Bridge are available from Constitution Park (Figure 3-40), adjoining the east side of the Stroffolino Bridge. The high towers are visible from Veterans Park further to the south, although the bridge itself is partially obscured by the Stroffolino Bridge. From the Stroffolino Bridge, the Walk Bridge is visible to both motorists and pedestrians (Figure 3-41).

From the north, on the west bank of the river, the Walk Bridge can be seen from Oyster Shell Park (Figure 3-42). Vistas are also available from the connecting Norwalk River Valley Trail (NRVT) that follows the west river bank and ends at the aquarium employee parking lot. Public access for pedestrians continuing south from the trail into the aquarium property is restricted by fencing. However, for aquarium patrons, views of the bridge are accessible from a path and exhibit areas adjoining the bridge on the west bank. On the east bank of the river, vistas of the bridge are available to pedestrians/cyclists from the Harbor Loop or Norwalk River Esplanade, which extends south to the Walk Bridge (Figure 3-43). Walk Bridge is also visible from the northbound I-95 lane in the elevated section west of the bridge over the Norwalk River, adjacent to Oyster Shell Park.

For motorists and pedestrians on adjoining streets, the Walk Bridge overpass structures appear as steel trusses and stone-faced abutment walls, such as where the tracks extend over North Water Street (Figure 3-44). The lattice of the approach span trusses is visually prominent, extending above the roadways, and flanked by stone-faced abutments that continue back from the street and under the elevated railroad structure (Figure 3-45). West of North Water Street, the granite stone-faced retaining wall continues under the elevated tracks for the length of the block (Figure 3-45). These stone-faced retaining walls under the elevated railroad are contributing elements of the National Register-eligible linear railroad district for the New Haven Line.

On the east side of the river, the tracks extend on a raised embankment, with overhead catenary system visible above the tracks. Where the tracks extend over Fort Point Street, the adjoining railroad embankment consists of stone-faced retaining walls. Southwest of the underpass for Fort Point Street, the stone-faced retaining wall continues along the length of adjoining Fort Point Street, where it parallels the railroad (Figure 3-46). The viewers in East Norwalk include residents and workers in businesses in these adjoining mixed use neighborhoods, located primarily on the south side of the railroad.

Figure 3-34—View of Walk Bridge, looking east from railroad with Maritime Aquarium on left and IMAX Theater on right

Figure 3-35—View of Stroffolino Bridge, looking south from Walk Bridge with Sheffield Island Cruises and IMAX Theater on right

Figure 3-36—View of Maritime Aquarium, looking northwest from Walk Bridge

Figure 3-37—View of Walk Bridge west approach and abutment, looking west from fire escape with Maritime Aquarium on right

Figure 3-38—View of Walk Bridge and West High Tower, looking northwest from private marina in East Norwalk

Figure 3-39—View of Walk and High Towers, looking north from parking area, with IMAX Theater on left

Figure 3-40—View of Walk Bridge, High Towers and Constitution Park, looking northwest from Route 136 (from Google maps)

Figure 3-41—View of Walk Bridge, looking north from Stroffolino Bridge

Figure 3-42—View of Walk Bridge and East High Tower, looking southeast from Oyster Shell Park (from Google maps)

Figure 3-43—View of Walk Bridge, looking southwest from Harbor Loop Trail/Norwalk River Esplanade

Figure 3-44—View of Walk Bridge west approach, looking north from North Water Street with IMAX Theater on right and Ironworks building on left

Figure 3-45—View of Elevated Railroad, looking east from North Water Street alley, with Lock Building on left

Figure 3-46—View of Fort Point Street Bridge and stone-faced abutment, looking east(from Google Maps)

3.19.3. Potential Impacts

No Build Alternative

In the No Build Alternative, no changes in the visual environment would occur. The configuration and appearance of the bridge and high towers would remain the same. Continued maintenance and repairs to the bridge and its component elements (fendering, OCS, and high towers) could result in minor changes over time.

Build Alternative

The Build Alternative will involve the following elements that will change the viewshed as a permanent condition:

- **Construction of a new bridge and removal of the existing bridge:** Views of the new bridge from the water will appear more open than the current views. The new bridge will replace the historic swing-span bridge with either two single-leaf bascule spans (with the Bascule Bridge) or with two vertical lift spans (with the Vertical Lift Bridge options). The towers of the Vertical Lift Bridge options would have a higher top elevation than the Bascule Bridge and the existing swing span bridge. The center pivot pier and the wooden fendering will be removed. With the Bascule Bridge and short span Vertical Lift Bridge, the two navigational channels on either side of the pivot pier, 53 and 58 feet in width, will be replaced with one navigational channel, at least 120 feet in width. With the long span Vertical Lift Bridge, the horizontal clearance opening would be wider (200 feet). Vertical clearance in the closed position will be approximately 27 feet, 11 feet higher than the existing bridge.

- **The removal or partial removal of stone-faced abutments on both river banks:** The bridge abutment on the west river bank will be totally removed, and the bridge abutment on the east river bank will be partially removed.

- **The removal of stone-faced abutments at North Water Street and at Fort Point Street overpasses:** The abutment for the railroad overpass west of North Water Street, which closely adjoins the street, will be set further back from the street than the existing abutment, creating an open area for pedestrians and cyclists. To the north, this railroad abutment/embankment closely adjoins the south side of the alley next to the parking lot for the Lock Building. Removal of this portion of the abutment will open up views of the Ironworks SONO building looking south from the parking lot and street north of the railroad. At Fort Point Street, with the Bascule Bridge, the stone-faced abutments carrying the railroad over the roadway would be replaced. With the Vertical Lift Bridge options, the stone-faced abutments at Fort Point Street could be replaced.

- **Slight increase in grade over the bridge that may continue east to Fort Point Street and may continue west towards South Main and Washington Streets:** Views of the elevated track will remain essentially the same. There may be minor differences in the track elevation (on the order of a few inches) where the tracks continue west of Water Street to Washington Street, but the basic configuration of the tracks will remain the same. The changes in elevation will be greater to the east approaching Fort Point Street, and these changes in grade would be greater with the Bascule Bridge than with the Vertical Lift Bridge. With the Bascule Bridge, the raised embankment east of the Norwalk River could include retaining walls on the north side, which could be visible in places from adjoining properties. However, the north side is primarily industrial in nature, being occupied by the water treatment plant and partially screened by trees, limiting views from this side of the tracks. With the Vertical Lift Bridge options, the railroad would be located on raised embankment, but would not include retaining walls.

- **Removal of the wooden fendering around the center pivot pier and displacement of the marina docks to the southwest of the bridge:** The fendering and docks dominate the views from the water around the bridge, but the docks could be restored in the future should a new owner establish a marina on the site.

- **Addition of new pedestrian/bicycle facility crossing under Walk Bridge:** The project will include a north-south pedestrian/bicycle connection at the east bridge abutment, which will be visible along the east bank of the river.

The viewers that may be affected include rail passengers traveling on Amtrak or Metro-North, but these changes may not be readily discernible to these groups, since they have brief, fleeting views of the project site. Motorists on adjoining roadways and I-95 and the Stroffolino Bridge also would be minimally affected, due to brief views available to these motorists.

Mariners and boaters will be more aware of visual changes on the river, particularly of the changes in the navigational channel and the appearance of the bridge, as shown in Figure 3-47, Figure 3-48, and Figure 3-49. The tower heights of the Vertical Lift Bridge options will range from approximately 100 – 150 feet and will be determined during final design. The renderings contained herein show the higher tower heights. These visual changes may also be more noticeable to pedestrians and cyclists using the adjoining river trails, particularly those using newly created trail(s), or users of the parks or other adjoining uses along the river, as shown in the renderings on Figure 3-50 through Figure 3-55. At North Water Street and Fort Point Street, motorists and pedestrians and employees/customers using the adjoining parking lots will be more aware of visual changes in the abutment/railroad embankment design.

Two of the changes that may be more noticeable from the water and adjoining roadways and uses will be the removal of the wooden fendering around the center pivot pier and displacement of the marina docks to the southwest of the bridge. The new planned bicycle/pedestrian facilities/trails may also be visible from the train and adjoining roadways and uses, depending on the final location and configuration.

The removal of the existing high towers will be discernible to viewers as far away as the I-95 Bridge to the north and from Veterans Park to the south. This change will be evident to viewers up to one mile away on the south and approximately one-half mile away from the north.

Figure 3-47–Rendering of Bascule Bridge (Option 4S) – View from the Water

Figure 3-48–Rendering of the Short Span Vertical Lift Bridge (Option 8A) – View from the Water

Figure 3-49–Rendering of the Long Span Vertical Lift Bridge (Option 11C) – View from the Water

Figure 3-50–Rendering of Bascule Bridge (Option 4S) – View from the Southeast

Figure 3-51–Rendering of the Short Span Vertical Lift Bridge (Option 8A) – View from the Southeast

Figure 3-52–Rendering of the Long Span Vertical Lift Bridge (Option 11C) – View from the Southeast

Figure 3-53–Rendering of the Bascule Bridge (Option 4S) – View from the Southwest

Figure 3-54–Rendering of the Short Span Vertical Lift Bridge (Option 8A) – View from the Southwest

Figure 3-55–Rendering of the Long Span Vertical Lift Bridge (Option 11C) – View from the Southwest

In downtown areas, views of the high towers are partially or fully obstructed by multi-story buildings, particularly in more developed areas away from the river. Occupants of buildings with views of the bridge will also likely be more aware of the changes in the design.

Section 5.3.14 discusses impacts to visual resources during the construction period.

3.19.4. Mitigation Measures

The design of the bridge and abutments, and other elements, will be performed in coordination with CTSHPO, the City of Norwalk's Design Review Committee, and other stakeholders. The design has been developed to minimize aesthetic impacts to the extent possible. Measures such as treatments of retaining walls and abutments and landscaping will be considered during final design to improve the appearance of the new bridge and project site.

3.20. Air Quality

3.20.1. Introduction, Regulatory Background, Methodology

This section discusses the potential effects on air quality due to the operation of the proposed project. Short-term air quality impacts from construction of the proposed project are discussed in Chapter 5.

The purpose of the Walk Bridge Replacement Project, as stated in Section 1.3, "is to restore or replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service, offer operational flexibility and ease of maintenance, and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/ Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River." This section presents the regulatory background and information on existing air quality in the area, and it also addresses transportation conformity.

Under the Clean Air Act of 1970 (last amended in 1990), USEPA is required to establish National Ambient Air Quality Standards (NAAQS) for pollutants considered to be harmful to public health and the environment. To date, USEPA has established NAAQS for six criteria pollutants:[139]

- Sulfur dioxide (SO_2)
- Particulate matter (PM_{10}, 10-micron and smaller along with $PM_{2.5}$, 2.5 micron)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Lead (Pb)

Congress directed USEPA to update the standards with current science at least every five years, and that revisions should be based solely upon the best current scientific evidence and opinion on public health effects and not on economic impacts. Over the years, the NAAQS have been revised for all pollutants except CO. The NAAQS, as published on USEPA's website as of October 6, 2015, are presented in

[139] There are six separate NAAQS for the six separate pollutants and each is on its own schedule for revisions/updates. See: http://www.epa.gov/airtrends/

Table 3-16. The latest revision, published in the Federal Register on October 26, 2015, proposes to lower the O_3 standard from 0.075 ppm to 0.070 ppm. This rule became effective on December 28, 2015.

Table 3-16—National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8-hour	9 ppm	Not to be exceeded more than once per year
		1-hour	35 ppm	
Lead (Pb)	Primary and secondary	Rolling 3-Month Average	0.15 μg/m³ [a]	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
	Primary and secondary	Annual	53 ppb [b]	Annual Mean
Ozone (O_3)	Primary and secondary	8-hour	0.075 ppm [c]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate Matter ($PM_{2.5}$)	Primary	Annual	12 μg/m³	annual mean, averaged over 3 years
	Secondary	Annual	15 μg/m³	annual mean, averaged over 3 years
	Primary and secondary	24-hour	35 μg/m³	98th percentile, averaged over 3 years
Particulate Matter (PM_{10})	Primary and secondary	24-hour	150 μg/m³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxides (SO_2)	Primary	1-hour	75 ppb [d]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: http://www3.epa.gov/ttn/naaqs/criteria.html, accessed November 4, 2015.
[a] Final rule signed October 15, 2008. The 1978 lead standard (1.5 micrograms per cubic meter [μg/m³] as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
[b] The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
[c] Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
[d] Final rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.
ppm = parts per million; ppb = parts per billion

The Clean Air Act Amendments of 1977 and 1990 required all states to submit a list to USEPA identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions that exceed the NAAQS for any criteria pollutant are designated as non-attainment areas for that pollutant. The Clean Air Act Amendments also established time schedules for the states to attain the NAAQS.

3.20.2. Existing Conditions

The project is located within the New Jersey-New York-Connecticut Interstate Air Quality Control Region #43. Fairfield County is in attainment/unclassifiable for three of the six criteria pollutants, is in nonattainment for the 2008 8-Hour Ozone standard, and has been redesignated to a maintenance area for CO and $PM_{2.5}$. As such, the project is required to meet Transportation Conformity Rule requirements (40 CFR 93). As stated in Section 3.7.2 the SWRMPO is responsible for developing the Transportation Improvement Plan (TIP), the four year financial program for implementation of federally-funded projects included in the LRTP. The *South Western Region 2015-2018 TIP*, current as of March 17, 2016, lists the construction of the Walk Bridge as a federally- and state-funded construction project for 2017 and 2018. The FHWA and FTA determined that the LRTP and TIP are in conformance with the transportation planning requirements of Titles 23 and 49 USC, the Clean Air Act Amendments, and related regulation in May 2015.

CTDEEP operates 15 air monitoring stations in the state.[140] None of CTDEEP's monitoring sites are located in Norwalk. The existing monitoring data presented in Table 3-17 are from nearby monitoring sites in Westport and Bridgeport.

Table 3-17—Existing Ambient Air Monitoring Data

Pollutant	NAAQS		Location	Concentration
	Averaging Time	Units		2014
CO	1-hour	35 ppm	Roosevelt School, Park Avenue, Bridgeport	2.4
	8-hour	9 ppm		1.4
NO_2	1-hour	100 ppb	Sherwood Island State Park, Westport	48
	Annual	53 ppb		9.04
O_3	8-hour	0.075 ppm	Sherwood Island State Park, Westport	0.081
$PM_{2.5}$	Annual	12 μg/m^3	Sherwood Island State Park, Westport	7.5
	24-hour	35 μg/m^3		21
PM_{10}	24-hour	150 μg/m^3	Roosevelt School, Park Avenue, Bridgeport	35
SO_2	1-hour	75 ppb	115 Boston Terrace, Bridgeport	8
			Sherwood Island State Park, Westport	8

Source: http://www.epa.gov/airdata, accessed on October 30, 2015 and November 4, 2015

3.20.3. Potential Impacts

No Build Alternative

As described in Chapter 2, the No Build Alternative assumes that Walk Bridge would remain in service as it currently exists, with continued maintenance and emergency repairs implemented as necessary. The existing deficiencies of Walk Bridge would not be resolved potentially resulting in future bridge opening failures and potential diversion of passenger and freight traffic to highway modes. These diversions may have an adverse effect on air quality.

[140] Connecticut Department of Energy and Environmental Protection, Bureau of Air Management, *"Connecticut 2015 Annual Air Monitoring Network Plan"*, June 22, 2015.

Build Alternative

The Build Alternative will address the existing deficiencies, resulting in reliable bridge openings and no diversions of trips away from the rail mode. Even though the proposed improvements will allow for "increased capacity and efficiencies of rail transportation," there are no changes in service being proposed as part of this project.

USEPA's Transportation Conformity Rule was amended by USEPA with the final rule on March 10, 2006 and requires a hot-spot analysis to determine project level conformity in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. A hot-spot analysis is an assessment of localized emissions impacts from a proposed transportation project and is only required for "projects of air quality concern." USEPA's "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas" (2010) provides examples of transit projects of air quality concern:

- A major new bus or intermodal terminal that is considered to be a "regionally significant project" under 40 CFR 93.101; and
- An existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses increases by 50 percent or more, as measured by bus arrivals.[141]

These examples involve new transit facilities or increased service. Since the Walk Bridge Replacement Project will not involve any change in service, the project is not a "project of air quality concern." Therefore, the Build Alternative (applicable to all three Build options) will not have a measureable effect on air quality and no detailed analysis is required.

3.20.4. Mitigation Measures

Long-term adverse impacts are not anticipated, therefore mitigation is not proposed.

3.21. Noise and Vibration

3.21.1. Introduction, Regulatory Background, Methodology

This section assesses the potential changes on noise and vibration levels from the proposed project. Short-term noise and vibration impacts from construction are discussed in Chapter 5.

FTA's *Transit Noise and Vibration Impact Assessment* guidance manual provides background information on transit noise and vibration, establishes FTA's noise and vibration impact criteria, and presents methodologies for assessing noise and vibration impacts.[142] The project area is presently served by commuter, Amtrak and freight service. Since the proposed project does not include any proposed changes in service, the following assessment focuses on determining the change in noise and vibration levels relative to the potential shifts in alignment and the onset of potential impacts using FTA criteria.

[141] USEPA, "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas," 2010, pp. B-1 – B-2.
[142] Transit Noise and Vibration Impact Assessment, Prepared by Harris Miller Miller & Hanson, Inc., Federal Transit Administration, FTA-VA-90-1003-06, May 2006.

Noise

Noise is a form of vibration that causes pressure variations in elastic media such as air and water. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are most commonly measured in decibels.

The decibel (dB) is the unit of measurement for noise. The decibel scale audible to humans spans approximately 140 dB. A level of zero decibels corresponds to the lower limit of audibility, while 140 decibels produces a sensation more akin to pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. Therefore, a 26 percent change in the energy level only changes the sound level one dB. The human ear would not detect this change except in an acoustical laboratory. A doubling of the energy level would result in a three dB increase, which would be barely perceptible in the natural environment. A tripling in energy sound level would result in a clearly noticeable change of five dB in the sound level. A change of ten times the energy level would result in a ten dB change in the sound level. This would be perceived as a doubling (or halving) of the apparent loudness.

The human ear has a non-linear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The “A” weighting scale is widely used in environmental evaluations because it closely resembles the non-linearity of human hearing. Therefore, the unit of A-weighted noise is dBA.

Time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure. The single number descriptors, Leq(h) and Ldn, are used to assess train noise. The Leq(h) is the equivalent steady-state sound having the same A-weighted sound energy as that contained in the time-varying sound over a one-hour period. The Leq correlates reasonably well the effects of noise on people. The Day-Night Sound Level, Ldn, is based on the A-weighted equivalent sound level for a 24-hour period, with an additional 10 decibels added to the actual or projected noise levels during the nighttime hours (10 pm to 7 am). All noise levels in the environmental assessment are A-weighted sound levels.

There are four basic sources of railroad wayside noise:

- Diesel-engine exhaust;
- Cooling fans;
- Wheel/rail noise – The noise that is radiated directly from the vibrating wheels and rails; and
- Horns and crossing bells.

There are two types of wheel/rail noise:

- Roar noise caused by small-scale roughness of wheel- and rail-running surfaces that produces fluctuations in the interaction forces between wheels and rail; and
- Impact noise created by discontinuities such as rail joints, wheel flats, or shelled or spalled areas on the wheel- and rail-running surfaces.

The factors considered in developing the change between existing and future Ldn noise levels include:

- Distance between track and sensitive receptors; and
- Operating speed.

FTA Noise Criteria

The FTA noise impact criteria are based on a comparison of existing and future outdoor noise levels. The criteria were developed to address potential annoyance in a residential environment using Ldn as the noise descriptor. The Ldn noise level descriptor is defined as the 24-hour Leq where the nighttime noise, from 10:00 pm to 7:00 am, is increased by 10 decibels prior to including the noise levels in the 24-hour calculation. Noise mitigation is to be considered when measures are necessary to mitigate adverse impacts. The graphical representation of the FTA criteria, which is based on following land use categories, is presented in Figure 3-56:

- Category 1: "Tracts of land where quiet is an essential element in their intended purpose,
- Category 2: Residences and buildings were people normally sleep, and
- Category 3: Institutional land uses with primarily daytime and evening use."[143]

Another way to look at the criteria is based on the allowable increase in cumulative noise exposure when the project noise is added to the existing noise, as shown in Figure 3-57 for Category 1 and 2 land uses.

3.21.2. Existing Conditions

The primary sources of noise in the vicinity of the project site are the trains using Walk Bridge. The four tracks serve Metro-North commuter trains, Amtrak's Acela and regional trains, and seasonal freight trains operated by Providence and Worcester RR. Total daily operations between 7:00 am to 10:00 pm are 139 trains, plus an additional 31 train operations between 10:00 pm to 7:00 am.

Vibration

Ground-borne vibration and noise are caused by vibrations originating at the wheel/rail interface and propagating from the rails through the intervening soil and rock to nearby buildings. The resulting vibration may be perceptible as mechanical motion (windows rattling, dishes on shelves rattling, etc.) and the acoustic radiation by the building components may cause an audible low-frequency rumble.

Airborne noise from trains on at-grade or aerial structures generally overpowers the ground-borne noise and vibration. However, the potential impacts of ground-borne vibration and noise cannot be ignored.

Ground-borne vibration and noise inside buildings are often near the threshold of human sensitivity. In this range, a small increase in vibration or noise levels can cause increases in human response. Variability in soil and rock conditions and building designs make prediction more difficult than for airborne noise levels.

[143] Transit Noise and Vibration Impact Assessment, Table 3-2.

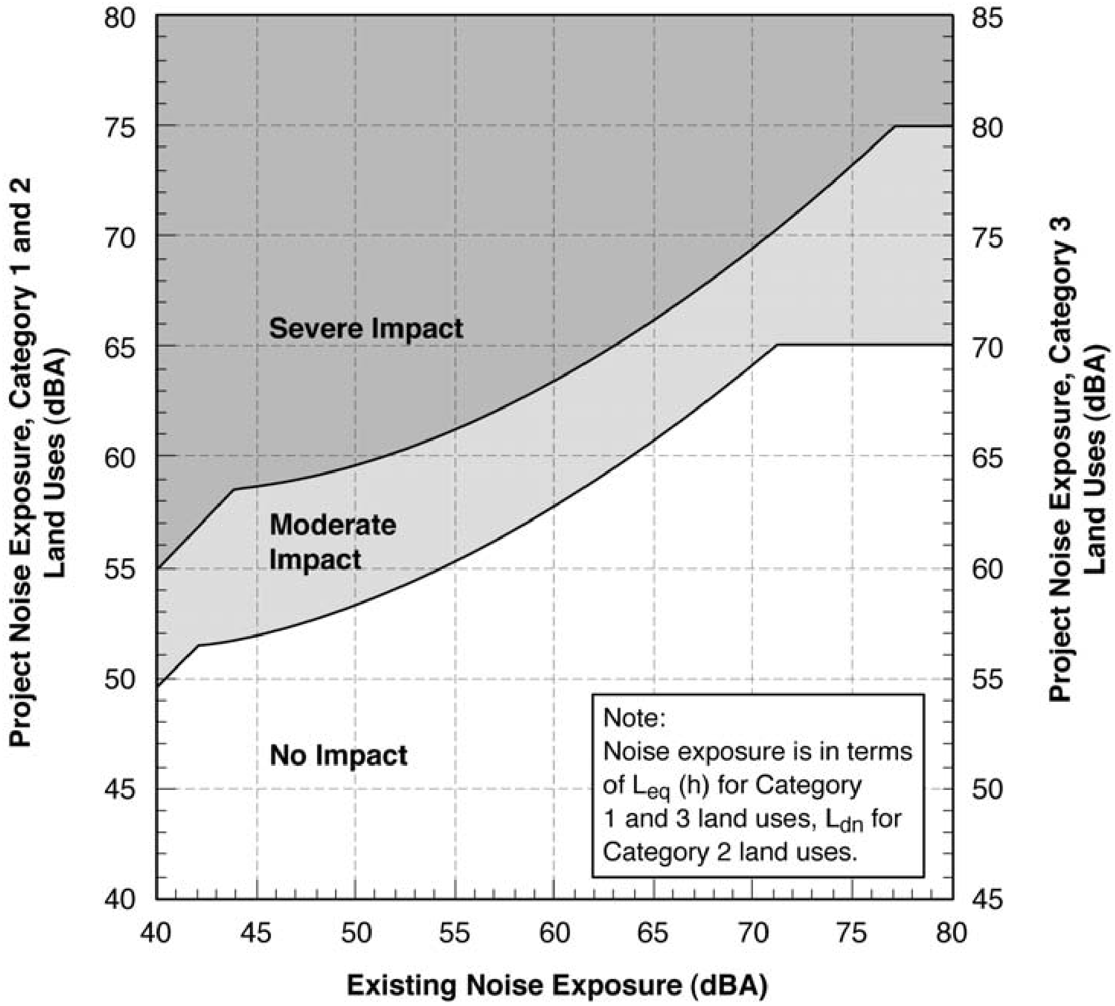

Figure 3-56—FTA Noise Impact Criteria for Transit Projects[144]

[144] Ibid, Figure 3-1, page 3-3.

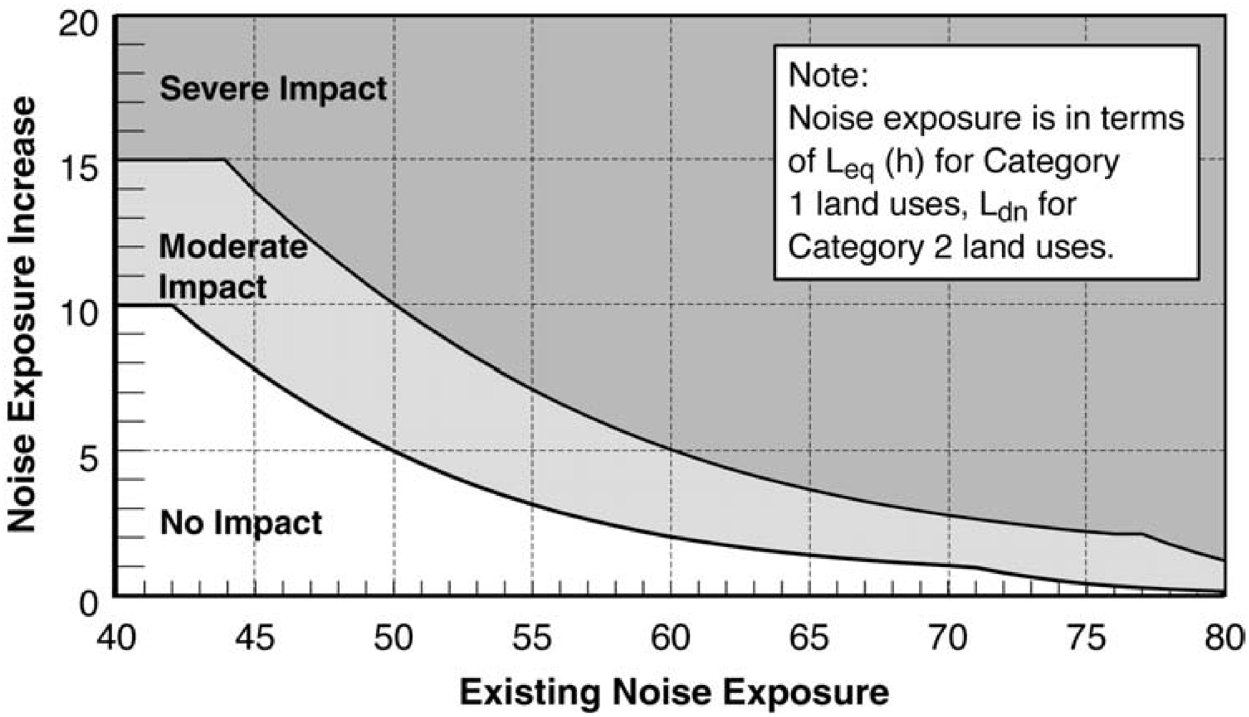

Figure 3-57—Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2)[145]

Vibration can be described in terms of the displacement, velocity or acceleration of a vibrating surface. The peak velocity of a vibration is used to assess building damage. However, it is not appropriate for human response to vibration. One single number descriptor, Vibration velocity in decibels (VdB), is used to assess transit vibration.[146]

Ground-borne noise is the rumbling sound created by the vibration of a room's surfaces. The descriptor used is the A-weighted sound level, dBA. Ground-borne noise from rail facilities has a significant low frequency component. Therefore, the ground-borne noise sounds created by the rumbling noise are louder than broadband noise with the same dBA level.

FTA Vibration Criteria

Ground-borne vibration and noise are typically not every day experiences to most people. Along this rail corridor, commuter, passenger and freight trains are the source of most perceptible outdoor ground-borne vibration velocity levels. Typical background vibration velocity levels in residential neighborhoods not exposed to rail traffic are usually 50 VdB or lower. The human threshold is around 65 VdB.[147]

Ground-borne noise is the rumbling sound created by the vibration of a room's surfaces. The descriptor used is the A-weighted sound level, dBA. Ground-borne noise from rail facilities has a significant low frequency component. Therefore, the rumbling noise created ground-borne noise sounds louder than

[145] Ibid, Figure 3-2, page 3-6.
[146] VdB is the ratio of the root mean square velocity amplitude to the reference velocity amplitude. All the vibration levels in this EA are referenced to 1x10-6 in./sec.
[147] Ibid, page 7-5.

broadband noise with the same dBA level. The FTA criteria for ground-borne vibration and noise are presented in Table 3-18.[148]

The criteria presented in Table 3-18 are for new rail alignments or when existing freight lines in joint use corridors are moved closer to sensitive receptors to accommodate future higher speed passenger rail. FTA guidelines state that when the project induced vibration levels exceed the existing vibration levels by five VdB, the existing operations can be excluded and the future operations should be compared to the criteria in Table 3-18. Following are some representative scenarios for addressing vibration impact in joint use corridor:

1. *Infrequently used rail corridor* (fewer than five trains per day): Use the general vibration criteria, Table 3-18.

2. *Moderately used rail corridor* (5 to 12 trains per day): If the existing train vibration exceeds the impact criteria given in Table 3-18, there will be no impact from the project vibration if the levels estimated using FTA procedures are at least 5 VdB less than the existing train vibration. Otherwise, the vibration criteria in Table 3-18 apply to the project.

3. *Heavily used rail corridor* (more than 12 trains per day): If the existing train vibration exceeds the impact criteria given in Table 3-18, the project will cause additional impact if the project significantly increases the number of vibration events. A significant increase would be triggered by approximately doubling the number of trains.

If there is not a significant increase in vibration events, there will be additional impact only if the project vibration, estimated using FTA procedures, will be 3 VdB or more than the existing vibration.[149]

Table 3-18—Ground Borne Vibration and Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels, VdB			Ground-Borne Noise Impact Levels, dBA		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[5]	N/A[5]	N/A[5]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Notes:
1 "Frequent Events" is defined as more than 70 vibration events per day.
2 "Occasional Events" is defined as between 30 and 70 vibration events per day.
3 "Infrequent Events" is defined at fewer than 30 vibration events per day.
4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.
5 Vibration-sensitive equipment is not sensitive to ground-borne noise.

[148] Ibid, Table 7-1.
[149] Ibid, page 8-5.

3.21.3. Potential Impacts

No Build Alternative

As described in Chapter 2, the No Build Alternative assumes that Walk Bridge would remain in service as it currently exists, with continued maintenance and emergency repairs implemented as necessary. Thus, there would be no change in noise and vibration levels.

Build Alternative

Noise

The detailed noise analysis procedures presented in the FTA manual were used to determine the potential change in Leq noise levels at the Maritime Aquarium at Norwalk and the potential Ldn noise level changes at residential areas abutting the area of the Build Alternative between the Norwalk River and the eastern terminus of the project. The Build Alternative would not increase operations and the operating speeds will remain similar to existing operations due to the presence of the bridge and the adjacent South Norwalk station.

The Bascule Bridge would shift Tracks 1 and 3 approximately nine feet closer to the aquarium with a similar increase in the distance from Tracks 2 and 4 to the aquarium. The proposed track alignment shifts for both options of the Vertical Lift Bridge would be less than those for the Bascule Bridge option. Therefore, the net change in distance is such that the daytime peak hour Leq noise levels would not change at the aquarium.

The Build Alternative would shift Tracks 2 and 4 approximately two to three feet closer to the residences west of Water Street. The proposed alignment shift would not change the Ldn noise levels. West of the river, the Bascule Bridge would shift Tracks 1 and 3 away from the residences and Tracks 2 and 4 would shift slightly closer to the residences. The largest proposed shift would occur with the Bascule Bridge immediately east of the bridge. Tracks 1 and 3 would move approximately 37 feet away from the right-of-way while Tracks 2 and 4 would shift five feet closer. The shifts in alignment would gradually diminish until the future alignment meets the existing alignment approximately 250 feet east of Fort Point Street. The Ldn noise levels for the residences in the vicinity of the project site would not change. The Vertical Lift Bridge (both options) would shift Tracks 2 and 4 five feet closer to the right-of-way, while leaving Tracks 1 and 3 almost on the existing alignment. The shifts in alignment would gradually diminish until the future alignment meets the existing alignment just west of the Fort Point Street Bridge. The Ldn noise levels for the residences in the vicinity of the project site would not change for the Vertical Lift Bridge (either option).

Vibration

As discussed in the noise section, the Build Alternative would not influence the number of operations or operating speed. The new tracks will still include switches, cross-overs and the transition from the ballasted track to the movable bridge. As all of these transitions will be new, the vibration levels created by these special trackworks should be slightly less than the existing sources of vibration. With no projected increases in operations, the vibration levels adjacent to the project area would not increase in any of the Build Alternative options.

3.21.4. Mitigation Measures

Long-term noise and vibration impact is not expected so mitigation is not proposed.

3.22. Cultural Resources

3.22.1. Introduction, Regulatory Background and Methodology

This section presents a description of above-ground (standing) historic resources within the project area and archaeological (subsurface) resources, areas of archaeological sensitivity, and an assessment of the proposed Walk Bridge Replacement Project's potential impacts on these cultural resources and areas.

Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470f), requires that federally funded or permitted projects take into account the effects of their undertakings on historic and archaeological resources listed in or eligible for listing in the National Register of Historic Places (NR).

Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) states that the Secretary of USDOT may approve a transportation program or project requiring the use of land from a historic site of national, state or local significance (as determined by the federal, state or local officials having jurisdiction over the site) only if the following exists: 1) there is no feasible and prudent alternative to using that land, and the program or project includes all possible planning to minimize harm to the Section 4(f) property; or 2) the Section 4(f) use is *de minimis*.

CEPA states that actions undertaken by state agencies must be evaluated in regard to their impacts on historic, sacred, and archaeological sites of state or national importance. The State Register of Historic Places (SR) is Connecticut's list of historic properties deemed worthy of preservation by the Connecticut State Historic Preservation Office (CTSHPO).

Details on the methodologies used to identify and assess historical and archaeological resources that could be impacted by the project are provided in separate technical reports that were prepared for the project.

Areas of Potential Effect

Section 106 requires that project proponents establish an Area of Potential Effect (APE), defined as the geographic area(s) within which the project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.[150] Two APEs were developed for the Walk Bridge Replacement Project, for above-ground (standing) historic properties and for archaeological resources.

The APE for above-ground historic properties was delineated as: 1) the limits of project actions within the railroad ROW, extending from the east end of the South Norwalk Railroad Bridge over South Main and Washington Streets to a point east of the Fort Point Street Railroad Bridge; 2) the project's temporary construction staging/access areas; and 3) historic properties that are immediately adjacent to either of these.

The highest components of the project—the existing high towers—are visible from a number of other historic properties, such as the NR-listed Haviland and Elizabeth Streets-Hanford Place Historic District, but this visibility alone does not constitute part of the properties' historic setting. It did not appear

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

appropriate to extend the APE so as to include properties from which project components were visible except in the cases (all bordering on the railroad ROW) where there could be visual impacts on the properties' integrity of setting. The adjacent historic resources all have important historical associations with the rail line: the industries in the area prospered in part because good rail transportation was available close by (both the Norwalk Lock Company and the Norwalk Iron Works at one time had dedicated sidings), and the commercial and institutional buildings that came to dominate the streetscapes of South Norwalk located there largely because of its status as an important rail junction.

The APE for archaeological resources, was delineated as: 1) the limits of project actions within the railroad ROW, extending from the east end of the South Norwalk Railroad Bridge over South Main and Washington Streets to a point east of the Fort Point Street Railroad Bridge; 2) the project's temporary construction staging/access areas; and 3) underwater and shoreline areas that could be impacted by the project's temporary and permanent facilities in the Norwalk River in the vicinity of the bridge.

Identification – Historic Resources

To assess above-ground historic resources that are present within the APE, research and field surveys were conducted. General statewide and local published histories, standard works on New England railroad history, and inventories of historic resources were consulted in order to establish an overall historical context and to help identify historic resources. In addition to histories of Norwalk and of the two railroad lines that converge in the project area, historic maps, archives, illustrations, photographs, and NR forms for individual properties and districts were reviewed. Site-specific resources included Historic American Engineering Record (HAER) documentation of the bridge, the Northeast Corridor Line and the electrification of the line. Railroad track maps from the late 19^{th} century to ca. 1950; Sanborn insurance maps; annual reports of the Hartford and New Haven Railroad and the New York, New Haven & Hartford Railroad (NY, NH & H); and the *Shoreliner* and other publications of the New Haven Railroad Historical and Technical Association were reviewed. The APE was field-inspected by the project historians in May and July of 2015.

Properties identified by the project historians as potentially eligible were evaluated by applying the NR criteria of significance, which state the following:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. *That are associated with events that have made a significant contribution to the broad patterns of our history; or*
B. *That are associated with the lives of persons significant in our past; or*
C. *That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
D. *That have yielded or may be likely to yield, information important in history or prehistory.*

Resources may qualify under one or more of the NR eligibility criteria. In addition to meeting at least one of the criteria, NR-eligible resources must also possess "several" of the seven aspects of integrity (location, design, setting, materials, workmanship, feeling, and association).

The criteria for listing in the SR closely follow that of the NR. Connecticut's SR includes districts; sites; buildings; structures and objects of national, state or local significance. These resources possess integrity of location, design, setting, materials, workmanship, feeling and association and:

1. *are associated with events that have made a significant contribution to our history and the lives of persons significant in our past; or*
2. *embody the distinctive characteristics of a type, period or method of construction; or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
3. *have yielded, or may be likely to yield, information important in prehistory or history.*

The SR includes the following:

- All properties that were surveyed in the 1967-68 state inventory and subsequently adopted by the predecessor of the Historic Preservation Council in 1975.
- Properties that have been listed in the NR are automatically listed on the SR.
- Properties included in local historic district or historic property study reports that have received favorable recommendation by CTSHPO pursuant to CGS Section 7-147b are listed on the SR.
- Properties that have been submitted to the Historic Preservation Council for consideration will be listed upon approval.

Identification – Archaeological Resources

To identify existing archaeological resources and assess the potential for undiscovered archaeological (i.e., subsurface) resources that may be present within the APE, a Phase IA Archaeological Assessment Survey was conducted. The purpose of the Phase IA survey was to determine if any known archaeological sites have been reported within or adjacent to the APE, and to assess the potential for undocumented archaeological sites to be present in the APE. This assessment was based on documentary data and on environmental characteristics often associated with pre-Colonial Native American sites. Subsurface testing is ongoing to confirm whether buried archaeological sites are actually present within the APE.

3.22.2. Existing Conditions

Above-Ground Historic Resources

Listed, eligible, and potentially eligible historic resources fall into two categories: those that are railroad-related, chiefly parts of the existing railroad infrastructure; and those that are non-rail-related but adjacent to the APE.

Rail Line and Related Structures

The railroad structures in the project area are part of a linear district along the rail line between the New York/Connecticut border and New Haven Line (formerly known as the New York, New Haven, & Hartford Railroad [NY, NH & H RR]). This linear railroad district and the railroad structures in the project area that are contributing elements to this and other districts are described as follows. NR-listed, eligible, and potentially eligible railroad-related historic structures located in the APE include the following resources identified in Table 3-19 and shown in Figure 3-58.

Table 3-19–State and National Register Listed, Eligible or Potentially Eligible Railroad-Related Historic Structures in the APE

Historic Resource	Listed	Contributing to an Eligible Linear Historic District
Norwalk River Railroad Bridge (Walk Bridge)	X	
High Towers		X
Catenary Support Structures		X
Stone Retaining Walls		X
Interlocking Tower (Switch Tower Museum)	X	
South Norwalk Railroad Bridge, South Main and Washington Streets	X	
Fort Point Street Railroad Bridge		X

New Haven Railroad Line and Catenary System. The NHL has long been regarded as an important historic resource that includes a pioneering electrification system, numerous early railroad bridges, and historic trackside passenger stations, freight houses, and interlocking towers. The line was documented by HAER in 1977 (HAER No. CT-11), and its signalization system was documented in 1982 (HAER No. CT-8). That same year, the American Society of Mechanical Engineers designated the electrification of the line a National Historic Engineering Landmark.[151] CTSHPO determined that the electrification of the line from New Haven to New York was eligible for listing in the NR (following the same boundaries as the HAER documentation). A report on the New Haven Railroad catenary system, prepared for CTDOT in 2000, recommended listing of the electrification of the line from New Haven to New York[152] under Criterion C. Because of the importance of the NY, NH & H RR in the transportation history of Connecticut, and the impact of the railroad on the economic and social history of the communities it served, the overall rail line is eligible under Criterion A. The overall rail line is also eligible under Criterion C because collectively, the various components of the line illustrate the railroad-engineering practices of the 19th and early 20th centuries. This approach, considering the entire rail line as a single NR-eligible property (specifically as a linear historic district), is consistent with the approach taken by federal and state agencies in the New Haven-Hartford-Springfield Rail Corridor improvement project[153] and other Connecticut projects involving historic rail lines.

Norwalk River Railroad Bridge (Walk Bridge). Walk Bridge is a deck-truss, rim-bearing swing bridge that carries four tracks of Metro-North between New Haven and New York, Amtrak passenger trains on the Boston/New York/Washington corridor, and freight trains operated by the Providence & Worcester Railroad. It was built in 1896 by the Pennsylvania Steel Company's Bridge and Construction Department as part of the four-tracking and elevation of the NHL. This is the earliest movable bridge on the NEC, and it is the only rim-bearing, deck-truss swing bridge. The bridge consists of a steel superstructure and stone masonry piers and abutments. From east to west, the bridge is a total of 562 feet long and includes two fixed deck-truss spans, each 120 feet, the 202-foot-long swing span, and another 120-foot fixed deck-

[151] Not an official government designation.
[152] Stewart, Robert (2000) *The New Haven Railroad Catenary System.* East Granby, CT: Historical Technologies, Connecticut Historic Preservation Collection, Archives and Special Collections at Thomas Dodd Research Center, University of Connecticut Libraries.
[153] Federal Railroad Administration, *Programmatic Agreement Among the Federal Rail Administration, Federal Transit Administration, the Connecticut State Historic Preservation Office, the Massachusetts State Historic Preservation Office, and the Connecticut Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act As It Pertains to the New Haven-Hartford-Springfield High-Speed Intercity Passenger Rail Project*. Executed in August 2012. Online at http://www.nhhsrail.com/pdfs/ea/nhhs_pa.pdf, accessed March 30, 2016.

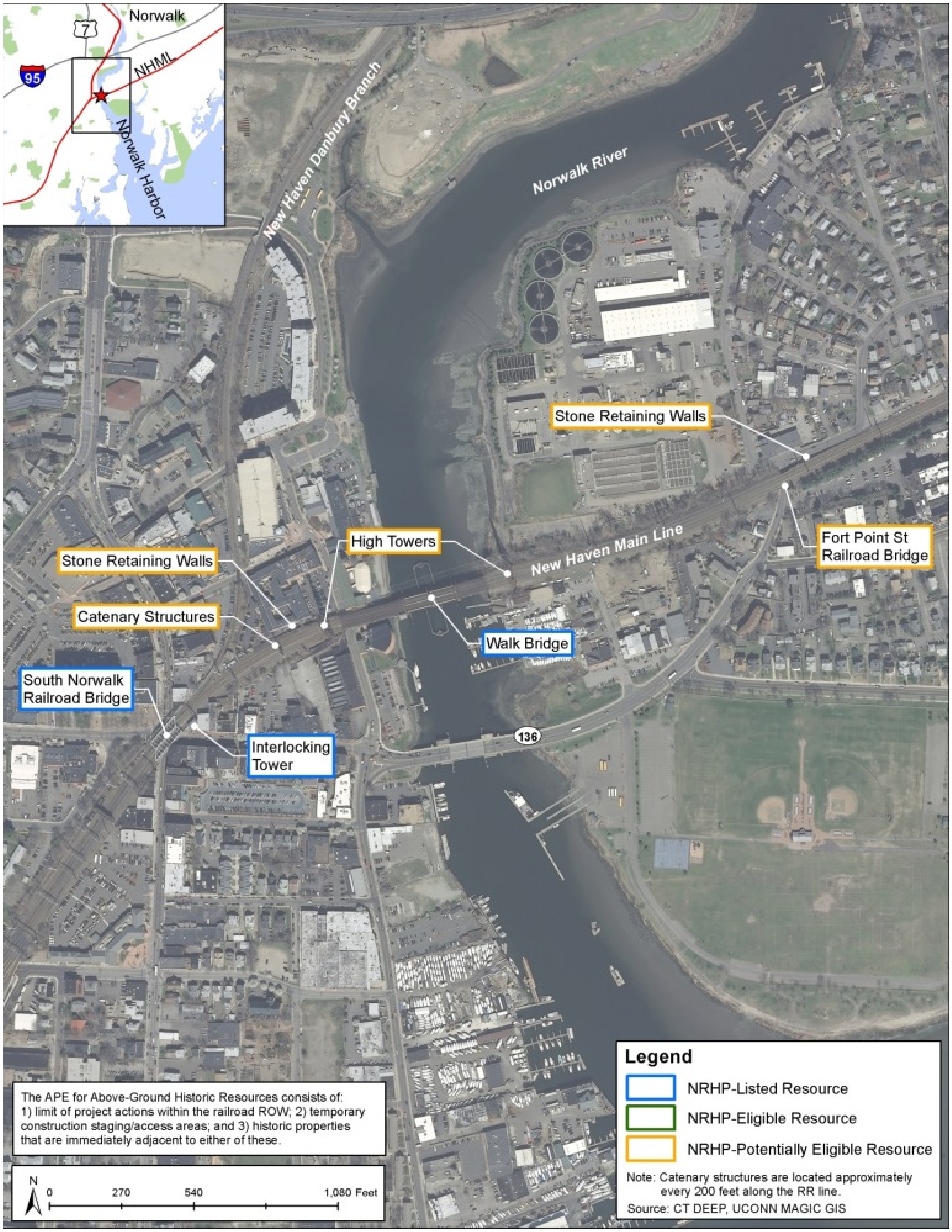

Figure 3-58–Railroad-Related Historic Structures in the APE

truss span. The bridge is particularly notable for its swing-span mechanism, which utilizes a series of 96 rollers, set into a steel track atop a drum on the center pier, in order to operate the movable span.

Walk Bridge was listed in the NR in 1987 as one of several significant movable railroad bridges along the Northeast Corridor in Connecticut.[154] In addition to its design significance as an example of period engineering (NR Criterion C), the bridge is important in Connecticut's transportation history because of the role of the NY, NH & H in consolidating rail service in the state (NR Criterion A). The bridge includes the approach span over North Water Street and two other approach spans.

High Towers and Catenary Support Structures. The electrification of the line was completed in 1914. In addition to numerous catenary support structures, most of which are original to the electrification, the system includes a high steel-lattice tower on either side of the river to carry transmission lines over the channel. The Engineering Significance Statement for the bridge[155] does not explicitly address the catenary support structures and the two high transmission towers. However, these components are potentially eligible for the NR as contributing elements of the overall rail line as a linear historic resource (NR Criteria A and C). Moreover, in reviewing another project affecting overhead catenary electrification features, CTSHPO noted that the extant catenary system is an integral component of the country's first large-scale electrification of a main line railroad right-of-way and has found the New Haven Railroad Electrification and Catenary System to be a NR eligible entity.[156] The high towers and catenary support structures could also be considered contributing elements to that entity.

Stone Retaining Walls (Fort Point and North Water Streets). In the early 1890s, the four-tracking and elevation of the main line required lengthy cut-stone retaining walls for much of the railroad's right-of-way as it passed above city streets. The walls are found throughout the line, but the most notable examples within the APE can be found on Fort Point Street and west of the western approach span over North Water Street. These structures are potentially eligible for the NR as contributing resources to the potential linear historic district embracing the overall rail line (NR Criteria A and C).

South Norwalk Railroad Bridge over Washington and South Main Streets. This pin-connected steel-truss bridge was built in 1896 to carry four tracks over the intersection of Washington and South Main streets in South Norwalk. The abutment walls and stepped wing walls are built of quarry-faced granite blocks. This structure was listed in the NR as part of the South Main and Washington Streets Historic District and was the subject of HAER documentation (HAER No. CT-168). It is notable as an example of the work of the Berlin Iron Bridge Company, Connecticut's only large-scale 19th-century bridge fabricator. In addition to being a contributing resource of the listed historic district, the bridge is also a contributing resource to an eligible linear historic district embracing the entire New York to New Haven rail line under NR Criteria A and C.

[154] United States Department of Interior, National Park Service. National Register of Historic Places Inventory – Nomination Form. "Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource." Received April 28, 1987. Date Entered June 12, 1987.
[155] Stewart, Robert (1999) *Engineering Significance Statement: Walk Bridge (No. 41.47) (Bridge No. 4288R).* Westport, CT: Historical Perspectives, Inc.
[156] Maddox, Dawn, Letter of Dawn Maddox, Deputy State Historic Preservation Officer, to Mark D. Neri, CTDOT Rail Operations, regarding Milford to West Haven catenary replacement project, November 22, 1999.

Interlocking Tower. The interlocking tower controlled the juncture of the NY, NH & H main line and the Danbury & Norwalk branch line that led north to Danbury. In 1895, as part of the raising of the tracks of the main line, the tower was raised two stories. It is a rare survivor of its type, since it retains all of the original levers and switches, which were manually operated. This structure was listed in the NR as part of the South Main and Washington Streets Historic District. It also contributes to the overall significance of the rail line as an eligible linear historic district (NR Criteria A and C). Currently it is occupied as a historical site, the South Norwalk Switch Tower Museum.

Fort Point Street Railroad Bridge. The Fort Point Street Bridge dates from 1941, when the railroad replaced an earlier plate-girder at the site. It consists of a series of built-up steel beams spanning stone abutments that continue into the adjacent retaining walls for the elevated tracks. It is a contributing resource to the potential linear historic district (NR Criteria A and C).

Adjacent Historic Resources That Are Not Directly Rail-Related

Listed, eligible, or potentially eligible historic-resource properties are located in the project APE. These resources are listed in Table 3-20 and depicted in Figure 3-59.

Table 3-20–National Register Listed, Eligible or Potentially Eligible Standing Resources That Are Not Directly Rail-Related

Historic Resource	Listed	Eligible	Potentially Eligible
South Main and Washington Streets Historic District (Including Boundary Increases)	X		
Former Norwalk City Hall[a]	X		
Addition to South Main and Washington Streets Historic District			X
Industrial Buildings Historic District			X
Norwalk Iron Works[b]			X
Norwalk Lock Company[c]		X	
Liberty Square Historic District			X

Notes:
a. Individually listed and also a contributing building within the South Main and Washington Streets Historic District.
b. Because it is now part of the Maritime Aquarium complex, which includes substantial new construction, the portion remaining from the former Iron Works would probably only be considered eligible as part of a historic district.
c. The Norwalk Lock Company complex has been determined individually eligible; it also contributes to a potentially eligible historic district.

South Main and Washington Streets Historic District, South Norwalk. This NR-listed district, including two later boundary expansions, is a T-shaped area of commercial buildings on Washington, South Main, and North Main streets. The buildings are densely packed and date from the last quarter of the 19th century and the early years of the 20th century. Most are brick, three or more stories high, and many have ornamental cast-iron storefronts and trim, primarily Italianate in style. The buildings are generally of similar scale and setback, creating walls along the streets that are quite cohesive. As a whole, resources in the district are well-preserved examples of particular types of commercial architecture (NR Criterion C). They also represent Norwalk's economic and civic development and South Norwalk's role in particular as a harbor, railroad junction, and industrial center, which led to commercial expansion in the post-Civil War era (NR Criterion A). The railroad bisects the district; the Walk Bridge, catenary support structures, and high towers are visible from a number of vantage points within the district. The district also includes as contributing components two rail-related structures, the Interlocking Tower and the South Norwalk Railroad Bridge over the intersection of South Main and Washington streets.

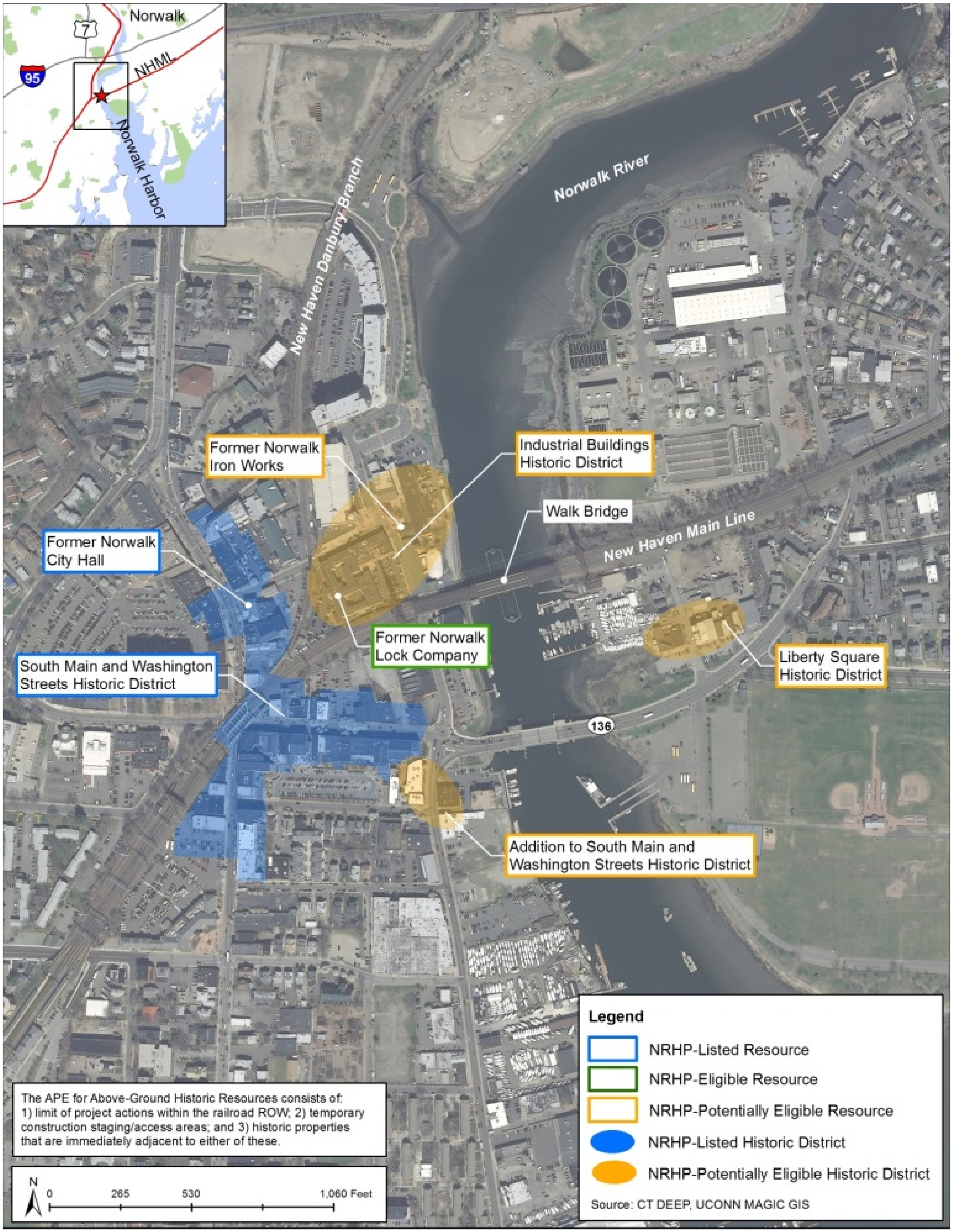

Figure 3-59–Standing Historic Properties in the APE That Are Not Directly Rail-Related

Former Norwalk City Hall, South Norwalk. This elaborate red-brick Colonial Revival-style building at 41 North Main Street in South Norwalk was built in 1912. In addition to being a contributing building within the South Main and Washington Streets Historic District, it is individually listed in the NR.

Addition to the South Main and Washington Streets Historic District. The South Main and Washington Streets Historic District could logically be expanded to include as contributing buildings three commercial buildings on Water Street. These buildings include: 50 Water Street (circa1900), a three-story brick building; 68 Water Street (circa 1910), a two-story yellow-brick building; and 53 Water Street (1853), a three-story brick commercial building with an elaborate bracketed wooden cornice, window hoods and cornice above the storefronts (NR Criteria A and C).

Industrial Buildings Historic District, North Water Street, South Norwalk (Norwalk Iron Works and Norwalk Lock Company Buildings). West of the Walk Bridge and immediately north of the railroad right-of-way are two 19th-century brick factory complexes. The former Norwalk Lock Company buildings have been converted to office use, and the former Norwalk Iron Works complex has been incorporated into the Maritime Aquarium at Norwalk. Together these resources constitute a small, potentially-eligible historic district that recalls the important role of industry in Norwalk's economic history (NR Criterion A). In addition to their location adjacent to the railroad tracks, the two properties have historical associations with the railroad. The Norwalk Lock Company property was individually determined eligible for the NR by CTSHPO in 2000.

Liberty Square Historic District, East Norwalk. This row of late 19th-century and early 20th-century commercial buildings, two and three stories high, is a vestige of the continuation of South Norwalk's Washington Street commercial district into East Norwalk. This area is a potential NR-eligible district that would be significant on the local level because of its architectural qualities (NR Criterion C) and because of its historical associations with a late 19th-century period of economic expansion (NR Criterion A)

Archaeological Resources

The APE is characterized primarily by a built-up man-made environment, which includes tracks, bridges, culverts, embankments, and other features that are part of the existing rail infrastructure, as well as industrial and residential urban settings.

Known Pre-Colonial Archaeological Sites in or near the Walk Bridge APE

Review of the Connecticut state archaeological site files indicates that no archaeological surveys have been conducted within the APE, but a total of 11 previously-recorded pre-Colonial sites are recorded within approximately one mile of the existing bridge. These sites are listed in the Archaeological Sensitivity Assessment Technical Report.

One Late Woodland/Contact period site, a palisaded Native American settlement, is recorded within the APE. The site, which is noted on the state site form for the historic-period Neptune Site (103-17), is depicted on historic period maps.

The site-file data indicate that undisturbed portions of the APE, especially those near the Norwalk River, possess moderate to high archaeological sensitivity for pre-Colonial archaeological resources. However, undisturbed sediments represent a very small percentage of the total APE. Extensive land-making and soil displacement associated with the construction, modification, and demolition of rail lines, buildings, and structures has likely destroyed or deeply buried many of the pre-Colonial archaeological deposits within the APE.

Further evaluation of potential project impacts to previously undocumented pre-Colonial archaeological resources will be conducted using soil borings data, and refined as plans for individual project parcels are further developed. Bathymetric data and information from soil borings will also be used to assess the underwater archaeological sensitivity of the portions of the Norwalk River within the project area.

Known Historic-Period Archaeological Sites in or near the Walk Bridge APE

Review of the archaeological site files at CTSHPO and the Office of State Archaeology (OSA) indicates that there are two historic-period sites (103-17 and 103-50) recorded within a mile of Walk Bridge.

- **Site 103-17 - Neptune Site.** Site 103-17 is recorded within the APE (in Parcel 3/1/25 in Figure 3-60), just southeast of the existing bridge in East Norwalk. The Neptune Site is described as the first (unofficial) landfill area for South Norwalk and is believed to date from the early 19th century to the early 20th century. It is possible that landfilling activities are related to the filling of marshy portions of the project area, depicted on historic maps. The Neptune Site was identified by a collector who surface-collected and "pot-hunted" the site using a metal detector and shovel. Reported artifacts included medicine and beverage bottles from local stores. When the site was recorded in 1982 it measured roughly 30 by 55 feet and cultural materials were visible around the perimeter. The site was situated between wetlands on the east, the marina to the north, the river to the west, and sterile mud to the south. It is possible that remnants of this site may still exist in the APE. This is also the historic- mapped location of a Native American fortification.
- **Site 103-50 – Metro-North Railroad 1910 Electrification Norwalk New Haven Railroad Danbury Branch Site.** Site 103-50 is located across the Norwalk River, about 0.25 miles west of the Norwalk Bridge in South Norwalk. The site includes the circa 1910 electrification infrastructure which extends for about one-mile from CP 214, Switch 35 on the Amtrak Northeast Corridor to a point approximately 5000 feet north, roughly 600 feet north of Jenning's Crossing.[157]

While there are only two historic period archaeological sites recorded within one mile of Walk Bridge, a review of historic maps indicates that the APE has the potential to contain many more sites, including domestic, industrial, and railroad-related sites.

Archaeological Sensitivity Assessment within the Walk Bridge APE

An archaeological sensitivity assessment was conducted on the parcels within the APE proposed for use for construction easements, staging, storage, and access areas (as described in Section 3.6). The parcels were assessed for sensitivity for pre-colonial Native American and historic-period archaeological resources.

In general, the proximity of the project area to the Norwalk River and its associated marshlands and feeder streams suggests that these parcels are highly sensitive for pre-Colonial resources. The coves, mudflats, and estuarine zones that characterize this area today have probably existed for at least 4,000 years, persistently attracting pre-Colonial Native American populations. However, many of these parcels are heavily developed and have contained industrial and/or domestic structures since the mid-to-late 19th century. As a result, many of the undisturbed and relatively dry areas in the APE are considered to be highly sensitive for pre-colonial resources. Nearly all of the parcels are potentially sensitive for historic-period archaeological resources, as most of these areas have been heavily developed since the mid-19th century. Due to the extensive nature of past industrial developments on several of the parcels, however, it

[157] The name on the site form is somewhat misleading, as the electrification occurred in 1925.

is highly unlikely that any intact archaeological resources remain. This determination was based on the land-use history of the parcel, the potential for intact deposits, and the potential significance of undocumented sites in terms of information potential and singularity or importance of site types.

Table 3-21 presents a summary of the recommendations for the terrestrial parcels within the APE. The areas considered to have archaeological sensitivity within the parcels are shown in Figure 3-60. For many of the parcels, subsurface archaeological testing and/or archaeological monitoring is recommended prior to earth disturbance activities.

In terms of underwater archaeological resources, the existing bathymetric data suggests that there may be some preservation of former shorelines/upland areas that were submerged as sea level rose. If such submerged landforms are intact, they would likely possess archaeological potential. Vibracore and hand auger testing will determine whether submerged landforms have survived historic-period development and erosion. Figure 3-61 shows the proposed vibracore and hand-auger testing locations overlaid on a bathymetric map of the Norwalk River in the project area. The proposed testing locations would be required in either the Bascule Bridge or the Vertical Lift Bridge options of the Build Alternative.

Table 3-21–Summary of Recommendations for Parcels in the APE

Map/ Block/ Lot	Address	Pre-Colonial/Contact Period Sensitivity	Historic-Period Sensitivity	Recommendations
3/1/22	9 Goldstein Place	High	Moderate	Subsurface archaeological testing/archaeological monitoring; geoprobes
3/1/25	11 Goldstein Place	High	Moderate	Subsurface archaeological testing/archaeological monitoring; geoprobes
3/1/16	3 Goldstein Place	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
3/1/24	5 Goldstein Place	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
3/1/15	1 Goldstein Place	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
3/1/30	10 Goldstein Place	Moderate	Low	Subsurface archaeological testing; geoprobes
3/1/29	4 Goldstein Place	Moderate	Low	Subsurface archaeological testing; geoprobes
3/1/19	6 Goldstein Place	Moderate	Low	Subsurface archaeological testing; geoprobes
3/1/8	217 Liberty Square	Low	Low	Subsurface archaeological monitoring
3/2/3	60 South Smith Street	Moderate	Low	Subsurface archaeological testing; geoprobes
3/2/6	21 Goldstein Place	Moderate (northern portion)	Low	Subsurface archaeological testing (northern portion); geoprobes

Map/ Block/ Lot	Address	Pre-Colonial/Contact Period Sensitivity	Historic-Period Sensitivity	Recommendations
2/84/33	90 Water Street	Low	High (northwestern portion)	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/84/63	70 Water Street	Low	High (southwestern portion)	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/84/19	68 Water Street	Low	Low	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/24/8	18 Marshall Street	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/19/1	4 North Water Street	Low	Low	No testing or monitoring recommended.
2/19/2	10 North Water Street	Low	Low	No testing or monitoring recommended.
2/19/3	10 North Water Street	Low	Low	No testing or monitoring recommended.
2/24/10	1North Water Street	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/24/22	99 Washington Street	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/24/24	83 Washington Street	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/24/26	79 Washington Street	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes
2/24/27	67 Washington Street	Moderate	High	Subsurface archaeological testing/archaeological monitoring; geoprobes

* Recommendations may be amended after geotechnical data becomes available, contingent upon field conditions, and as design is advanced.

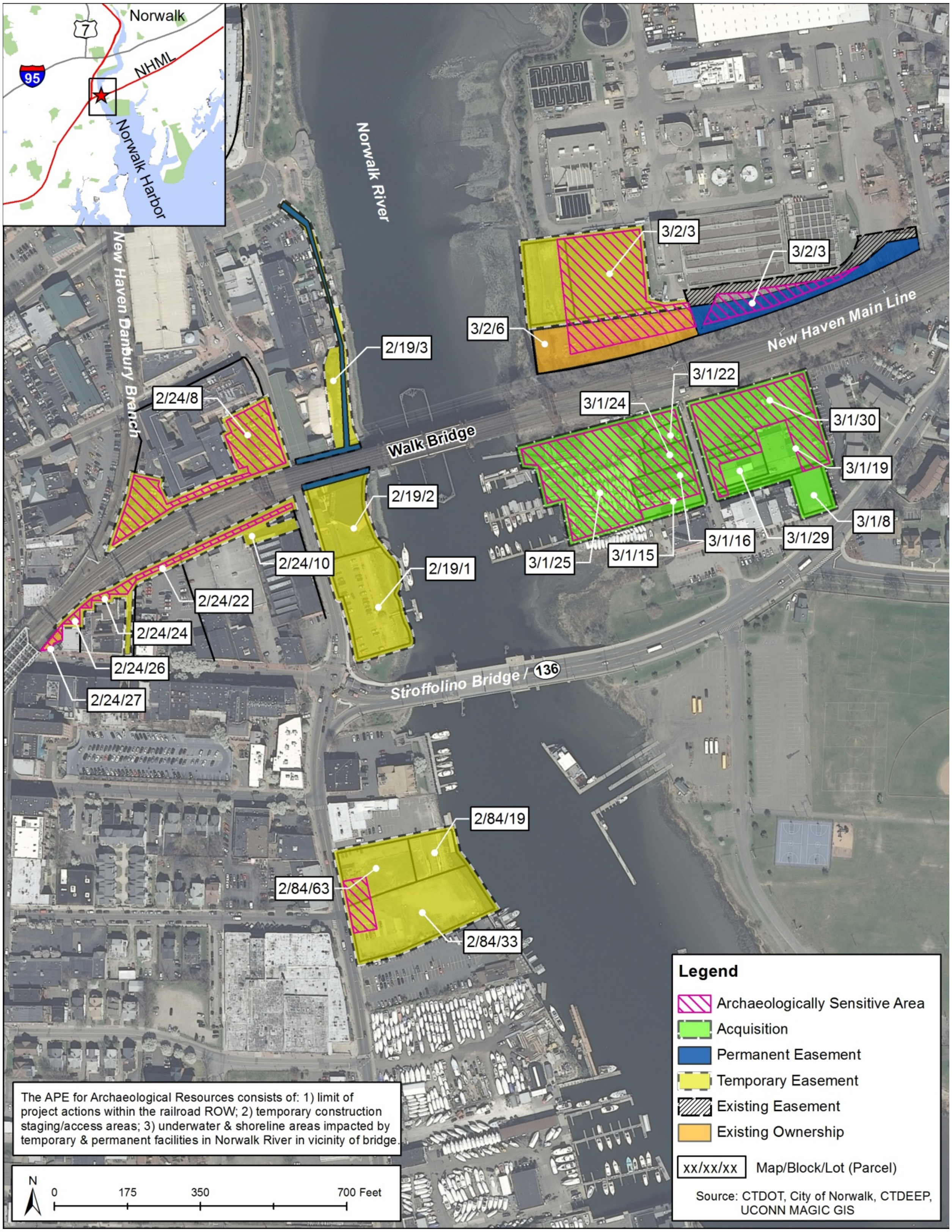

Figure 3-60–Archaeologically Sensitive Areas in the APE

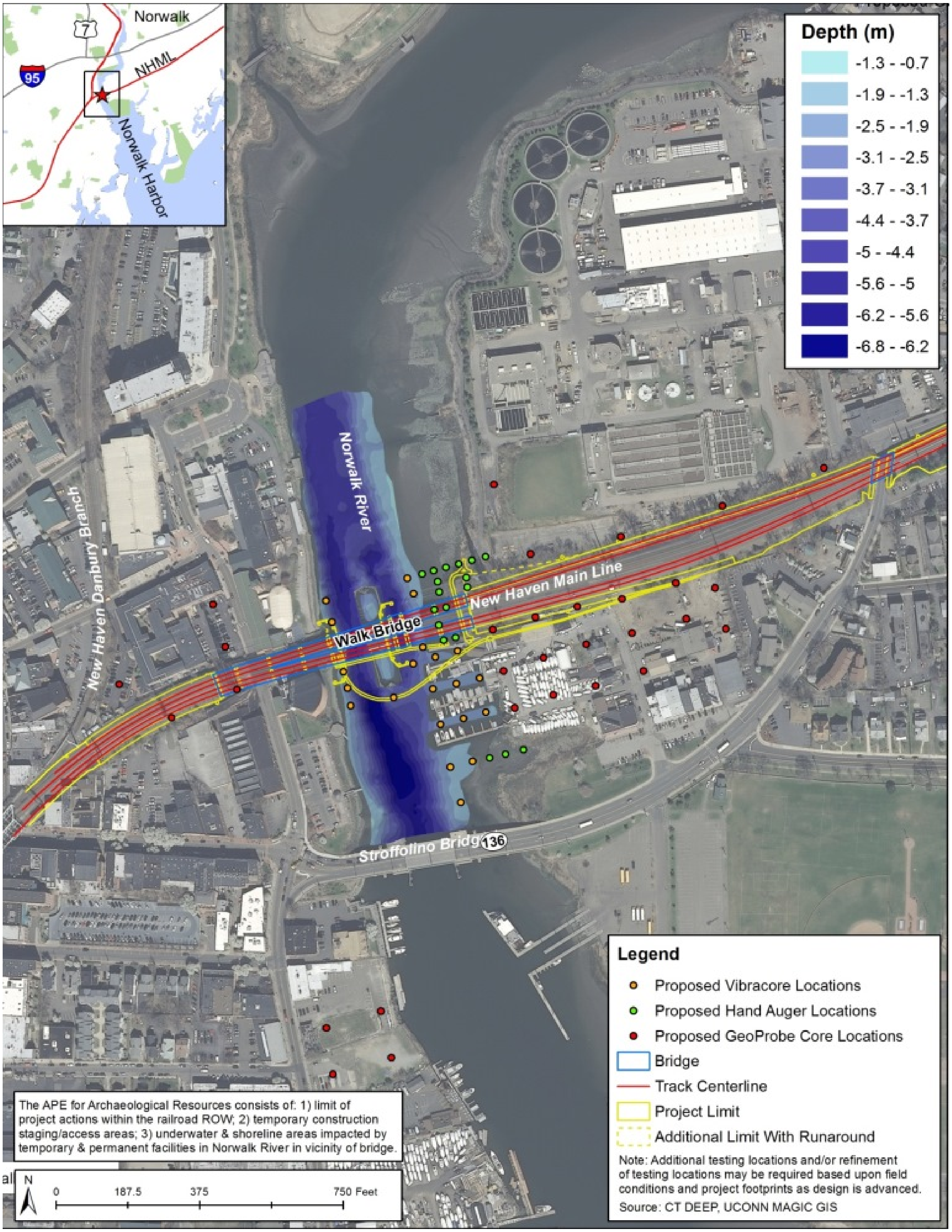

Figure 3-61–Proposed Testing Locations in the Archaeologically Sensitive Portions of the APE

3.22.3. Potential Impacts

No Build Alternative

As the No Build Alternative would retain the existing bridge, alignment, and associated infrastructure, it would have no immediate direct or indirect impact to above-ground railroad-related and non-railroad-related resources within the APE. However, experience suggests that ongoing deterioration of the bridge and its associated systems would require remedial measures that CTSHPO has in the past considered to be adverse effects, due to the necessary diminishment of the historic bridge's integrity of materials and design.

The No Build Alternative would not create any impacts on archaeological resources.

Build Alternative

Historic Resources

The project will likely affect historic properties in the APE that are listed in, eligible for listing in, or likely eligible for listing in the NR. The following project actions are expected to result in effects on historic resources:

- Removal and replacement of the Norwalk River Railroad Bridge (Walk Bridge) and Fort Point Street Railroad Bridge;
- Removal of the high towers;
- Removal and replacement of catenary support structures;
- Removal of stone retaining walls and construction of new retaining walls; and
- Creation and use of temporary construction staging/access areas and permanent access areas.

Project actions that will create temporary or permanent changes to the river and its banks, such as the use for a run-around alignment (for the Bascule Bridge), will not affect standing historic resources, but these project actions may affect archaeological resources.

The following paragraphs present a summary of recommended findings of effects of the project on NR listed, eligible, and potentially eligible properties.

Norwalk River Railroad Bridge (Walk Bridge). The Build Alternative will result in the loss of the existing bridge as a NR-listed resource and therefore result in an adverse effect to historic properties.

High Towers and Catenary Support Structures. The Build Alternative will remove the high steel lattice towers on either side of the river that carry transmission lines over the channel. Because the towers represent contributing components of the overall rail line as a NR-eligible linear resource, removal of the towers will result in an adverse effect. The catenary support structures also contribute to the significance of the overall rail line as a NR-eligible linear resource; removal of the structures will result in an adverse effect.

Stone Retaining Walls. The project will require the replacement of the circa 1896 stone retaining walls west of Water Street and near the Fort Point Street Railroad Bridge. These walls represent contributing components of the overall rail line as a NR-eligible linear resource; the removal of the walls will result in an adverse effect.

South Norwalk Railroad Bridge over Washington and South Main Streets. The project's actions within the railroad ROW begin at the end of the bridge with minor changes to the track geometry. These minor changes will have no adverse effect on the bridge itself or its overall setting.

Fort Point Street Railroad Bridge. Because of changes in track geometry, the Build Alternative will require the replacement of the existing railroad bridge over Fort Point Street. Because it is a contributing component of the overall rail line as a NR-eligible linear resource, the bridge's replacement will be an adverse effect.

South Main and Washington Streets Historic District. The existing rail line, Walk Bridge, high towers, and catenary support structures form an important part of the overall setting of the historic district, both because the age of these structures (1896-1914) reflects the district's period of significance, and because the railroad played a critical role in the area's history. Removal and replacement of the bridge and catenary support structures and removal of the high towers will result in a diminishment of the district's integrity of setting and therefore will result in an indirect (visual) adverse effect. The project also has the potential to affect the district because of the temporary construction staging/access area that will extend into the district north of Washington Street. Most of the access area is located in a strip of undeveloped land at the rear of the buildings. Provided no physical damage to any of the district's buildings occurs as a result of the preparation and use of the temporary construction staging/access area, there will not be an adverse effect.

Interlocking Tower (South Norwalk Switch Tower Museum). The property is part of a temporary construction staging/access area that extends along the north side of the parcels on Washington Street. Provided no physical damage to the building occurs as a result of the preparation and use of the temporary construction staging/access area, there will not be an adverse effect.

Addition to South Main and Washington Streets Historic District. The South Main and Washington Streets Historic District could reasonably be enlarged to include additional commercial buildings at the north end of Water Street. One of these buildings, 68 Washington Street, a circa1910 yellow-brick commercial building, is adjacent to a temporary construction staging/access area. Provided no physical damage occurs as a result of the preparation and use of the temporary construction staging/access area, there will not be an adverse effect.

Former Norwalk City Hall. This building is relatively remote from the project area and faces away from the project. No impacts are anticipated.

Industrial Buildings Historic District. The existing rail line, Walk Bridge, high towers, retaining walls and catenary support structures form an important part of the overall setting of this potential district, both because the age of these components (1896-1914) reflects the district's period of significance and because the railroad played a critical role in the development of the area for industrial use. Removal of the bridge, high towers, catenary support structures, and retaining walls will diminish the integrity of setting of the individual buildings and the potential historic district, as could incompatible new construction to replace these elements, thereby resulting in an indirect (visual) adverse effect.

The parking areas of the former Norwalk Lock complex at 18 Marshall Street will be used for temporary construction staging/access areas. Provided no physical damage occurs as a result of the preparation and use of the temporary construction staging/access areas, there will not be an adverse effect. Similarly, use of land adjacent to the former Norwalk Iron Works, 10 North Water Street, which currently has parking and modern buildings associated with the Maritime Aquarium, will not result in an adverse effect, provided no physical damage occurs to the historic buildings on the property as a result of the preparation and use of the construction staging/access areas or permanent access areas.

Liberty Square Historic District. This potentially eligible historic district is adjacent to a temporary construction staging/access area. Provided no physical damage to any of the district's buildings occurs as a result of the preparation and use of the temporary construction staging/access area, there will not be an adverse effect.

The two Build Alternative options would be similar in their effects on standing historic properties. The only difference is that the Vertical Lift Bridge would introduce a more-visible instance of new construction and therefore could have a greater visual effect on the settings of adjacent historic properties. However, as with Bascule Bridge, the design for the elements of the Vertical Lift Bridge would be as visually compatible as possible with the character of these adjacent historic properties.

Table 3-22 presents a tabulation of the recommended findings of effects of the project on NR-listed, eligible, and potentially eligible properties.

Table 3-22–Recommended Findings of Effects of Project on Listed, Eligible, and Potentially Eligible Properties

Property	National Register Status	Effects(s) and Recommended Finding
Norwalk River Railroad Bridge (Walk Bridge)	Listed	To be replaced: Adverse Effect.
High Towers	Contributing to an eligible linear historic district	To be removed: Adverse Effect.
Catenary Support Structures	Contributing to an eligible linear historic district	Some or all of the existing catenary support structures will be removed: Adverse Effect.
Stone Retaining Walls	Contributing to an eligible linear historic district	To be removed: Adverse Effect.
South Norwalk Railroad Bridge	Contributing to a listed historic district	No Adverse Effect.
Fort Point Street Railroad Bridge	Contributing to an eligible linear historic district	To be removed: Adverse Effect.
South Main and Washington Streets Historic District	Listed	1. Removal/replacement of bridge and high towers will have a visual impact on the district's setting: indirect (visual) Adverse Effect. 2. Construction staging/access area along the edge of the district on the north side of Washington Street: No Adverse Effect conditional upon no damage.
Interlocking Tower (South Norwalk Switch Tower Museum)	Contributing to a listed historic district.	No adverse Effect conductional upon no damage.
Addition to South Main and Washington Streets Historic District	Potentially eligible	Building at 68 Water Street is adjacent to construction staging/access area: No Adverse Effect conditional

Property	National Register Status	Effects(s) and Recommended Finding
(50, 53, and 68 Water Street)		upon no damage.
Former Norwalk City Hall, 41 North Main Street	Listed	No Effect.
Industrial Buildings Historic District	Potentially eligible	Removal of the high towers and removal and replacement of the Walk Bridge, catenary support structures, and stone retaining walls will have a visual impact on the setting of the potentially eligible historic district: Indirect (Visual) Adverse Effect.
Former Norwalk Lock Company, 18 Marshall St.	Eligible	1. Removal of the high towers and removal and replacement of the Walk Bridge, catenary support structures, and stone retaining walls will have a visual impact on the building's setting: Indirect (Visual) Adverse Effect. 2. Use of parking areas for construction staging/access area: No Adverse Effect conditional upon no damage.
Former Norwalk Iron Works (Maritime Aquarium), 10 North Water St.	Potentially eligible as contributing to an historic district	1. Removal of the high towers and removal and replacement of the Walk Bridge, catenary support structures, and stone retaining walls will have a visual impact on the building's setting: Indirect (Visual) Adverse Effect. 2. Use of nearby areas for construction staging/access areas or permanent access areas: No Adverse Effect conditional upon no damage.
Liberty Square Historic District	Potentially eligible	Adjacent to construction staging/access area: No Adverse Effect conditional upon no damage.

Archaeological Resources

Archaeological assessment was conducted for the terrestrial parcels within the APE that are proposed for construction easements, staging, storage, and access areas (Figure 3-60). The proximity of the project area to the Norwalk River and its associated marshlands and feeder streams suggests that many of these parcels are highly sensitive for pre-Colonial resources, while the long industrial and residential history of the APE indicates that many of the parcels have the potential to contain historic-period domestic, industrial, and railroad-related sites.

Potential impacts to buried archaeological resources in terrestrial construction, staging, storage, and access areas include compaction due to heavy machinery or fill and soil disturbance from large vehicle treads/tires, machine excavation, and drilling. However, it is not possible to assess conclusively the Build Alternative impacts to potential subsurface archaeological resources until the project plans are advanced. Similarly, potential impacts to underwater and shoreline archaeological resources in riverine parcels, including those areas proposed as dredging areas, substructure locations, footings for a run-around alignment, temporary work trestle locations, and the possible submarine cable trench, also are impossible to quantify without more developed project plans.

While several of the proposed project parcels have been assessed as having low archaeological sensitivity based on the results of background research (Table 3-21), additional testing is required to determine the presence or absence of archaeological resources in many of the parcels. Geoarchaeological assessment, in the form of vibracores and manual soil cores, will identify locations within the project parcels that contain intact buried soils, as well as those that have been thoroughly disturbed by 19th- and 20th-century development. Exposure of intact buried soils in areas determined to be archaeologically sensitive will then be necessary to determine the presence or absence of archaeological deposits.

CTDOT is evaluating a combination of bathymetric, vibracore, and hand-auger data (Figure 3-61), along with data gathered from pedestrian (on-foot) survey of shorelines and intertidal areas within the APE, to determine the potential for intact cultural resources in underwater, riverbank, and intertidal parcels slated for project use. Geoprobe-derived data is being evaluated to determine the potential for intact cultural resources in terrestrial areas slated for project use. The ongoing testing, along with archaeological monitoring in select areas, are adequate methods for evaluating the presence and/or potential for subsurface cultural materials, reconstructing paleogeography, evaluating depositional environments, and potentially recording changes in historical land use. The collected data will be analyzed to provide recommendations for further investigations or mitigation, based on an overall assessment of archaeological potential within the APE. In areas determined to possess archaeological sensitivity, additional archaeological assessments will be required to accurately assess project impacts. Note that additional testing locations and/or refinement of testing locations shown on Figure 3-61 may be required contingent upon field conditions and as design advances.

The archaeological impacts of the Build Alternative options are likely to be similar, except that the Vertical Lift Bridge options (Options 8A and 11C) would not require assessing the footings for a run-around alignment that could be used with the Bascule Bridge option (Option 4S). The evaluation of potential project impacts will be refined as project plans are further developed.

3.22.4. Mitigation Measures

Adverse effects to above-ground resources will be mitigated through measures agreed upon during ongoing agency and stakeholder consultation. Agencies and stakeholder groups involved in consultation include CTSHPO, the Norwalk Historical Commission, Norwalk Preservation Trust, Norwalk Historical Society, and the SONO Switch Tower Museum, as well as the Tribal Historic Preservation Offices (THPO) of the Mashantucket Pequot Tribal Nation and the Mohegan Tribe of Indians of Connecticut. Appendix 1 contains a Draft Memorandum of Agreement (MOA) for the Walk Bridge Replacement Project. FTA, CTDOT and CTSHPO will serve as signatory parties to the MOA, and the stakeholder groups and THPOs will serve as concurring parties to the MOA.

Based upon mitigation measures that were developed and approved for similar projects in the past, appropriate mitigation measures for this project could include the following:

- Pre-construction documentation of historic resources that will be lost;
- Designs for new elements that will be visually compatible with adjacent historic properties;
- Re-use of stone to face new walls and/or bridge abutments; and
- Interpretive installations for the public and other educational programs.

For archaeological resources, mitigation measures will be refined once the types and significance of archaeological resources in the APE are known and the project impacts to those resources are defined. The Draft MOA contains an Archaeological Treatment Plan (Appendix A) to address project impacts to under-ground resources. Typical mitigation measures include terrestrial and/or underwater archaeological data recovery programs, public education, and paleoenvironmental reconstruction based on geoprobe, vibracore, and manual soil core data.

Archaeological data recovery programs, comprising the removal of all or part of a site, would be appropriate in areas where significant archaeological sites will be impacted, if those areas are accessible and safe to excavate (i.e. not contaminated). Data recovery programs would be prepared in consultation with CTDOT, FTA, and CTSHPO.

Mitigation in the form of a public education program could include information about the history, archaeology, and environment of the project area disseminated to the public through websites, museum exhibits, and public presentations.

A third possible form of mitigation, that would be appropriate for areas that are inaccessible or too contaminated for archaeological excavation, would be the collection and synthesis of geological, environmental, and palynological (pollen) data to reconstruct the prehistoric and early historic environment and associated human lifeways along the Norwalk River. The data for such analyses can be collected with geoprobes, vibracore, and manual soil cores.

3.23. Hazardous and Contaminated Materials/Environmental Risk Sites

3.23.1. Introduction, Methodology, and Regulatory Background

This section addresses the presence of hazardous and contaminated materials and environmental risk sites in the vicinity of the project, including within the Norwalk River. It also presents the findings of investigations conducted to date on the parcels proposed for acquisition and temporary easements for the construction of the project, and identifies federal and state requirements relative to the management of site contamination.

Multiple federal and state regulations address the presence of site contamination and hazardous materials in construction and demolition activities. The U.S. Resource Conservation and Recovery Act (RCRA) created a federal regulatory framework for “cradle to grave” hazardous waste management, from the time it is generated until its ultimate disposal. The 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorized USEPA to respond to releases of hazardous substances that endanger public health, welfare, or the environment. The applicable regulations for addressing asbestos-containing materials (ACM) are USEPA’s National Emission Standards for Hazardous Air Pollutants (NESHAP).[158] The Occupational Safety and Health Administration’s (OSHA’s) Lead in Construction regulations (29 CFR 1926.62) regulate the exposure to lead in construction.

Connecticut has adopted hazardous waste regulations that incorporate federal hazardous waste requirements (under both RCRA and CERCLA), and in some cases, has modified several federal requirements which make Connecticut’s program more stringent or broader than the federal program. Connecticut's Remediation Standard Regulations (RSRs), CGS Section 22a-208a(c)(2); RCSA Sections 22a-133k-1 through 22a-133k-3, provide detailed guidance and standards that are used to determine whether or not remediation of contamination is required. The Connecticut Department of Public Health implements the standards for asbestos abatement (RCSA Sections 19a-332a-1 through 19a-332a-16) and lead abatement (RCSA Sections 19a-111-1 through 19a-111-11 and 20-478-1 and 20-478-2).

[158] 40 CFR Part 61.

CTDOT's Office of Environmental Compliance (OEC) provides technical support and regulatory guidance related to hazardous wastes and regulated contaminated materials, including conducting environmental investigations of suspected waste sites in the vicinity of CTDOT projects and facilities; negotiating cleanup requirements with federal and state regulatory agencies; and managing site remedial activities.

Existing conditions data was derived from historical resources, published databases, and CTDEEP and municipal records, and on-site reconnaissance where possible.

3.23.2. Existing Conditions

The historic and current use of the railroad can result in soil and groundwater contamination. Concurrent with the construction of Walk Bridge in the 1890s, the railroad ROW was elevated through the project area. Built on fill material of unknown origin, it is likely that the ROW contains contaminants such as polycyclic aromatic hydrocarbons (PAHs) from fossil fuel combustion products and metals. Over the years, railroad operations and maintenance could have resulted in contamination from spills or leaks, and the accumulation of total petroleum hydrocarbon (TPH), lead, and other pollutants in the soil. Typical contaminants associated with railroad track bed, soils, and railroad ties include volatile organic compounds (VOCs), found in petroleum products used in fuels, equipment repair and metal works; semi-volatile organic compounds (SVOCs), including PAHs, coal-derived products such as creosote applied as a protection to rail ties, and coal and coal ash used as fill material; and pesticides and herbicides. Additionally, asbestos containing material (ACM) is likely found in equipment structures such as the existing control house.

In November 2014, CTDOT conducted a preliminary screening within approximately one-half-mile (to include potential construction staging areas) of Walk Bridge to assess the potential for encountering contamination. This database search included federal, state, and other lists of identified or potential releases of hazardous or contaminated materials generated for federal and state regulatory programs.[159] Approximately 65 sites listed on federal and/or state databases are located within approximately one-half-mile of Walk Bridge. These databases and sites are listed in Table 3-23; sites are shown on Figure 3-62.

Table 3-23—Potential or Identified Hazardous or Contaminated Materials Sites within Approximately One-half Mile of Walk Bridge

Database	Database Description	Listed Sites	Map Site Number [a]
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List	Sites that have been investigated or are currently under investigation by USEPA for the release, or threatened release, of hazardous substances pursuant to CERCLA.	2	4, 10
CERCLIS-No Further Remedial Action Planned (NFRAP) List	CERCLIS sites that have been removed from the CERCLIS list.	1	64
RCRA-Small Quantity Generator (SQG)	Sites that generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.	4	11, 27, 32

[159] Environmental Data Resources (EDR) Inc. Walk Bridge Replacement, Norwalk, CT Inquiry Number 4141952.2S, November 26, 2014. The database search included a total of 54 federal databases,26 State of Connecticut databases, five Tribal databases, and five EDR proprietary records databases. Note that many sites are listed on more than one database.

Database	Database Description	Listed Sites	Map Site Number [a]
RCRA- Conditionally Exempt Small Quantity Generator (CESQG)	Sites that generate 100 kilograms or less per month of hazardous waste or one kilogram or less per month of acutely hazardous waste.	1	27
RCRA Non-generator sites or sites that are no longer listed (NonGen/NLR)	RCRA sites which do not presently generate hazardous waste	15	10, 11, 13, 20, 27, 27, 28, 30, 32, 34, 36, 40, 42
US BROWNSFIELDS	USEPA's list of Brownfields properties from the Cleanups in My Community Program	5	9, 41, 53, 56
Facility Index System (FINDS)	List with facility information and pointers to other federal databases with additional information.	21	9, 10, 13, 20, 27, 28, 30, 32, 34, 36, 41, 42, 53, 56
US Aerometric Information Retrieval System (AIRS)	Compliance data on air pollution point sources regulated by USEPA and/or state and local air regulatory agencies	3	27, 32, 40
State Databases			
CT State Hazardous Waste Sites (SHWS)	Sites with contamination levels greater than applicable cleanup criteria soil and/or groundwater.	6	2, 8, 58, 64, 65
CT Site Discovery and Assessment Database (SDADB)	Sites where it is suspected that hazardous waste has been disposed.	32	2, 4, 7, 8, 9, 11, 12, 13, 14, 27, 28, 37, 40, 42, 46, 51, 52, 53, 55, 56, 58, 59, 60, 62, 63, 64, 65
CT SWRCY	CTDEEP's inventory of recycling facilities	1	11
CT Underground Storage Tanks (UST)	CTDEEP's inventory of registered underground storage tanks.	18	4, 11, 19, 20, 21, 26, 27, 28, 30, 36, 37, 40, 41, 52, 53
CT Leaking Underground Storage Tanks (LUST)	CTDEEP's inventory of reported incidents of leaking underground storage tanks.	26	4, 6, 7, 14, 16, 18, 19, 20, 24, 31, 34, 39, 40, 44, 52, 53, 54, 56, 59, 61
CT Leachate and Wastewater Discharge Site (LWDS)	CTDEEP's inventory of sites with surface and groundwater discharge that receive wastewater discharge, are waste sites, or are locations of accidental spills.	4	3, 5, 29, 57
CT/NY/NJ/RI MANIFEST	Manifest data, which lists and tracks hazardous waste from generator status through disposal status; identifying 68 sites in CT, six sites in NY, two sites in NJ, and two sites in RI	CT-68; NY-6; NJ - 2; RI - 2	CT=4, 10, 11, 13, 16, 17, 19, 21, 22, 23, 25,26, 27, 28, 32, 33, 34, 36, 37, 38, 40, 41, 43, 47, 49, 50, 52, 53, 56, 59, 62; NY=27, 30, 34, 43, 47; NJ=11, RI=11, 27

Database	Database Description	Listed Sites	Map Site Number [a]
CT SPILLS	CTDEEP's Oil and Chemical Spill database	23	4, 6, 7, 14, 16, 18, 25, 28, 31, 34, 35, 37, 39, 42, 50, 52, 54, 55, 56, 59, 61
CT ENG CONTROLS	Sites with engineered control (self-implementing remedial option) under CT Remediation Standards regulations	1	37
CT AUL	CTDEEP's list of Environmental Land Use Restriction sites	2	11, 53
CT Volunteer Clean Up Priority (VCP)	Sites involved in the CT voluntary remediation program	3	2, 10, 62
CT BROWNFIELDS	Inventory of Brownsfields sites from the CT Brownsfields Redevelopment	4	41, 53, 56
CT ENF	List of sites with enforcement actions	4	2, 4, 14, 59
CT National Pollutant Discharge Elimination System (NPDES)	List of sites with permit NPDES permits issued by CTDEEP	4	2, 11, 27
CT AIRS	List of permitted air sources	2	11, 40
CT PROPERTY	List of sites that meet the definition of hazardous waste establishment	14	2, 9, 11, 13, 14, 27, 37, 40, 46, 51, 56, 59
CT Contaminated or Potentially Contaminated Sites (CPSC)	List of CPSC or "Hazardous Waste Facilities" as defined in CGS Section 22a-134f; this list includes sites that are identified on other federal and state lists, including RCRA and CERCLIS	42	2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 16, 18, 20, 24, 27, 31, 34, 37, 39, 40, 44, 46, 51, 52, 53, 54, 55, 56, 57, 59, 62, 64, 65
CT Significant Environment Hazard (SEH)	List of sites with abatement of short-term risks, per the CT Significant Environmental Hazard Statute	1	37
Other Databases			
Manufactured Gas Plant (MGP)	Manufactured Gas Plant	1	1
US Hist Auto Stat	List of gas stations or automotive service or repair stations (historical records)	15	10, 15, 16, 27, 32, 33, 43, 45,53
US Hist Cleaners	List of potential dry cleaners and cleaning establishments (historical records)	5	34, 48, 53

a. Map site numbers may contain multiple listings.
Source: EDR, CT Inquiry Number 4141952.2S, November 26, 2014

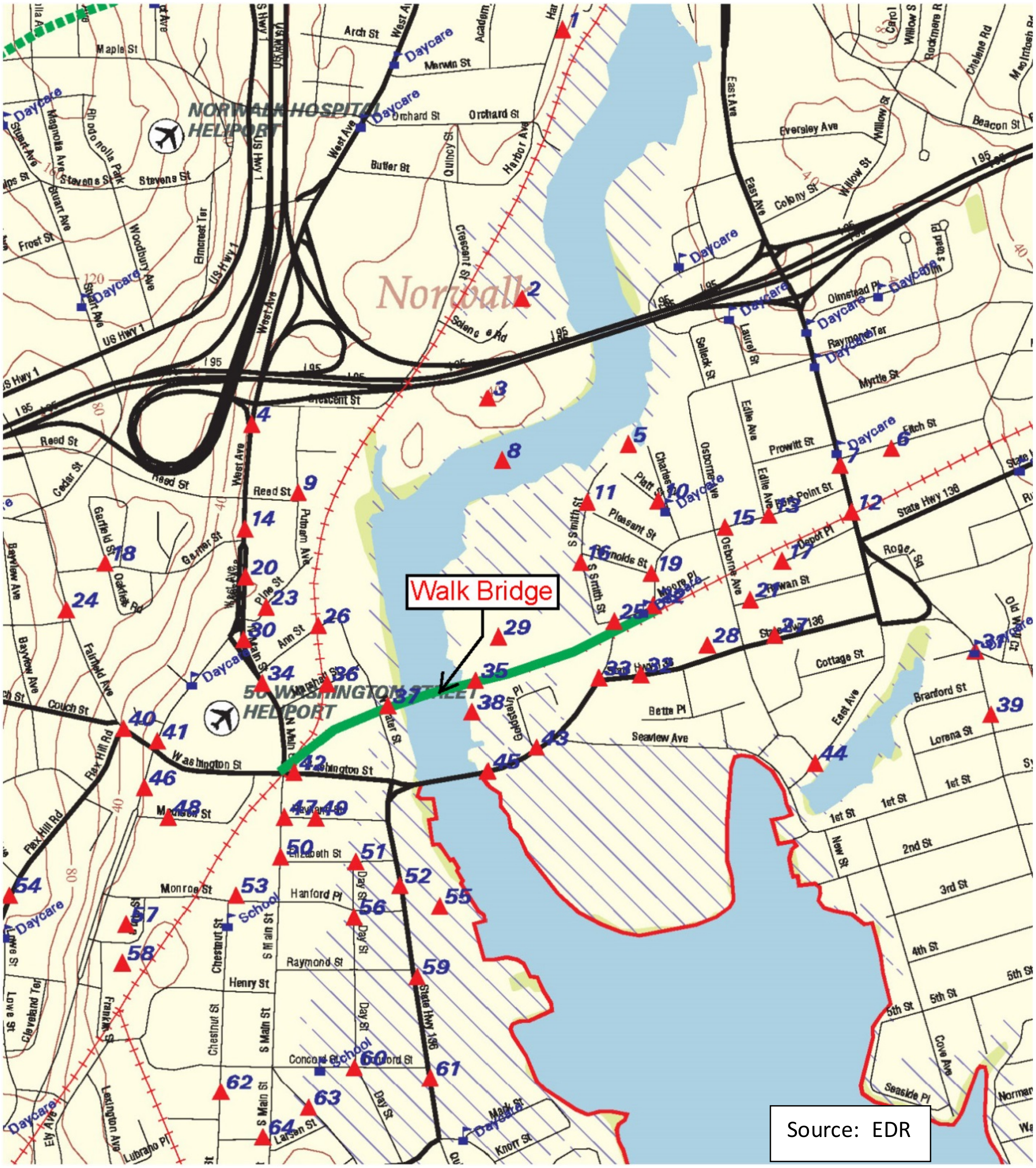

Figure 3-62—Map of Potential or Identified Source of Hazardous or Contaminated Materials within Approximately One-half Mile of Walk Bridge

3.23.3. Potential Impacts

No Build Alternative

In the No Build Alternative, CTDOT would continue to implement its normal bridge maintenance activities. Some activities, such as repair of the existing control house and bridge painting, could require lead and/or asbestos testing and possible abatement. CTDOT would be required to comply with applicable state and federal regulations if the paint on the existing bridge were disturbed and determined to contain lead.

In the No Build Alternative, it is not anticipated that CTDOT would require parcel acquisitions to conduct its normal bridge maintenance activities; therefore, CTDOT would not be responsible for management of environmental risk sites. With the exception of abatement activities that could be required due to regularly-scheduled maintenance, impacts to environmental risk sites or from hazardous material associated with the No Build Alternative would be related to ongoing NHL train operations, as there would be no anticipated demolition of existing facilities.

Build Alternative

As presented in Section 3.6, CTDOT will require the use of 23 parcels for construction staging, laydown, and equipment storage, to be obtained primarily through full-parcel acquisition (nine parcels) and full- or partial-property temporary easements (12 parcels). These parcels are required for all three Build options. CTDOT is required to perform due diligence prior to acquiring properties, including identifying potential on and off-site areas of environmental concern that may have resulted in subsurface contamination at the site.

In September and October 2015, CTDOT conducted Preliminary Site Evaluations (PSEs) of the nine parcels proposed for acquisition and three of the parcels proposed for temporary easements.[160] Due to the current or historical uses of the sites or to off-site operations, site-specific potential release areas (PRAs) exist, and Subsurface Site Investigations (SSIs) were recommended at six parcels. As part of its due diligence, CTDOT's OEC is completing SSIs or Exploratory Site Characterization Reports for the six parcels proposed for acquisition.[161] Should the SSIs indicate that soil or groundwater within the parcel contains regulated compounds at concentrations exceeding the applicable soil and groundwater clean-up criteria, then additional investigation or active remediation may be required. Additionally, a site-specific Environmental Health and Safety Plan (HASP) may be required. For those sites without significant contamination that would require additional investigation or active remediation, proper management and disposal is required for any contaminated materials that may be removed, handled, transported, or disposed during construction. Table 3-24 presents the results of the PSEs and SSIs conducted to date on parcels proposed to be acquired.

The Build Alternative will require the management and disposal of sediment and soils associated with water-based and land-based construction activities. In the Bascule Bridge (Option 4S), approximately 15,100 cy of sediment will managed and disposed, and in the two Vertical Lift Bridge options (Option 8A and Option 11C), approximately 16,700 cy of sediment will be managed and disposed. Additionally, off-site disposal of excavated soils may be required; requirements will be refined as design advances. The off-site disposal of sediment and soil represents a permanent impact of the project. Section 5.3.18 further

[160] BL Companies, Inc. Task 120 – Preliminary Site Evaluation, Replacement of Walk Bridge over Norwalk River, various parcel reports, Prepared for CTDOT Division of Environmental Compliance, September and October 2015.
[161] BL Companies, Inc. Task 210 – Subsurface Site Investigation Report, Replacement of Walk Bridge over the Norwalk River, various parcel reports, Prepared for CTDOT Division of Environmental Compliance, February 2016.

describes hazardous material management activities for which CTDOT will be responsible during construction of the project.

Table 3-24—Preliminary Site Evaluations of Proposed Acquistition Parcels

Map/ Block/ Lot	Address	Site Evaluation Results	Next Steps
Acquisition Parcels			
3/1/15	1 Goldstein Place	Evidence of potential release areas (PRAs) exists due to historical site uses and off- site historical operations adjacent to or in upgradient or cross-gradient locations. Exterior shingles are asbestos-containing material (ACM).	No further site investigation recommended.
3/1/16	3 Goldstein Place	Evidence of PRAs exists due to historical site uses and off- site historical operations adjacent to or in upgradient or cross-gradient locations.	No further site investigation recommended.
3/1/29	4 Goldstein Place	Evidence of PRAs exists due to historical site uses and off- site operations adjacent to or in upgradient or cross-gradient locations. Subsurface site investigation (SSI) completed.	No additional investigation or active remediation required.
3/1/24	5 Goldstein Place	Evidence of PRAs exists due to historical site uses and off- site operations adjacent to or in upgradient or cross-gradient locations.	No further site investigation recommended.
3/1/19	6 Goldstein Place	Evidence of PRAs exists due to current and historical site uses and off- site historical operations adjacent to or in upgradient or cross-gradient locations.	SSI ongoing
3/1/22	9 Goldstein Place	Evidence of PRAs exists due to historical site uses and off- site, historical operations adjacent to or in upgradient or cross-gradient locations. SSI completed.	No additional investigation or active remediation required.
3/1/30	10 Goldstein Place	Evidence of PRAs exists due to current and historical site uses and off- site historical operations adjacent to or in upgradient or cross-gradient locations.	SSI ongoing.
3/1/25	11 Goldstein Place	Evidence of PRAs exists due to historical site uses. SSI completed.	No additional investigation or active remediation required.
3/1/8	217 Liberty Square	Evidence of PRAs exists due to historical site uses. SSI completed.	No additional investigation or active remediation required.

Sources: BL Companies, Inc. *Preliminary Site Evaluations*, multiple property reports, September and October 2015; prepared for CTDOT, BL Companies Project Number 14EC0022; CTDOT Project No. 301-76; Assignment No. 314-5074 . *Subsurface Site Investigations*, multiple property reports, February 2016, prepared for CTDOT, BL Companies Project Number 14EC0028; CTDOT Project No. 301-76; Assignment No. 314-5178.

3.23.4. Mitigation Measures

CTDOT's OEC will be responsible for overseeing the environmental screening procurement and completion of the properties to be acquired for the Build Alternative. If contamination is identified on the sites, CTDOT's OEC will ensure that proper procedures are followed with respect to the contamination and that remediation is performed pursuant to federal and state laws and regulations, including the preparation of site-specific Environmental HASPs.

3.24. Safety and Security

3.24.1. Introduction, Methodology, and Regulatory Background

This section presents an overview of existing safety and security conditions in the NHL corridor, including rail safety and marine safety in the vicinity of the project site, and addresses safety and security implications of the Walk Bridge Replacement Project.

Pursuant to 49 CFR 209.1, FRA is responsible for enforcing federal statutes and regulations related to railroad safety, including track safety, railroad operations, railroad workplace safety, and train control systems.

As the owner of Walk Bridge and the NHL, CTDOT is responsible for providing for the safety of the traveling public and protecting the state's capital investment in the bridge. CTDOT has implemented a security program in cooperation with Metro-North, Amtrak, and other partners.

Pursuant to 33 CFR 160 et seq., USCG is responsible for enforcing federal laws to insure the safety of vessels and waterfront facilities, and the protection of navigable waters. The Norwalk Harbor Management Plan provides guidelines and recommendations for the use of Norwalk Harbor, including setback from the federal navigation channel, public safety, and boat mooring, in accordance with City and state regulations. The City of Norwalk Police Department's Marine Unit and the harbormaster enforce state boating regulations (CGS Section 15-121).

Existing plans and initiatives to improve rail safety and security were identified by reviewing available information, including publications by the National Transportation Safety Board, CTDOT, and MTA/Metro-North. Existing plans and initiatives relative to marine safety and security were identified through a review of USCG and CTDEEP publications.

3.24.2. Existing Conditions

Rail Safety and Security

CTDOT's System Safety Program Plan is the principal rail equipment safety document. The plan addresses fire protection, inspection and testing, maintenance and repair of equipment, employee training and qualification, system modifications, configuration management, internal safety management assessment and the safety certification process. Since the terrorist attacks of September 11, 2001, CTDOT has instituted emergency response plans, which are reviewed and updated on a continuous basis.

Through the federal Transit Security Grant Program (TSGP), CTDOT has implemented many of its security priorities, focused on protecting critical surface transportation infrastructure. Since 2005, CTDOT has received over $25 million, which has funded infrastructure projects such as the installation of fencing, access controlled gates, guard posts, and other security features at rail yards and Closed Circuit Television Video Cameras (CCTVs) at rail stations, rail yards, and bridges on rail lines. Other projects include funding to implement a public awareness campaign specific to the NHL service area, conducting law enforcement operations dedicated to transit security, and the planning of emergency preparedness exercises.

In December 2013, FRA issued Emergency Order No. 29, "Establishing Requirements for Controlling Passenger Train Speeds and Staffing Locomotive Cabs at Certain Locations on the Metro-North Commuter Railroad Company." FRA required Metro-North to identify main track locations with a reduction of more than 20 mph from the maximized authorized operating speed for passenger trains, and then modify its existing signaling system to enable adequate advance warning of and adherence to speed restrictions. The existing signaling system on the NHL consists of Automatic Train Control (ATC) with CAB signaling.[162,163] Metro-North implemented the requirements of Emergency Order No. 29 at the six curve and/or bridge locations on the NHL with reduced operating speed, including Walk Bridge, by September 2014.

In June 2014 Metro-North developed a "100-Day Action Plan" which outlined 32 initiatives to improve safety and reliability of railroad operations, based on operations assessments by the National Transportation Safety Board, the FRA, the Transportation Technology Center (TTCI), and the MTA Blue Ribbon Panel on Safety. Safety/security initiatives include installing new timber ties, continuous welded rail, new miter rails and presence detectors at Walk Bridge, which were completed in 2015.

CTDOT is working with MTA and Metro-North to comply with the federal mandate for implementing Positive Train Control (PTC) along the New Haven Line (as listed in Table 3-1). In its October 2015 update to its Capital Program Oversight Committee, MTA reported that Metro-North is targeting full implementation of PTC by December 2018. Metro-North is conducting a pilot test for PTC functionality from Bridgeport to New Haven. The pilot program started in September 2015 and is estimated to be completed by summer 2016. By December 2017, Metro-North anticipates that PTC will be fully deployed on 100 percent (270) of its wayside miles. By December 2018, Metro-North anticipates that PTC will be fully functional on 100 percent (343) of its on-board units.[164] To date, Amtrak has implemented PTC technology on about 400 miles of the track it owns on the NEC, including its New Haven to Boston route.

Passenger Safety and Security

MTA's Police Department is the primary law enforcement agency for Metro-North, and is responsible for policing the 36 rail stations in the state of Connecticut that Metro-North services and patrolling the railroad ROW in Connecticut from Greenwich to New Haven, as well as the NHL branch lines. Amtrak Police is the primary law enforcement agency for the Amtrak intercity passenger service in Connecticut on the Springfield Line and Shoreline.

MTA is the lead agency responsible for addressing major emergencies at its operating agencies. Metro-North is responsible for developing its own emergency response plans, which the MTA reviews. Metro-North's emergency plans to address specific types of emergencies include the Weather Emergency Service Plan, Emergency Evacuation Procedures for Fire, Emergency or Hazmat Incidents, and the Electrical Power Shortage Plan. Metro-North also provides printed and electronic on-board emergency evacuation procedures for passengers, which specify that passengers are to evacuate from trains only with the supervision and assistance of train crew members.[165]

Metro-North is responsible for conducting annual customer satisfaction surveys on Metro-North rail lines. The most recent survey of customer satisfaction was conducted in June 2014, following a period in which several incidents occurred on the railroad, including the two outages on Walk Bridge. For Metro-North

[162] A CAB signal is a signal located in the engineman's cab or compartment indicating a condition affecting the movement of a train or engine and used in conjunction with interlocking signals and in conjunction with or instead of block signals (fixed signals at the entrance of a block to govern trains and engines entering and using that block). ACS allows railroad operators to monitor train speed, maintain a safe braking distance, and maintain train separation.

[163] The NHL Waterbury Branch has a Manual Block System.

[164] http://web.mta.info/mta/news/books/pdf/150622_1315_CPOC.pdf.

[165] Metropolitan Transportation Authority, Long Island Railroad and Metro-North Railroad, "On Board Train Emergency and Evacuation Instructions," http://web.mta.info/mta/pdf/railsafety.pdf, Accessed 1/26/2016.

East of Hudson, which includes trains crossing over Walk Bridge, the percentage of customers reporting that they were satisfied or very satisfied with their personal security on trains and at home boarding stations remained high (near and exceeding 90 percent) from 2010 to 2014. From 2010 to 2014, the percentage of customers satisfied or very satisfied with communications during unplanned service interruptions, such as the bridge failures, declined substantially. For communications at boarding stations, the percentage of satisfied and very satisfied customers declined from a high of 76 percent in 2010 to 55 percent in 2014. For communications on board trains, the percentage of satisfied and very satisfied customers declined from a high of 81 percent in 2010 to 63 percent in 2014.[166]

In its "100-Day Action Plan," Metro-North implemented changes to enhance customer and employee safety, and indicated that the integration of the plan improved safety and performance throughout the system.[167]

Marine Safety and Security

A CTDOT River Use Survey of navigational users indicated that the river is busy, particularly during the peak recreational boating summer season, and barges that use the river (for deliveries of aggregate, masonry, sand and fuel oil) have difficulties negotiating the channel at the bridge because of the bend in the river to the north of the bridge.[168] The narrow navigational channel under the Walk Bridge also contributes to the risk of boat collisions. On September 24, 2014, the Norwalk Harbormaster scheduled a boating safety forum open to the public, in response to the collision earlier that month of a rowing club boat and small powerboat beneath the Walk Bridge.[169] The reason given by the harbormaster for the forum was the accident, as well as "other navigational difficulties" in that part of the river.

The narrow navigational channel under the Walk Bridge, with an existing horizontal clearance of 58 feet on the west and 53 feet on the east, has historically contributed to collisions of marine vessels with bridge fenders. As a result of repeated vessel collisions with the fender system, CTDOT scheduled emergency repairs to the existing Walk Bridge fender system along the east channel of the Norwalk River. The repairs started in July 2016) and are estimated to take four to six months.

3.24.3. Potential Impacts

No Build Alternative

In the No Build Alternative, CTDOT would continue to implement its existing security program and Metro-North would continue to implement its customer and employee safety improvements as outlined in its 100-Day Action Plan. Ongoing safety measures, such as exterior bridge lighting and navigation lighting would be maintained and upgraded as required. However, as indicated in the Project Purpose and Need (Chapter 1), the existing bridge does not meet current design safety standards.

Due to the age of the structure and history of bridge mechanical failures, future bridge failures may be expected, adversely affecting thousands of commuters as well as marine traffic. The unreliability of Walk Bridge could lead to reduced customer satisfaction, similar to what Metro-North experienced following

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[166] Metro-North Railroad, 2014 Customer Satisfaction Survey. http://web.mta.info/mta/news/books/docs/2014-MNR-CSS-Board-Presentation.pdf.
[167] http://web.mta.info/mta/news/books/docs/2014-MNR-CSS-Board-Presentation.pdf.
[168] CTDOT, "Bridge Safety and Evaluation: River Use Survey, Bridge: Walk Bridge No. 41.47, Metro-North Railroad over Norwalk River, prepared by CME Associates, Inc., October 1999.
[169] The Hour Online, "Norwalk Harbormaster to host boating safety forum Wednesday evening," September 20, 2014, http://www.thehour.com/news/norwalk/norwalk-harbormaster-to-host-boating-safety-forum-wednesday-evening/article_1ff141d0-d018-5aa6-ba9d-1e84bc923f76.html.

the bridge failures in spring 2014. Bridge outages create potential safety and security hazards for passengers. Further, the vulnerability of the existing bridge to natural hazards would increase as the bridge ages.

In the No Build Alternative, the narrow navigational channel would not be widened to better accommodate vessels and to improve alignment with the Stroffolino Bridge. It may be anticipated that marine traffic collisions with the existing bridge fenders might continue.

Build Alternative

Similar to the No Build Alternative, in the Build Alternative, ongoing CTDOT and Metro-North safety and security measures will be maintained. The project will incorporate a number of safety and security measures, including a CCTV system, exterior lighting located along the bridge structure, and navigation lighting to meet USCG requirements. The CCTV system will provide for increased security relative to operations (bridge, navigation channel, and boat traffic) and surveillance (pedestrian and vehicular activity, control house and exit and entrance points, and anchorage and pier points).

Chapter 4 identifies resiliency measures that will be incorporated into the new bridge design, construction, and operation; these measures will provide safety and security in the event of natural hazards.

The replacement bridge will improve safety and security from both rail and marine transportation perspectives. The operational redundancy provided through the construction of two independent spans will minimize the potential for rail operation disruptions. The higher vertical clearance, the wider navigation channel, and the channel realignment with the Stroffolino Bridge will improve marine navigation.

Chapter 5 presents safety and security measures that will be incorporated during project construction, including a public safety program and an emergency communications system with the Norwalk Police and Fire departments.

3.24.4. Mitigation Measures

Due to the safety and security improvements anticipated with the replacement bridge, mitigation measures will not be required.

3.25. Public Utilities and Service

3.25.1. Introduction, Regulatory Background, Methodology

This section provides information on existing utilities in the vicinity of Walk Bridge and assesses the impact of the project upon utility services.

Information regarding the nature and extent of existing utilities was compiled from consultation with the various utility companies that serve the area and mapping provided by the City of Norwalk.

3.25.2. Existing Conditions

The area around Walk Bridge is serviced by utilities typical of an urban setting. The City of Norwalk provides water, stormwater, sanitary sewer, and electric services. Eversource Energy provides additional local electric service and gas service, as well as controlling the transmission lines that run on the high towers along the rail corridor at Walk Bridge. Metro-North controls a series of catenary structures that support communication and signal lines that supply the passenger rail service travelling along this corridor.

Potable Water

Water service in the area of Walk Bridge is provided by South Norwalk Electric and Water (SNEW) on both the east and west sides of the river. Drinking water for the area is surface water that comes from four reservoirs located in the Towns of Wilton and New Canaan, including City Lake, Rock Lake, and Popes Pond Reservoirs in Wilton and the New Canaan Reservoir in New Canaan.

Mapping provided by SNEW shows a 16-inch cast iron line that runs along North Water Street and provides domestic and fire protection water service along the west side of the Norwalk River in the vicinity of Walk Bridge. This line currently provides water service to the Walk Bridge control house. On the east side of the river, in the vicinity of the bridge, a 6 inch cast iron service line located along Goldstein Place (that branches off a 10-inch cast iron line located along Washington Street) provides domestic and fire protection water service.

Sanitary Sewer

The Norwalk Water Pollution Control Authority (WPCA) provides sanitary sewer service in the area of Walk Bridge. The WPCA oversees the operation and maintenance of an extensive sewer system that includes 180 miles of pipeline, 22 pumping stations, and an 18 million gallon per day advanced secondary wastewater treatment plant (WWTP)[170]. The wastewater treatment plant is located directly northeast of the Walk Bridge and adjacent to the rail corridor. Wastewater treated by the WWTP is discharged into the Norwalk River and must meet both federal and state effluent quality standards.

Mapping provided by the City of Norwalk shows a 54-inch sanitary sewer main running along North Water Street and connecting to the WWTP via a 60-inch line that runs beneath the Norwalk River approximately 700 feet north of Walk Bridge. On the east side of the river there are sanitary sewer lines on Goldstein Place and along Washington Street that feed into the WWTP via a sewer main that crosses under the rail corridor approximately one-quarter-mile east of Walk Bridge.

Stormwater System

The stormwater system in the area of Walk Bridge primarily is limited to the west side of the bridge and includes both municipal and private stormwater conveyances. The City of Norwalk's North Water Street Pumping Station, located behind the IMAX Theater adjacent to the rail corridor, discharges into the Norwalk River between the rail bridge and the theater. There is a 12-inch clay pipe drainage line that runs along North Water Street that discharges through the North Water Pump Station, and a storm sewer line that crosses under the aquarium loading dock and the enclosed pedestrian passageway, then runs parallel with the bridge along its southern face before it discharges into the Norwalk River.

On the east side of the river, the closest storm sewer system to Walk Bridge is near Liberty Square, located at the intersection of Goldstein Place and State Route 136.

[170] WPCA website: http://www.wpcanorwalk.org/ (accessed August 24, 2015)

Electric Service

Electric service in the vicinity of Walk Bridge is provided by two different sources. SNEW services the area on the west side of the bridge. The majority of the service around Walk Bridge is provided via underground conduits that run along North Water Street perpendicular to the bridge, including to the Walk Bridge control house. An underground submarine cable, located approximately 10 feet from the northeast corner of the Walk Bridge support pier, runs northeasterly across the Norwalk River.

Norwalk's Third Taxing District (TTD) provides electric service on the east side of the bridge. Above ground conduits located along Goldstein Place and Fort Point Street provide electric service to the areas immediately adjacent to Walk Bridge.

Natural Gas

Natural gas service in the vicinity of Walk Bridge is provided by Eversource Energy. There is a single 8-inch main that runs along North Water Street and services the area on the west side of the river.

High Towers

Two high towers, located on the east and west sides of the Norwalk River over the rail corridor, carry 22 Metro-North aerial power conductors and aerial communication/signal cables, and eight Eversource Energy 115kV transmission lines[171]. The towers are steel latticed frame, and were constructed in 1912 and rehabilitated in 1990. The tower frames consist of a rigid H-configuration with two lower legs, three horizontal struts connecting the legs, and two sets of primary cross bracing between the lower legs. The towers originally had a height of 199 feet above the base, but were later modified with overbuilds, increasing their height to approximately 235 feet.

3.25.3. Potential Impacts

No Build Alternative

The No Build Alternative would have no long term or temporary effects on public utilities and service in the project area.

Build Alternative

The Build Alternative will have no long term adverse effects on local public utilities in the project area. This includes systems for potable water, sanitary sewer, stormwater, local electric service, telephone, cable, and natural gas service. If any utility relocation is required in the area of construction, they will be relocated in accordance with CTDOT construction specifications.

The WWTP discharge into the Norwalk River will not be affected. Similarly, existing stormwater discharges and the North Water Street pump station on the west side of the river will not be affected.

Due to the removal of the high towers, Eversource Energy high voltage transmission lines that currently cross the Norwalk River on the high towers will require relocation. The relocation of the utility functions on the high towers is not part of the Walk Bridge Replacement Project, but will be an indirect effect of the project. The Eversource power relocation will undergo a separate environmental evaluation and

[171] Connecticut Department of Transportation, Office of Rail Project, *"Relocation Feasibility Study High Towers Walk and Saga Movable Railroad Bridges, Final Submittal"*, February 12, 2010.

permitting process, which will include opportunities for public review and comment. Eversource Energy willbe responsible for relocating its lines and the associated environmental evaluations and permits. CTDOT will be responsible for removing the existing high towers as part of the Walk Bridge Replacement Project.

3.25.4. Mitigation Measures

Long term mitigation for public utilities with the Build Alternative is not needed or proposed.

No interruption to power service is anticipated. Engineering studies are being undertaken for the Eversource power relocation, and CTDOT is coordinating with Eversource Energy, Metro-North, CTSHPO, the City of Norwalk, and stakeholders to determine the best option for replacing the utility functions that exist on the high towers.

3.26. Title VI and Environmental Justice

3.26.1. Introduction, Regulatory Background, Methodology

This section presents an overview of federal and state requirements relative to environmental justice (EJ) and addresses the project's compliance with those protections.

Federal protections for EJ include EO 12898, "*Federal Actions that Address Environmental Justice in Minority Populations and Low-Income Populations*," and Title VI of the Civil Rights Acts of 1964. EO 12898 directs federal agencies to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Title VI directs that "each federal agency shall ensure that all programs or activities receiving federal assistance that affect human health or the environment do not….discriminate on the basis of race, color, or national origin."

The U.S. Department of Transportation (USDOT) Order 5610.2, "*Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," (*May 10, 2012) sets forth steps to prevent disproportionately high and adverse effects to minority or low-income populations. The USDOT Order frameworks the Title VI and EJ analyses conducted as part of transportation planning and NEPA provisions.

FTA and CTDOT also have issued regulatory guidance on EJ/Title VI, which define Title VI to include providing meaningful access for limited English proficiency (LEP) populations, defined as households where no one over the age of 14 speaks English only or speaks English "very well."[172]

The Title VI/EJ analysis for this project entailed collecting U.S. Census Bureau's 2010 Census, 2010 Demographic Profile Data for the three census tracts encompassing the project area, defined as roughly one-half-mile from the project site, and larger geographic areas. Low-income populations were identified using the poverty statistics from the U.S. Census Bureau's 2009-2013 5-year Estimates, Selected Economic Characteristics from the American Community Survey (ACS). ACS data from 2009-2013 also

[172] FTA guidance includes FTA Circular 4703.1, *Environmental Justice Policy Guidance for Federal Transit Administration Recipients* (August 15, 2012), and FTA Circular 4702.1B, *Title VI Requirements and Guidelines for Federal Transit Administration Recipients* (October 1, 2012). The FTA circulars also indicate that identification of EJ populations should be based on a comparison of project area EJ characteristics to those of the average proportion in the service area or planning area of the Metropolitan Planning Organization or state DOT, or other appropriate broader geographic area (such as city, county, state). The CTDOT *Title VI Program*, issued March 31, 2014, also provides guidance on performing EJ/Title VI assessments for NEPA documents.

was used to identify populations with LEP. Note that changes in the demographic composition that may have resulted from recent redevelopment in the SoNo District (as presented in Section 3.8) are not captured in the 2010 Census data (race statistics).

3.26.2. Existing Conditions

On an annual basis, SWRPA develops demographic profiles for the eight municipalities in the South Western Region and assesses the Region's transportation planning programs, such as the Transportation Improvement Program and Long Range Transportation Plan, for compliance with the guiding principles of environmental justice.[173] Populations of concern for Title VI/EJ are identified as part of the transportation planning process for the South West Region (including the project area), based on comparison with the regional means (average) of the following three EJ criteria for the planning area:

- Percent of minority population (non-whites, Hispanic);
- Per capita income; and
- Percent of persons below the poverty level.

If a census tract meets the threshold value for these criteria,[174] it is considered to meet EJ criteria.[175] This assessment used census tracts as the geographic level for data, as it was the most precise geographic level available for the ACS data. If a census tract meets all three criteria, it is considered by SWRPA to be a Community of Concern. Based on this assessment, SWRPA identified Communities of Concern that include the three census tracts that comprise the project study area.

Table 3-25 compares the minority, low-income populations, and per capita income in the study area census tracts to those for the city of Norwalk, the SWRPA, Fairfield County, and the state as a whole. The population in the three census tracts in the study area totals 13,477, of which approximately 65 percent consists of minorities.[176] This is higher than the average minority percentage for the city of Norwalk (approximately 44 percent), the SWRPA region (approximately 32 percent), Fairfield County (approximately 34 percent), and the state as a whole (approximately 29 percent). The total study area percentages of blacks (approximately 22 percent), Hispanics (approximately 20 percent), and other non-whites (approximately 20 percent) were elevated compared to the percentages for the city, the SWRPA region, the county, and the state as a whole, as shown in Table 3-25.

Of the three study area census tracts, two of the western tracts (Tracts 440 and 441) exceeded the regional averages for low-income populations (persons below the poverty level),[177] as shown in Table 3-25. Per capita income for the study area census tracts was generally lower than per capita income for the SWRPA, county, and state as a whole.[178]

[173] South Western Regional Planning Agency, *Transportation Planning Programs Including the Transportation Improvement Program 2012-2015 and the Long Range Transportation Plan 2011-2040*, August 2013.
[174] In the case of per capita income, the census tract was considered to meet EJ criteria if that if it does not equal or exceed the regional per capita income.
[175] This evaluation by SWRPA was based on the 2010 Census of Population and Housing, Redistricting Data and the 2007-2011 ACS 5-year Estimates.
[176] The percentages of non-whites were 72.4 percent for census tract 440, 69.2 percent for census tract 441, and 50.9 percent for census tract 442.
[177] Census tract 440 and census tract 441 had low-income populations that exceed the average low-income populations for the SWRPA, the city of Norwalk, the county, and the state. However, the low-income population for census tract 442 was comparable to that for the city, county, and state as a whole.
[178] The one exception was for census tract 441, which had a per capita income that only exceeded the average state per capita income.

Table 3-25—Minority and Low-Income Population Characteristics for the Study Area and Regions

Population Characteristic	State	Fairfield County	SWRPA Region	City of Norwalk	Tract 440	Tract 441	Tract 442	Total Study Area
Total Population	3,574,097	916,829	364,519	85,603	5,974	3,509	3,994	13,477
White	2,546,262	606,716	248,043	47,718	1,647	1,080	1,962	4,689
% White	71.2%	66.2%	68.0%	55.7%	27.6%	30.8%	49.1%	34.8%
Black	362,296	99,317	31,479	12,187	1,492	934	512	2,938
% Black	10.1%	10.8%	8.6%	14.2%	25.0%	26.6%	12.8%	21.8%
Asian	135,565	42,284	21,388	4,098	221	103	165	489
% Asian	3.8%	4.6%	5.9%	4.8%	3.7%	2.9%	4.1%	3.6%
Hispanic	226,148	79,184	32,047	11,108	1332	545	760	2,637
% Hispanic	6.3%	8.6%	8.8%	13.0%	22.3%	15.5%	19.0%	19.6%
Other	303,826	89,328	31,562	10,492	1,282	847	595	2,724
% Other	8.5%	9.7%	8.7%	12.3%	21.5%	24.1%	14.9%	20.2%
Minority	1,027,835	310,113	116,476	37,885	4,327	2,429	2,032	8,788
% Minority	28.8%	33.8%	32.0%	44.3%	72.4%	69.2%	50.9%	65.2%
% Below Poverty	10.2%	9.1%	5.4%	9.7%	17.3%	26.1%	9.6%	17.7%
Per Capita Income	$37,892	$48,721	$78,708	$43,767	$30,323	$39,777	$35,316	$35,139

Notes:
Total Study Area = sum (or average percentage) of statistics for all three Census Tracts (440, 441, 442).
Population characteristics are defined as follows: Whites: Not Hispanic, white alone;
Blacks: Race alone or in combination with one or more races, Black or African American;
Asian: Race alone or in combination with one or more races, Asian;
Hispanic: Hispanic or Latino and Race, Total population, Hispanic or Latino, White Alone.
Poverty thresholds are updated annually for changes in inflation and the cost of living, and dollar value thresholds vary by family size and composition. The 2013 poverty thresholds used by the U.S. Census Bureau included $12,119 for an individual under the age of 65 without children and was $11,179 for an individual 65 years or older.
Source: U.S. Census Bureau 2010 Decennial Census, Table DP-1, Profile of General Population and Housing Characteristics, 2010; 2008-2013 American Community Survey , Table DP03, Selected Economic Characteristics

Table 3-26 presents the percentages of LEP populations (persons 5 years of age and older that speak English less than "very well") relative to the total population. LEP populations comprise approximately 25 to 26 percent of the total populations of Tracts 440 and 441.[179] LEP population percentages for Tracts 440 and 441 were substantially higher than those for the state (eight percent), county (12 percent), and city (14 percent) as a whole. Table 3-26 also presents the percentage of households in which no one age 14 and over speaks English only or speaks English "very well." Within the city of Norwalk, LEP households constitute approximately eight percent of all households, which compares to approximately four percent for the SWRPA region, approximately eight percent for the county, and approximately five percent for the state. Two of the study area census tracts had at least twice as many households with LEP compared to average proportions for the city, SWRPA region, county, and state. LEP households comprised approximately 17 percent of the total households in Census Tract 440 and approximately 17 percent of the total households in census tract 441.[180]

[179] In comparison, the eastern census tract (Tract 442) had a percentage of LEP relative to total population of 10 percent, lower than that for the county and city, but higher than that for the state.
[180] In comparison, the LEP household percentages for the eastern census tract 442 was relatively low (4.8 percent of all households), even lower than that for the city, county (7.5 percent) and state (5.3 percent) as a whole, but higher than for the SWRPA (3.7 percent).

The most commonly spoken language within the LEP populations in the three study area census tracts is Spanish (defined to include Spanish Creole). In 2008-2013, the Spanish-speaking LEP populations comprised 17 percent of the total population of Census Tract 440, 22 percent of Census Tract 441, and eight percent of Census Tract 442. This compared to five percent for the state, seven percent for the county, and nine percent for the city. The second most commonly spoken language within LEP populations was French Creole, which comprised over five percent of the total population of Census Tract 440, but less than one percent of total population of the other two tracts.

Table 3-26—Percentages of Limited English Proficiency to Total Populations and Households

LEP Populations	Regional LEP Percentages			LEP Percentages for Study Area Census Tracts		
	State	County	Norwalk	440	441	442
LEP population totals (over 5 years of age)	8.4%	12.2%	14.0%	25.6%	25.0%	9.8%
LEP Household totals (over 14 years of age)	5.3%	7.5%	7.5%	17.4%	16.7%	4.8%

Source: U.S. Census Bureau American Community Survey 5-Year Estimates (2009-2013), Table S1601: Language Spoken at Home; Table S1602: Limited English Speaking Households.

3.26.3. Potential Impacts

No Build Alternative

The Census Tracts in the study area have been identified as Communities of Concern by the SWRPA. Continuing bridge malfunctions and delays in train service affect not only the regional NEC service, but also can result in delays for commuters. Continuation of the current condition could adversely affect the downtown community, including EJ populations that use the NHL via the South Norwalk Train Station or the East Norwalk Train Station and those persons that live and work near Walk Bridge. However, impacts would not be disproportionately adverse for EJ populations that could be affected.

Build Alternative

The Census Tracts in the study area have been identified by SWRPA as EJ Communities of Concern. The three residential property displacements (including up to six residences) and four businesses affected in East Norwalk are located within the eastern Census Tract (442). A rowing club using one of these business locations will be displaced, which could affect several hundred members, including high school and middle school rowers, some of which could be EJ populations.

This census tract had a low-income population (defined as the percentage of persons with income below the poverty threshold) comprising 10 percent of the total population in 2013, which was higher than percentages for the SWRPA planning region (5.4 percent), but comparable to statistics for the state, county, and city. The per capita income in 2013 for this census tract of $35,316 was below the averages for the state ($37,892), county ($48,721), SWRPA region ($78,708), and city ($43,767) as a whole. However, statistics at the finer block group level (Block Group 3) encompassing this area, only had 6 percent of the entire population as income below the poverty thresholds for the 5-year averages for both 2013 and 2014, which was lower than low-income population percentages for the state, county, and city (ranging from 8.1 percent to 10.5 percent). Per capita incomes for this block group ($41,212 in 2013 and $41,932 in 2014) however were lower than that for the city ($43,767-$43,778) and county ($48,721-$49,688), but higher than the state ($37,892-$28,480). The census tract (442), census block group (Block Group 3), and the census block (3001) encompassing this area had minority populations of 51 percent, 60.4 percent, and 82.3 percent, respectively, in 2010. The surrounding block group had 15 percent LEP for the population (over 5 years of age) in 2014, which was higher than percentages for the state (8.3 percent), county (12.3 percent), and city (13.3 percent). This block group had a percentage of LEP households of 9 percent in 2014, higher than that for the city (6.8 percent), county (6.9 percent), and state (4.7 percent). In this block group, the majority of LEP households (61 percent) are Spanish speaking, and the percentages of Spanish speaking LEP was 54.3 percent of total LEP population for individuals over age 5.

The project will not disproportionately impact EJ communities. Although all three Census Tracts and all four block groups encompassing the project site have similar EJ characteristics, as previously described, the affected census tract and census block group in East Norwalk have the lowest percentages of low-income populations and minorities. The proposed permanent property displacements for construction staging areas in East Norwalk will be located in the least urbanized and least developed portions of the project site.

It is not known whether the affected businesses and residents in the Goldstein Place/Liberty Square neighborhoods include EJ populations, but given the high proportion of minorities/LEP and income characteristics in the surrounding census tract/block group/block, there is potential that these businesses and residents may include EJ populations. The parties affected by these property displacements include owners and employees of the affected businesses, customers (including rowers and other users of the displaced marina), and any residents (owners and/or tenants) displaced by the proposed property acquisitions. These affected uses/landowners would be provided with relocation assistance and CTDOT is investigating the opportunities for relocation in the immediate project vicinity.

The project wil replace an existing bridge on an existing rail corridor and will represent an overall benefit to the entire community and is important to the continued economic prosperity of the region. The improved accessibility and reliability of the proposed bridge and navigational opening will also benefit EJ communities, which comprise a substantial portion of the local community. An improved Walk Bridge will provide continued accessibility to rail, which provides economic opportunities for the local community. The majority of the residents (75 percent) of Fairfield County commuting to Manhattan for work travel by rail, and an improved Walk Bridge will also benefit local businesses frequented by tourists, visitors, and residents. The revitalization occurring in the SoNo District adjoining the bridge will benefit from an improved bridge. The project will provide long-term benefits to not only the local EJ communities working, living near, or commuting to/from the project site, but also to EJ communities located regionwide that depend on the accessibility provided by the NEC and the regional economic benefits accruing from its continued usage.

3.26.4. Mitigation Measures

Relocation assistance will be provided to affected property owners and tenants, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. Property displacements are addressed in Section 3.6.

CTDOT has performed extensive public outreach and will continue this outreach to keep the community informed of the project and to comply with Title VI and EJ requirements so that EJ and Title VI populations have equal access to information about the project, including awareness of and inclusion in the public comment period. CTDOT is coordinating with the City of Norwalk to identify community organizations representing EJ communities and methods for outreach to EJ and LEP groups, which could include the following:

- Translating communications materials in appropriate languages;
- Advertising in multi-language publications;
- Conducting grassroots outreach by establishing partnerships in low-income neighborhoods, including community organizations, neighborhood groups, and small neighborhood businesses;
- Attending neighborhood events and fairs with information materials; and
- Ensuring that concerns and issues voiced from stakeholders are tracked and addressed.

A public scoping meeting was held on February 25, 2015, and a public meeting was held on May 11, 2016 to obtain public input into the project prior to publication of the EA/EIE. The public meetings were advertised in a Spanish newspaper. In advance of the May 11th public meeting, email notifications and telephone calls were made to notify community and neighborhood organizations, and a project fact sheet translated into Spanish was distributed to community groups and posted at locations suggested by community contacts. An additional public hearing will be held to receive comment on this EA/EIE. In accordance with Title VI/EJ requirements, the public meetings have been, and will continue to be, held in ADA-accessible facilities/locations and advertised to offer special accommodations or language assistance upon request. Information on the project is also available to the public on the project web site, which includes a translation feature. Additionally, factsheets about the project will be translated into Spanish and Haitian Creole.

Outreach will include a Local Presence Plan, which will include direct outreach at train stations, kiosks, and attendance at local events.

3.27. Secondary and Cumulative Impacts

3.27.1. Introduction and Regulatory Background

This section presents the potential indirect (or secondary) and cumulative impacts of the Build Alternative upon the environment, which differ from direct impacts. NEPA defines direct impacts as impacts that are caused by the action and occur at the same time and place [40 CFR 1508.8(a)]. CEPA defines direct impacts as the primary environmental consequences of the action [RCSA Section 22a-1a-3(a)].

NEPA defines secondary and cumulative impacts as follows:

- Secondary impacts are reasonably foreseeable impacts which are caused by the project, but would occur either in the future (later in time) or in the vicinity of (but not in the same location as) the direct impacts [40 CFR 1508.8(b)].
- Cumulative impacts are impacts resulting from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions regardless of whether they are federal, non-federal, or private actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

CEPA defines secondary and cumulative impacts as follows:

- Secondary impacts are the secondary consequences on local or regional social, economic, or natural conditions or resources which could result from additional activities (associated investments and changed patterns of social and economic activities) induced by the project, both in the short-term and in the long-term [RCSA Section 22a-1a-3(a)].

- Cumulative impacts are defined as the impacts on the environment which result from the incremental impact of the project when added to other past, present or reasonably foreseeable future actions to be taken by the sponsoring agency. [RCSA Section 22a-1a-3(b)].

NEPA and CEPA definitions of secondary impacts are similar. In assessing cumulative impacts, NEPA requires an assessment of the incremental impact of the project upon actions, whether governmental or private. CEPA requires an assessment of the incremental impact of the project upon other agency-directed actions.

3.27.2. Secondary Impacts

CTDOT will remove the high towers as part of the Build Alternative; all three Build options would require the removal of the high towers. The removal of the high towers, and the removal of the Eversource power from the high towers, will be a direct impact of the Build Alternative. The relocation of the Eversource power will be a secondary impact of the project. Eversource Energy will be responsible for relocating its lines and the associated environmental evaluations and permits. The relocation of the utility function is currently undergoing engineering feasibility studies. Potential environmental impacts of the power relocation, including land use and natural resource impacts, will be assessed through a separate review and permitting process.

Secondary impacts also include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air, water, and other natural systems. Resources evaluated with respect to secondary impacts include land use and socioeconomics.

CTDOT is implementing the Build Alternative to correct deficiencies in the existing bridge. The project will replace the existing Walk Bridge and Fort Point Street Bridge in similar alignments and with the same number of tracks; the project is not anticipated to result in increased train frequency. The improved rail transportation conditions, however, could induce growth-related impacts. As indicated in Section 3.4, the improvement in service performance due to the project may increase confidence in the NHL and therefore help maintain and even promote the ongoing revitalization of the Norwalk area, including the SoNo neighborhood. Additionally, the Build Alternative likely will result in short-term regional economic benefits due to the circulation of construction spending within the region.

Minor secondary land use changes could occur on parcels to be acquired for temporary construction activities. The existing land uses in the Goldstein Place area will change through the duration of project construction. Following project completion, CTDOT intends to sell the parcels. The future use of the parcels, zoned for Industrial No. 1 and Neighborhood Business uses, could result in land uses that are different from the current land uses on these parcels.

Secondary land use impacts and economic growth also may occur due to the improved marine transportation conditions. The improved navigation conditions resulting from the project, including the improved reliability of the bridge and wider navigation channel, may produce indirect economic benefits to the commercial marine community in Norwalk. Current marine-based businesses will be more likely to expand and new marine-based businesses will be more likely to locate up-river, expanding the water-dependent land uses.

It is important to note that future land use development and economic growth depend on a number of factors, including the local economy, demographics, interest rates, and municipal zoning and regulations. Multiple developments are proposed and ongoing in the city of Norwalk, and in particular the SoNo District, as indicated in Section 3.8.

3.27.3. Cumulative Impacts

The assessment of cumulative impacts examines the incremental impact of the project when added to past, present and future foreseeable actions. Resources evaluated with respect to cumulative impacts include rail and marine transportation, traffic, pedestrian and bicycle facilities, cultural resources, and natural resources.

Rail and Marine Transportation Cumulative Impacts

The geographic area of consideration for the assessment of cumulative impacts upon rail transportation is the 46.8-mile New Haven Main Line within Connecticut. Implementation of the Build Alternative, combined with the planned and programmed rail improvements identified in Section 3.1, will substantially improve service along the NHL for intercity and commuter rail passengers and rail freight operations. Section 5.3.1 addresses the coordination of NHL improvement projects in close proximity to Walk Bridge: Danbury Improvements at Dock Yard, State Project No. 0301-0180; Universal Interlocking at CP-243, State Project No. 0301-0181; Rehabilitation of East Avenue Bridge, State Project No. 0170-1375; and Rehabilitation of the Osborne Avenue Bridge, State Project No. 0301-1061.

The geographic area of consideration for the assessment of cumulative impacts upon marine transportation is the Norwalk River and Harbor. As a result of the proposed river dredging to straighten the bridge's alignment with the Stroffolino Bridge, combined with the 2014 completion of the USACE's federal navigation channel dredging program, will be a substantial improvement in marine transportation conditions in the Norwalk Harbor and River.

Traffic Cumulative Impacts

The geographic area of consideration for the assessment of cumulative impacts upon traffic is approximately one-half-mile from the project limits.

In addition to the NHL improvement projects identified in Section 3.1, CTDOT is conducting or proposing to conduct other transportation improvement projects in the vicinity of the Build Alternative, concurrent with or overlapping with the Walk Bridge construction schedule.[181] Additionally, other private developments within the vicinity of the project are anticipated. These public and private projects include the following:

- District 95/7 (The SoNo Collection), a regional shopping center/mixed use development located in the vicinity of West Avenue and North Water Street, scheduled to start in fall 2016.
- State Project No. 102-357, Stroffolino Bridge Armoring, scheduled to start in spring 2017.
- State Project No. 102-348, Rehabilitation of the Yankee Doodle Bridge (I-95 over Norwalk River), scheduled to start in spring 2018.

[181] CTDOT, "Upcoming CTDOT Projects: Norwalk & Westport," http://www.ct.gov/dot/lib/dot/documents/dpublicmeetingsminutes/westport-norwalk_projects_handout.pdf. Accessed 2/12/2016.

- State Project No. 102-295, Resurfacing and median reconstruction of Interstate-95, scheduled to start in spring 2018.

There is a potential for cumulative adverse impacts to existing traffic patterns. It is anticipated that traffic management plans will be required with these projects. To minimize the potential for adverse cumulative impacts of multiple transportation projects within close proximity of each other, CTDOT will work with the City of Norwalk to develop traffic detour plans and other appropriate measures.

Pedestrian and Bicycle Facilities Cumulative Impacts

The geographic area of consideration for the assessment of cumulative impacts on pedestrian and bicycle facilities is the NRVT dedicated trail network in Norwalk.

As described in Section 3.4, the Build Alternative will include accommodations for a north-south pedestrian and bicycle connection to the Norwalk Harbor Loop Trail, part of the NRVT, which currently ends north of Walk Bridge at the WWTP. In coordination with the City of Norwalk, bicycle groups, and CTDEEP, CTDOT is evaluating options to extend the Harbor Loop Trail to the south and/or east. Additionally, CTDOT is working with the City of Norwalk and stakeholders regarding options for an extension of the NRVT on the western side of the river. These opportunities for additional pedestrian and bicycle connections, combined with recently completed and currently proposed projects, including construction of the third section of the NRVT (connecting Union Park to New Canaan Avenue),[182,183] will be a substantial benefit to the bicycling community in Norwalk.

Natural Resources Cumulative Impacts

The geographic area of consideration for the assessment of cumulative impacts on natural resources is the Norwalk River, including subtidal and intertidal habitat and adjacent tidal and freshwater wetlands.

In addition to the replacement of Walk Bridge, CTDOT has several ongoing or proposed bridge reconstruction, replacement, or repair projects over the Norwalk River concurrent with or overlapping the construction schedule of the project.[184] These bridge projects include:

- Stroffolino Bridge Armoring, scheduled to start in spring 2017.
- Yankee Doodle Bridge Rehabilitation, scheduled to start in spring 2018.
- Perry Avenue Bridge Rehabilitation, scheduled to start in spring 2016.

There is a potential for cumulative adverse impact upon water quality. Similarly, there is a potential for cumulative adverse impact upon subtidal and intertidal habitat and tidal and freshwater wetlands. All of the projects will obtain state permits, however, which will require BMPs, strategies for protection of resources, and compensation for unavoidable impacts to resources. The Walk Bridge Replacement Project will include mitigation for impacts to resources. It is assumed that natural resource impacts from other projects will be similarly mitigated. The Build Alternative will therefore not contribute to cumulative adverse impacts upon natural resources proximate to the Norwalk River, including water quality.

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[182] The Norwalk River Valley Trail, 3rd Section, is identified in WCCOG's South Western Region 2015-2018 TIP (as of March 17, 2016).
[183] Norwalk River Valley Trail, Fall 2015 Newsletter and trail map. http://myemail.constantcontact.com/Norwalk-River-Valley-Trail-Fall-Newsletter.html?soid=1104713004882&aid=nR_rzR1W5VM
[184] WCCOG, South Western Region 2015-2018 TIP, as of March 17, 2016; CTDOT, "Upcoming CTDOT Projects: Norwalk & Westport," http://www.ct.gov/dot/lib/dot/documents/dpublicmeetingsminutes/westport-norwalk_projects_handout.pdf.

Cultural Resources Cumulative Impacts

The geographic area of consideration for the assessment of cumulative impacts on cultural resources includes the movable railroad bridges on the NHL in Connecticut.

In a June 1987 entry to the National Register of Historic Places, Walk Bridge was included as a contributing element within the Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource. All of the eight bridges comprising the Thematic Resource bridges were built by the New York, New Haven & Hartford Railroad between 1896 and 1919, and all were determined individually eligible for the National Register. As noted in the National Register inventory form, the eight movable bridges were deemed significant because they represent the distinctive characteristics of turn-of-the-century movable railroad bridges and they illustrate the historical development of Connecticut's most important rail corridor.[185]

Table 3-27 lists the eight historic movable bridges and their location on the NHL, ownership, and status.

Table 3-27—NHL Railroad Bridges in the National Register Thematic Resource Listing

Bridge	Location	Owner	Status
Mianus River (Cos Cob)	Greenwich	CTDOT	Replacement design on-going
Norwalk River (Walk)	Norwalk	CTDOT	Replacement scheduled in TIP and STIP for 2017-2018
Saugatuck River (Saga)	Westport	CTDOT	Replacement scheduled in TIP and STIP for 2017-2018
Pequonnock River (Peck)	Bridgeport	CTDOT	Replacement completed in 1998.
Housatonic River (Devon)	Stratford-Milford	CTDOT	Replacement design on-going
Connecticut River	Old Saybrook-Old Lyme	Amtrak	FRA's review of EA for replacement bridge ongoing
Niantic River	East Lyme-Waterford	Amtrak	Replacement completed in 2013.
Thames River (Groton)	New London-Groton	Amtrak	Conversion of bascule bridge to vertical lift bridge completed in 2008

Source: WCCOG, South Western Region 2015-2018 TIP, as of 3/17/2016

Of the eight historic bridges included in the National Register listing as a Thematic Resource, three bridges were replaced. Six bridges are programmed for replacement, and are in various stages of design and environmental review, including Walk Bridge**.** The Build Alternative will contribute to the adverse cumulative impact on cultural resources, through the loss of tangible examples of this historic movable bridge technology in Connecticut.

As part of the Section 106 review process, and as presented in Section 3.22, CTDOT is working with CTSHPO, the City of Norwalk, and historic stakeholders in the Norwalk community to assess impacts to historic resources and to develop mitigation measures to compensate for potential adverse impacts. This assessment will result in an MOAamong FTA, CTDOT, and CTSHPO. Mitigation measures could include HAER documentation. Appendix 1 contains a draft MOA. CTDOT will continue to coordinate with CTSHPO, the City, and historic stakeholders through project final design and construction.

[185] United States Department of Interior, National Park Service. National Register of Historic Places Inventory – Nomination Form. "Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource." Received April 28, 1987. Date Entered June 12, 1987.

4. Resiliency and Sustainable Design

4.1. Introduction

This chapter presents an overview of climate change and vulnerability, including the USACE's most recent analysis of flood risks along the Connecticut coastline. It presents FTA and CTDEEP guidance documents that respond to climate change and risk, and it addresses the ways that the Walk Bridge Project will incorporate adaptation strategies focused upon resiliency and sustainability.

On January 29, 2013, the Disaster Relief Appropriations Act of 2013 (PL113-2)[1] made funds available for public transportation systems impacted by Hurricane Sandy. On December 26, 2013, FTA announced the availability of funds from the Public Transportation Emergency Relief Program and the Disaster Relief Appropriations Act for projects that will reduce the risk of damage from future disasters in the areas impacted by Hurricane Sandy.[2] The announcement specifically solicited proposals for resiliency projects, defined as "those projects designed and built to address current and future vulnerabilities to a public transportation facility or system due to future occurrence or recurrence of emergencies or major disasters that are likely to occur in the geographic area in which the public transportation system is located; or projected changes in development patterns, demographics, or climate change and extreme weather patterns."[3] CTDOT was one of ten applicants, and the "Replacement of Norwalk River Railroad Bridge on the Northeast Corridor (Walk Bridge Replacement Project)" was one of 61 eligible projects. On November 5, 2014, USDOT and FTA announced that the Walk Bridge Replacement project would be allocated funds through the Act.[4]

In its *Climate Change 2014 Synthesis Report*,[5] the Intergovernmental Panel on Climate Change issued the following findings:

- Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes have been linked to human influences, including a decrease in cold temperature extremes, an increase in warm temperature extremes, an increase in extreme high sea levels and an increase in the number of heavy precipitation events in a number of regions.
- Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level will continue to rise.

Developing a resilient structure which provides for operational redundancy and which meets current design guidelines for extreme weather events is integral to the Walk Bridge Project purpose and need.

The need for resiliency is further emphasized for critical infrastructure such as Walk Bridge. Presidential Policy Directive 21 (PPD-21): *Critical Infrastructure Security and Resilience* identifies the transportation system as one of 16 critical infrastructure sectors in the United States whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation

[1] Public Law 113-2, H.R. 152, 127 Stat. 4, January 29, 2013
[2] 78 FR 78486
[3] 78 FR 78486 – Notice of Funding Availability for Resilience Projects in Response to Hurricane Sandy. http://www.gpo.gov/fdsys/granule/FR-2013-12-26/2013-30867
[4] 79 FR 65762
[5] Intergovernmental Panel on Climate Change, 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.

or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof. As a key component of the NHL, Walk Bridge is included within this definition of critical infrastructure by the U.S. Department of Homeland Security.[6] In accordance with PPD-21, critical infrastructure is required to be hazard resilient.

4.2. Climate Change and Natural Hazards Vulnerability

Multiple reports have identified the risks of climate change and vulnerability to natural hazards. In its *Hurricane Sandy Rebuilding Strategy*, August 2013, the Hurricane Sandy Rebuilding Task Force identified four sources of future risks to be addressed with hazard mitigation, recovery plans, and infrastructure rebuilding: extreme rainfall, hurricanes, winter storms, and sea level rise.[7] The City of Norwalk participates in multi-jurisdictional hazards planning through the Western Connecticut Council of Governments (WCCOG).[8] The *Natural Hazard Mitigation Plan*, approved by FEMA on 6/9/2011, serves as the City's plan that provides specific information related to natural hazards risk, capabilities, and mitigation strategies. Its latest update, the *Natural Hazard Mitigation Plan, Draft 2016-2021 Update for the South Western Region*, WCCOG identified a number of natural hazards to which the Southwestern Region is vulnerable. Severe storms with hail and/or damaging wind had an overall "high" risk ranking for the City of Norwalk. The following natural hazards had an overall "medium" risk ranking for the City of Norwalk: hurricane and tropical storms, severe wind, severe winter weather, and storm surge.[9]

The following sections describe natural hazards vulnerability along the Connecticut coast and in the vicinity of Walk Bridge.

4.2.1. Coastal Flooding

PL 113-2 directed the USACE to conduct a comprehensive study to address the flood risks of vulnerable coastal populations in areas that were affected by Hurricane Sandy within the boundaries of the USACE's North Atlantic Division.[10] In January 2015, USACE produced *The North Atlantic Coast Comprehensive Study (NACCS): Resilient Adaptation to Increasing Risk.*[11] The *NACCS* identified nine high-risk areas of the North Atlantic Coast that warrant additional analyses by USACE to address coastal flood risk; the Connecticut coastline was one of the nine high-risk areas.

The *NACCS* reported that coastal Connecticut is vulnerable to storm damage from wave attack, storm surge and erosion. Due to the east-west orientation of the southern shore in relation to the Atlantic Ocean, Connecticut is particularly vulnerable to storm surge flooding when winds from the northeast to east-southeast direction are greater than 30 mph and last for more than 12 hours, continuing through an astronomical high tide. Historically, most hurricanes striking the New England region have re-curved northward on tracks which paralleled the eastern seaboard maintaining a slight north-northeast track direction.[12] Since 1954, Connecticut has had 31storm-related FEMA-declared emergency and major disaster declarations, many of which involved coastal flooding and damages.[13]

[6] http://www.dhs.gov/critical-infrastructure-sectors
[7] Hurricane Sandy Rebuilding Task Force. Hurricane Sandy Rebuilding Strategy; Stronger Communities, A Resilient Region, August 2013. http://portal.hud.gov/hudportal/documents/huddoc?id=HSRebuildingStrategy.pdf.
[8] Formerly the South Western Regional Planning Association.
[9] WCCOG, Natural Hazard Mitigation Plan, Draft 2016-2021 Update for the South Western Region.
[10] The USACE's North Atlantic Division includes ten states in the northeastern United States, extending from Maine to Virginia, and the District of Columbia.
[11] USACE. *The North Atlantic Coast Comprehensive Study (NACCS): Resilient Adaptation to Increasing Risk.* Main Report. Final Report. January 2015. http://www.nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_main_report.pdf.
[12] USACE. North Atlantic Coast Comprehensive Study, Appendix D.
[13] https://www.fema.gov/disasters/grid/state-tribal-government/31. Accessed 12/03/2015. Note that FEMA started naming storms in 1953.

The *NACCS* identified 15 vulnerable, high exposure areas along the Connecticut coastline, which included the area along the coast from Westport to the west side of Norwalk Harbor and up the Norwalk River to Cross Street. Key facilities identified by the *NACCS* in this high exposure area include Norwalk Harbor (a major port in the area), wastewater treatment facilities, and the major rail line connecting New York City to the northeast region.[14]

4.2.2. Sea Level Rise

The *NACCS* presented relative sea level change scenarios for four planning horizons for the NOAA water level gauge locations across the NACCS study area with measurement records equal to or greater than 40 years. The study concluded that relative sea levels are rising throughout the entire study area. Further, sea level rise will increase the areas exposed to storm surge and will increase the frequency of flooding. The study concurs with a similar analysis conducted in 2013 for the U.S. National Climate Assessment by NOAA, the U.S. Geological Survey, and the Department of Defense Strategic Environmental Research and Development Program. Both the USACE and NOAA estimates incorporate the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report global mean sea level change projections and are consistent with predictions from the IPCC Fifth Assessment Report.

Table 4-1 and Figure 4-1 present the relative USACE and NOAA sea level change scenarios anticipated at the Bridgeport, Connecticut NOAA gauge, which is located approximately 15 miles northeast of Norwalk and the study location nearest to Walk Bridge. USACE's "low scenario" estimate is a linear extrapolation of the historical sea level change records. USACE's "intermediate scenario" is based primarily on ocean warming. USACE's "high scenario" estimate is a combination of more limited ice loss and ocean warming. NOAA's "low scenario" and "intermediate low scenario" estimates are identical to USACE's "low scenario" and "intermediate scenario," respectively. NOAA's "high scenario" estimate is higher than USACE's "high scenario" estimate.

Table 4-1—Relative Sea Level Change Scenarios, Connecticut Coast

Horizon Year	Estimated Feet of Water Level Rise NOAA Gauge 8467150, Bridgeport, CT			
	USACE Low Scenario[a]	USACE Intermediate Scenario[b]	USACE High Scenario	NOAA High Scenario
2018	0.0	0.1	0.2	0.3
2068	0.4	0.9	2.5	3.3
2100	0.7	1.7	5.0	6.6
2118	0.8	2.2	6.7	8.9

Notes:
a. Identical to NOAA's "low scenario" estimate
b. Identical to NOAA's "intermediate low scenario" estimate.
Source: USACE North Atlantic Division, NACC

The State of Connecticut has not officially adopted a sea level change scenario. The Connecticut Institute for Resilience and Climate Change Adaptation, a joint partnership between the University of Connecticut and CTDEEP, currently is researching the impacts of climate change along the coast, including mapping shoreline change.[15]

[14] USACE. North Atlantic Coast Comprehensive Study, Appendix D.
[15] http://circa.uconn.edu/research/index.htm.

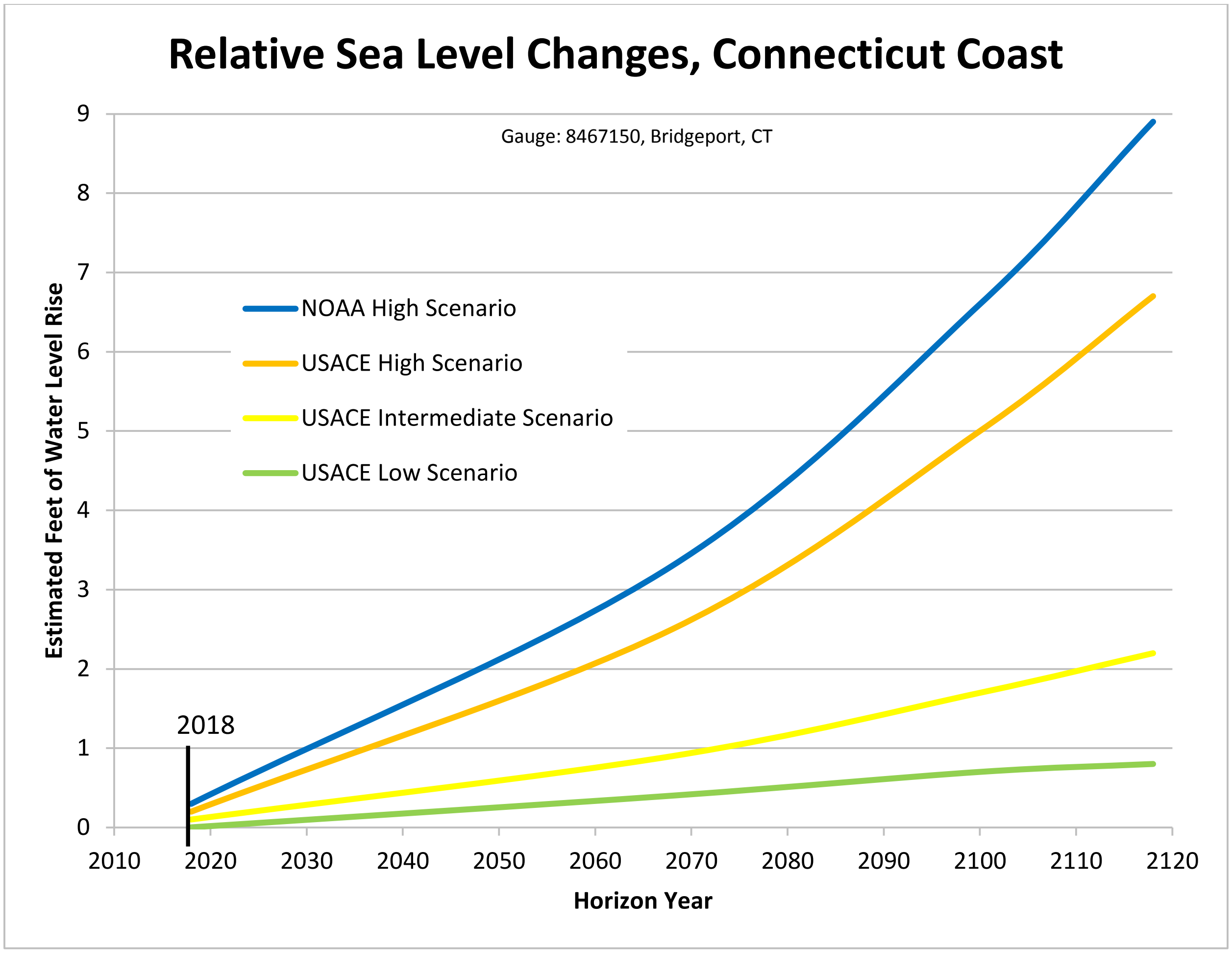


Figure 4-1—Relative Sea Level Change Scenarios, Connecticut Coast

As required by Public Act No. 08-98, "An Act Concerning Connecticut Global Warming Solutions," the Adaptation Subcommittee to the Governor's Steering Committee on Climate Change produced a report in 2010: *The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health*. With respect to the impacts of climate change upon infrastructure, including transportation, the report notes that changes in storm intensity and flooding, precipitation, and sea level rise present the most concern. The sensitivity of railroads to the impacts of climate change, particularly sea level rise and precipitation, is high, as many of railroads were constructed in floodplains and along coastal areas. The report indicates that the potential for adaptation is low, however, unless systems can be redesigned for future storms, flooding, and sea level rise.[16]

4.2.3. Hurricane Surge

The FEMA floodplain (shown on Figure 3-15) is based on a storm of a particular strength that currently has a 1-percent annual chance of occurrence. It is also useful to look at scenario-based storms, which can result in water levels that far exceed those anticipated during the 1-percent- annual-chance flood event. FEMA and the USACE have produced hurricane surge maps using the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model. The SLOSH model was developed using current NOAA storm surge

[16] Adaptation Subcommittee to the Governor's Steering Committee on Climate Change, *The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health*, April 2010.

modeling for Long Island Sound and does not include a parameter for sea level rise. SLOSH is based on tidal elevations, wind speed, and wind direction of a given event.

The SLOSH model hurricane surge maps show inundated areas based upon different categories of hurricanes, ranging in strength from Category 1 (with winds ranging from 74 to 95 miles per hour [mph] and coastal flooding with some damage) to Category 4 (with winds of 130 to 156 mph and catastrophic damage requiring extensive evacuations).[17]

Figure 4-2 shows the area around Walk Bridge that becomes inundated in the four categories of hurricanes. Note that although the figure shows hurricane Category 1 inundation at the western bridge abutment and tracks, the inundated area is not actually the bridge or tracks, but the ground under the bridge's west approach spans. Similarly, the small area of inundation at the eastern bridge abutment is actually inundated ground under the bridge's east approach spans.

Table 4-2 presents the elevations of key bridge elements on existing Walk Bridge and their ability to withstand inundation levels of different categories of hurricanes, based upon the peak water surface elevations of different events. The bridge's mechanical equipment for the center (pivot) pier is housed within the engine (machine) room. Additional mechanical equipment for the swing span is located below the engine (machine) room, very close to the top of pivot pier.

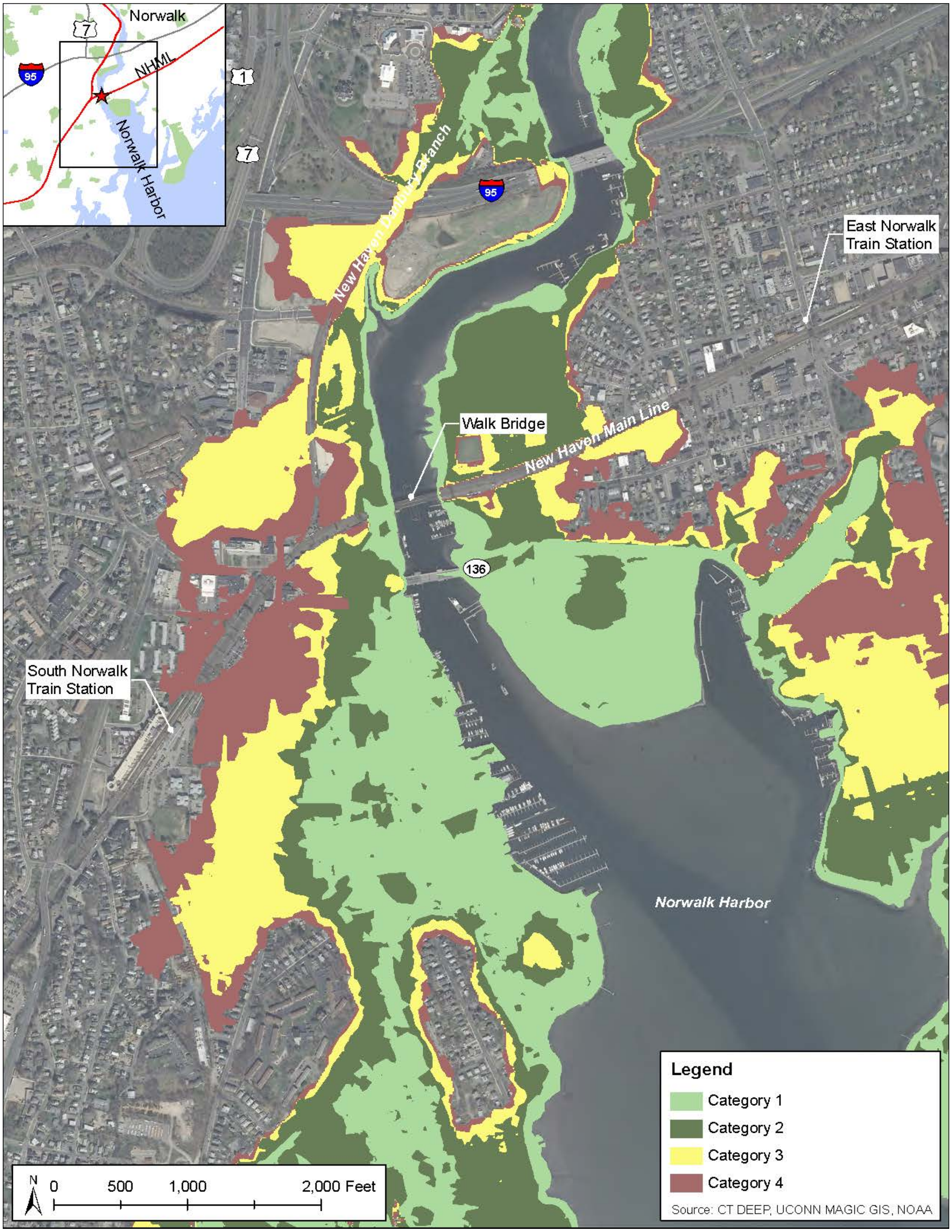
Table 4-2—Existing Walk Bridge Structural Elevations and Hurricane Resistance

Bridge Element	Approx. Elevation[a]	Resistance to Hurricane Inundation Levels[a]			
		Category 1 El. 9.2	Category 2 El. 14.1	Category 3 El. 19.0	Category 4 El. 24.4
Main Span Low Chord	19.8	yes	yes	yes	no
Approach Span Low Chord	18.0	yes	yes	no	no
Control House Lowest Floor	36.0	yes	yes	yes	yes
Engine (Machine) Room Floor	19.7	yes	yes	yes	no
Top of Pivot Pier	9.0	no	no	no	no

Note: a. Elevations shown in (NAVD88).

As shown in Table 4-2, the top of pivot pier and the mechanical equipment in its vicinity are impacted by inundation levels of all categories of hurricanes. With the exception of those mechanical elements located at the top of the pivot pier, the critical bridge elements can withstand inundation levels of Category 1 and Category 2 hurricanes. The majority of mechanical elements located in the engine (machine) room are impacted by inundations levels of Category 3 and Category 4 hurricanes.

[17] National Weather Service, National Hurricane Center. Saffir/Simpson Hurricane Wind Scale, http://www.nhc.noaa.gov/aboutsshws.php.



Note: Category 1 inundation shown at the western bridge abutment and tracks and the eastern bridge abutment is actually inundated ground under the bridge's approach spans

Figure 4-2—Hurricane Inundation Existing Conditions

4.3. Guidelines, Directives and Initiatives

Guidance documents have been produced at the federal, regional, and state government levels to assist state agencies and municipalities in addressing climate change and natural hazard vulnerability. Two agencies which have recently provided guidance include FTA and CTDEEP.

In its August 2011 report, "Flooded Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation,"[18] FTA identifies four categories of adaptation strategies to address climate change and natural hazard vulnerability:

- Maintain and manage, including adaptive management and accommodation, incorporating "smart" technologies such as sensors that detect changes in pressure and temperatures in materials;
- Strengthen and protect, by designing new infrastructure and assets to withstand future climate conditions, and building protective features such as retaining walls and vegetative buffers;
- Enhance redundancy, consisting of duplicating critical components of a system to increase system reliability; and
- Retreat, by avoiding increasing impacts by abandoning transportation infrastructure located in extremely vulnerable or indefensible areas, relocating, and/or siting new facilities in less vulnerable locations.

FTA's August 2014 report, *Transit and Climate Change Adaptation: Syntheses of FTA-Funded Pilot Projects*,[19] identifies adaptation strategies developed from seven pilot projects funded through its Climate Change Adaptation Initiative. Strategies to address flooding and extreme precipitation include raising minimum top-of-rail height based on 100-year flood elevations; extending design standards for flood-sensitive equipment to the 500-year flood zone; and strengthening protection around piers to reduce bridge scour. Strategies to address extreme heat and rail buckling include setting and maintaining high "rail-neutral temperatures;" installing rail temperature monitoring systems; using expansion joints to provide space for rail expansion; using concrete slab rather than stone ballast to increase stability; placing running rail on a structural concrete base; adding ventilation and cooling for key electronics; and providing backup power generation.

In 2013, CTDEEP released the final *Connecticut Climate Preparedness Plan*,[20] per the requirements of Public Act No. 08-98. The *Plan* has been used to inform the state agencies' work on resiliency and is available as a basis for developing action plans across state and local governments to address the potential impacts related to climate change in Connecticut. The *Plan* sets forth a series of resiliency and adaptation goals and also establishes action items for various planning topics, including infrastructure.

4.4. Project Design Adaptation Strategies

The Walk Bridge Replacement Project is being designed to increase system resiliency and enhance operational redundancy. System resiliency describes the ability to return the bridge to use, either partially or completely, in a relatively short period of time in the aftermath of a compromising event. It also refers to minimizing the vulnerability of critical elements of the bridge to facilitate its return to use. Operational redundancy means the ability to maintain train service on a limited number of tracks following an event that otherwise would have rendered all tracks inoperable.

[18] FTA, Buckled Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation, FTA Report No. 0001, August 2011.
[19] FTA, Office of Budget and Policy, Transit and Climate Change Adaptation: Synthesis of FTA-Funded Pilot Projects, FTA Report No. 0069, August 2014. ://www.fta.dot.gov/documents/FTA_Report_No._0069.pdf
[20] CTDEEP, *Connecticut Climate Change Preparedness Plan: Adaptation Strategies for Agriculture, Infrastructure, Natural Resources and Public Health Climate Change Vulnerabilities*, 2013.

In January 2015, EO 13690 - Establishing a Federal Flood Risk Management Standard – was issued, which established a flood risk reduction strategy for federally funded projects. EO 13690 requires that agencies site, design, and construct in accordance with the changing nature of flood risks, including the risks of sea level rise, using one of several approaches. In one approach, "critical actions," such as the mechanical system of a bridge, would be designed and constructed at least three feet above the FEMA 100-year flood elevation, the base flood elevation (BFE). The critical action elevation for the replacement of the Walk Bridge is 15 feet NAVD88, which is three feet above 12 feet (NAVD88), the BFE at this location.

As shown in Table 4-3, the proposed elevations of key bridge elements of the Bascule Bridge option would be higher than the mandate of EO 13690 and would substantially improve the bridge's resistance to hurricane inundation levels.

Table 4-3—Bascule Bridge (Option 4S) - Structural Elevations and Resiliency Measures

Bridge Element[a]	Elevation (+/-)	Critical Action Elevation (El. 15)	Resistance to Hurricane Inundation Levels[b]			
			Category 1 El. 9.2	Category 2 El. 14.1	Category 3 El. 19.0	Category 4 El. 24.4
Main Span Low Chord	30.2	yes	yes	yes	yes	yes
Approach Span Low Chord	24.0	yes	yes	yes	yes	no
Control/Electric Room Lowest Floor	24.6	yes	yes	yes	yes	yes
Machine Room (Drive Machinery & Motors) Lowest Floor	62.5	yes	yes	yes	yes	yes

Notes:
a. Elevations of the bridge elements are based on preliminary-level design.
b. Elevation shown for peak water surface elevation (NAVD88)

With the exception of the approach span low chord, which would withstand inundations levels of a Category 3 hurricane, the preliminary design of the Bascule Bridge would provide for key elements of the bridge to withstand inundation levels of a Category 4 hurricane. The Bascule Bridge would allow storms to flow through the bridge without inundating or impacting the bridge's main span, including beams, deck, ballast, and rails. In all category events, storms would not impact critical mechanical and electrical elements in the control house or machine room.

As shown in Table 4-4, the proposed elevations of key bridge elements of the short-span and long-span Vertical Lift Bridge options also would be higher than the mandate of EO 13690 and would substantially improve the bridge's resistance to hurricane inundation levels.

Table 4-4—Vertical Lift Bridge (Options 8A and 11C) - Structural Elevations and Resiliency Measures

Bridge Element[a]	Elevation (+/-)	Critical Action Elevation (El. 15)	Resistance to Hurricane Inundation Levels[b]			
			Category 1 El. 9.2	Category 2 El. 14.1	Category 3 El. 19.0	Category 4 El. 24.4
Main Span Low Chord	29.9	yes	yes	yes	yes	yes
Approach Span Low Chord	23.7	yes	yes	yes	yes	no
Control/Electric Room Lowest Floor	22.0	yes	yes	yes	yes	no
Machine Room (Drive Machinery & Motors) Lowest Floor[c]:	65.6	yes	yes	yes	yes	yes

Notes:
a. Elevations of the bridge elements are based on conceptual-level design. The elevations of the critical bridge elements would be the same regardless of the span length of the vertical lift bridge.
b. Elevation shown for peak water surface elevation (NAVD88).
c. Elevation is shown for a span-driven option, which represents the lowest possible elevation of the machine-room lowest floor.

Option 8A and Option 11C could be designed as either a span-driven bridge or a tower-driven bridge. In a span-driven configuration, the machinery would be mounted on top of the truss. In a tower-driven configuration, the machinery would be mounted on top of the tower. For a tower-driven bridge, CTDOT will determine the tower height during final design. Regardless of the tower height, the elevation of the machinery would be substantially higher than the elevation provided by the span-driven option and the elevations of a critical action and a Category 4 hurricane inundation level. For either a span-driven or a tower-driven vertical lift bridge design, the resiliency of this critical bridge element would not be compromised.

As design of the vertical lift structure is advanced, it may be possible to raise the elevations of the approach span low chord and the control house lowest floor to withstand Category 4 hurricane inundation levels. Additionally, the sight-line study, an evaluation of the ability of the bridge operator to have unobstructed views in all directions, will be completed during final design. This study will determine the control house operator elevation level. Final design attributes could include bridge elements placed to withstand Category 4 hurricane levels.

Table 4-5 presents components that CTDOT will investigate as project design advances to increase system resiliency and enhance operational redundancy. These adaptation strategies, which include strategies for bridge, track and supporting infrastructure, primarily focus upon addressing the impacts of climate change relative to flooding and extreme precipitation. The strategies also include design and construction methods to preclude or minimize impacts due to other natural hazards, including severe winter weather, heat, wind, and earthquakes. As applicable and appropriate, these project design components would be incorporated in either the Bascule Bridge option or the Vertical Lift Bridge options.

Table 4-5—Build Alternative Design Strategies for Resiliency and Redundancy

Resiliency/Redundancy Strategy	Project Design Response
Extend design standards to 500-year flood zone and incorporate safeguards	Locate the mechanical drive machinery and supports above the Design Flood Elevation (DFE), which is equal to the BFE plus 3 ft.[a]
	Locate the electrical system components critical to safety and bridge operations above the DFE.[a]
Extend design standards for seismic design	Design for seismic provisions at Level 3 at the Survivability Limit State.
Incorporate operational redundancy	Construct two independent movable spans, each supporting two tracks, over the navigation channel.
Incorporate drive and mechanical system redundancy	Operate each movable span by two motors and drives, alternating between motor/drive pairs on successive bridge openings. Each drive will be capable of operating each main motor.
	Use dampers if they are determined to contribute to the overall system redundancy.
Incorporate electrical system redundancy	Provide dual-drive systems so that if the selected main drive system is inoperable, the alternative main drive system may be selected.
	Provide Dual Programmable Logic Controller (PLC) central processing units (CPUs) so that the bridge operator can switch to the second unit if the first unit fails.
	Provide motor control centers (MCC) to allow for manual bridge operation if the PLC fails.
	Use redundant dual fiber optic cables and configure in diverse cable paths so that fiber communications can continue in the event of a fiber break.

Resiliency/Redundancy Strategy	Project Design Response
	Provide a standby generator for backup utility power. The generator, which will be equipped with an automatic transfer switch to transfer loads to the generator upon loss of power, will be sized to handle all bridge loads required for bridge operation and the Control House, including navigation lighting.
Provide sustainable materials and methods	Provide track spacing between the movable structures to accommodate the requirements of the moving leaves, and access for inspection and maintenance.
	Install bearings and anchor bolts to allow the entire bearing and bolt to be removed for replacement.
	Construct machinery rooms to accommodate a clearance envelope around static and moving obstructions and to promote ease of access and maintenance.
	Avoid drainage discharge onto other bridge elements, into the waterway, or onto traffic beneath the bridge. Direct drainage system discharges to a storm drain or at the toe of embankment slopes.
	Construct drainage system with corrosion-resistant materials and provide cleanouts for maintenance.
Strengthen and protect critical infrastructure	Locate mechanical drive machinery within a heated weather-tight enclosure constructed of non-combustible materials.
	Protect equipment in the Control House and electrical rooms with transient voltage surge suppression (TVSS) devices.
	Mount all outdoor power outlets within enclosures for protection. Use watertight conduit connectors on externally mounted conduits.
	Fasten the fixed side of rail miter joints to resist movement from continuous welded rail thermal stresses
	Incorporate static and dynamic ice loading into the substructure design.
	Use small diameter electrical cables, rather than bundled, large diameter cables, to maximize flexibility and longevity.
	Select electrical materials to provide protection from accelerated corrosion due to condensation, cold weather conditions, and the marine environment.

a. The DFE, defined as the BFE (at 12 ft NAVD88) plus additional 3 ft (for Critical Actions), is higher than the 500-year floodplain elevation of 11.9 ft NAVD88.

5. Construction Period Impacts

5.1. Introduction

Chapter 5 presents a general overview of construction activities and sequencing of the Build Alternative. This chapter also describes potential temporary, construction-related impacts and mitigation measures. Construction impacts of the Bascule Bridge are generally similar to those of the Vertical Lift Bridge, but differences are noted, especially impacts that are related to the shorter construction duration associated with the long span Vertical Lift Bridge (Option 11).

Construction sequencing and staging is conceptual at this preliminary level of design and will be refined as design progresses in future phases of project development.

5.2. Construction Schedule and Sequencing

Construction of the Build Alternative is expected to occur over approximately three and one-half to four years, depending on the option. The construction period for the project with a short span Vertical Lift Bridge may take several months less time than construction of a Bascule Bridge, and construction of a long span Vertical Lift Bridge is expected to take several fewer months than the short span. The project will involve typical bridge and railroad construction activities, including work in and over water, such as:

- Implementation of mitigation measures;
- Installation and maintenance of erosion and sedimentation controls throughout duration of project;
- Movement of materials and equipment;
- Excavation;
- Drilling foundation shafts;
- Pile driving;
- Installing and removing sheeting and cofferdams;
- Placement of fill;
- Compacting;
- Construction of retaining walls;
- Grading;
- Dredging;
- Water Handling;
- Bridge construction including erection of structural elements;
- Demolition;
- Installation of electrical and mechanical equipment;
- Construction of control house and associated electrical and plumbing work;
- Pouring concrete;
- Installation of railroad track, signal systems and OCS;

- Installation of temporary traffic controls;
- Installation of temporary, in-water trestle work platforms; and
- Use of barges during construction.

5.2.1. Sequencing with the Bascule Bridge (Option 4S)

Construction will occur in multiple stages over the construction period with the objective of accommodating railroad and marine traffic to the greatest extent possible. Relocation of the Eversource Energy wires will occur before bridge construction commences. Metro-North wires will be transferred to an underground duct bank and submarine cable early in construction. Construction sequencing and staging is conceptual at this preliminary level of design and will be refined as design progresses in future phases of project development. However, it is currently envisioned that the work for the project with the Bascule Bridge option will generally proceed in the following sequence with use of a temporary run-around structure. A run-around consists of a temporary two-track bridge structure placed on an alignment north of Walk Bridge. Once the run-around becomes functional, train operations shift from the existing bridge to the runaround; replacement of Walk Bridge then proceeds while rail service is accommodated on the run-around. The run-around is removed once rail service on the replacement bridge is fully operational.

- Implement mitigation measures;
- Build temporary trestles and temporary gravel access platform on the west bank under the bridge;
- Build retaining walls on the east side;
- Build run-around structure (if used) and switch rail traffic to Tracks 1 and 3 on run-around structure and close Tracks 2 and 4;
- Float out existing swing span;
- Demolish existing piers and fenders within sheet pile marine enclosures;
- Build retaining wall on west side;
- Build new approach spans;
- Demolish existing high towers;
- Install new control house;
- Float in new south bascule span and complete control house, counterweight, mechanical, and OCS systems for both spans;
- Finish track and OCS for Tracks 2 and 4 and open them to rail traffic;
- Float in new north bascule span;
- Finish work on north bascule if needed; install Tracks 1 and 3 and OCS and open them to rail traffic;
- Remove any remaining trestles; and
- Stabilize construction sites following removal of all construction-related equipment.

Modifying the temporary trestles, backfilling earth excavations and behind retaining walls and abutments, installing drilled shaft foundation and pier caps, and modifying OCS will occur as needed at various times during construction.

In general, construction sequencing will be similar under the "online" construction option, which does not build run-around tracks. Instead of using temporary run-around tracks, rail traffic will operate on the existing northern tracks (Tracks 1 and 3) while the southern portion of the bridge and approaches are first demolished, and the new bridge and tracks are then built (Tracks 2 and 4). Once the southern side is finished and Tracks 2 and 4 are operational, rail traffic is shifted to these new tracks from Tracks 1 and 3, and the northern portion of the bridge and approaches is first demolished, and new Tracks 1 and 3 and approaches are then built.

5.2.2. Sequencing with the Vertical Lift Bridge Short Span Option (Option 8A)

Construction will occur in multiple stages over the construction period with the objective of accommodating railroad and marine traffic to the greatest extent possible. Relocation of the Eversource Energy wires will occur before bridge construction commences. Metro-North wires will be transferred to an underground duct bank and submarine cable early in construction. Construction sequencing and staging is conceptual at this preliminary level of design and will be refined as design progresses in future phases of project development. However, it is currently envisioned that the work for the project with the short span option will generally proceed in the following sequence:

- Implement mitigation measures;
- Build temporary trestles and temporary gravel access platform on the west bank under the bridge;
- Relocate existing control house;
- Build east retaining wall on the south side;
- Close tracks 2 and 4;
- Remove existing approach spans for tracks 2 and 4;
- Partially remove existing swing span;
- Demolish existing high towers;
- Erect lift span towers on south side;
- Build south approach spans;
- Build west retaining wall on south side;
- Build new approach spans;
- Float in new south lift span; install counterweight, mechanical, and OCS systems, and testing;
- Install new control house;
- Demolish pivot pier;
- Finish track and OCS for Tracks 2 and 4 and open them to rail traffic;
- Remove approach spans on north side;
- Build west retaining wall on north side;
- Build north approach spans;
- Erect towers on north side;
- Float in new north lift span; install counterweight, mechanical, OCS systems, and testing;

- Install Tracks 1 and 3 and OCS and open them to rail traffic;
- Remove any remaining trestles; and
- Stabilize construction sites following removal of all construction-related equipment.

Modifying the temporary trestles, backfilling earth excavations and behind retaining walls and abutments, installing drilled shaft foundation, pier caps, and modifying OCS will occur as needed at various times during construction.

5.2.3. Sequencing with the Vertical Lift Bridge Long Span Option (Option 11C)

Construction will occur in multiple stages over the construction period with the objective of accommodating railroad and marine traffic to the greatest extent possible. Relocation of the Eversource Energy wires will occur before bridge construction commences. Metro-North wires will be transferred to an underground duct bank and submarine cable early in construction. Construction sequencing and staging is conceptual at this preliminary level of design and will be refined as design progresses in future phases of project development. However, it is currently envisioned that the work for the project with the long span option will generally proceed in the following sequence:

- Implement mitigation measures;
- Build temporary trestles and temporary gravel access platform on the west bank under the bridge;
- Relocate existing control house;
- Build new lift span foundations;
- Demolish existing high towers;
- Build lift span piers;
- Remove Track 2 and 4 superstructure;
- Build west approach substructure and walls;
- Build east abutment and retaining walls;
- Place new Track 2 and 4 superstructure;
- Build west approach;
- Build east approach;
- Erect lift span towers on south side;
- Remove existing swing span;
- Demolish pivot pier;

- Float in new vertical lift span for Tracks 2 and 4; install counterweight, mechanical, OCS system, and testing;
- Open Tracks 2 and 4; Lift span operational;
- Remove existing fender system and piers;
- Remove Track 1 and 3 superstructure;
- Build west approach substructure and walls;
- Build east abutment;
- Place new Track 1 and 3 superstructure;
- Build west approach;
- Build east approach;
- Erect lift span towers on north side;
- Float in new vertical lift span for Tracks 1 and 3; install counterweight, mechanical, OCS system, and testing;
- Open Tracks 1 and 3; Lift span operational;
- Remove any remaining trestles; and
- Stabilize construction sites following removal of all construction-related equipment.

Modifying the temporary trestles, backfilling earth excavations and behind retaining walls and abutments, installing drilled shaft foundation and pier caps, and modifying OCS will occur as needed at various times during construction.

5.3. Potential Impacts and Mitigation Measures

In general, potential construction impacts among the three Build options are the same or similar. The duration of those impacts would vary among the Build options, with the long span Vertical Lift Bridge (Option 11C) having the shortest duration of impacts, followed by the short span Vertical Lift Bridge (Option 8A). The Bascule Bridge option (Option 4S) would have the longest duration of construction period impacts.

5.3.1. Rail Transportation

CTDOT will strive to minimize disruptions to rail traffic by maintaining train service on as many tracks as possible during the project construction. Currently, rail transportation over Walk Bridge consists of a four-track operation. The normal four-track operation includes routine work windows, where certain tracks are taken out of service for maintenance as well as routine, scheduled time periods when all four-tracks are out of service to accommodate navigation traffic.

Throughout nearly all of the construction period, CTDOT intends to maintain weekday passenger train service by keeping at least two tracks in service. Long-term two-track outages, where a pair of tracks is taken out of service (Tracks 2 and 4 or Tracks 1 and 3), will be required. CTDOT estimates that over the course of the approximate four-year construction period, a four-track outage will be required in the Build Alternative (all three options) for limited periods of time. These limited four-track outage instances will be during the removal of the swing span, installation of temporary fixed spans, installation of new movable spans, and final operational adjustments of the new bridge. Each four-track outage will be of short-duration (several days); to the extent possible, the four-track outages will be scheduled during an off-peak and/or weekend period.

Prior to implementing the long-term, two-track outages, CTDOT will complete facility upgrades on the NHL to ensure continued train operations along the NHL and to minimize potential adverse impacts to Metro-North and Amtrak service. The two projects, which are described in Section 3.1, include improvements to the Danbury Branch at Dock Yard (State Project 0301-0180) and construction of a universal interlocking at CP-243 (State Project No. 0301-0181). While these projects have utility for improving NHL operations independent of the Walk Bridge Replacement Project, they also will minimize adverse effects of the Build Alternative during construction. Both NHL improvement projects will facilitate considerable train movement flexibility on the NHL main line. These improvements also will minimize the number of schedule adjustments required during the long-term track outages required for construction of the Build Alternative.

Construction of the long span Vertical Lift Bridge (Option 11C) would be approximately 40 months from construction start to restoration of four-track rail service; a two-track outage would be required for up to 30 months. Construction of the short span Vertical Lift Bridge (Option 8A) would be approximately 44 months from construction start to restoration of four-track rail service; a two-track outage would be required for up to 34 months. Construction of the Bascule Bridge (Option 4S) would be approximately 47 months from construction start to restoration of four-track rail service; a two-track outage would be required for up to 37 months.

CTDOT is coordinating the construction of the Build Alternative with other CTDOT projects located in close proximity to Walk Bridge. To reduce the number and duration of track outages in the vicinity of Walk Bridge, CTDOT will stage the construction of the Build Alternative with two other bridge replacement projects located along the NHL in Norwalk: the East Avenue Railroad Bridge Project (Bridge No. 42.14; State Project No. 170-1375) and the Osborne Avenue Railroad Bridge Project (Bridge No. 41.96; State Project No. 301-0161). Section 3.1 presents additional information about these projects. During final design and throughout the construction period, CTDOT will work with Metro-North, Amtrak, and freight service providers to ensure that train operations proceed in a manner that maintains service, facilitates passenger boarding and alighting at East Norwalk and South Norwalk Stations, and prioritizes the overall safety of the railroad corridor.

5.3.2. Marine Transportation

During construction, the Build Alternative will temporarily impact the navigation channel and marine transportation in the immediate vicinity of the bridge. Channel impacts will include channel closures, horizontal restrictions, and vertical restrictions. Construction-related marine impacts would vary among the three Build options.

Full channel closures consist of activities during which no waterway traffic can transit through the bridge, required for activities such as removing the existing swing span, erecting the new movable spans, and constructing and removing temporary supports. Full channel closure for these activities, each of which could require several days, would represent a very small percentage of the total anticipated in-water construction time for the Build options. Depending upon the contractor's means and methods, the Bascule Bridge (Option 4S) and the short span Vertical Lift Bridge (Option 8A) could require three separate full closures, and the long span Vertical Lift Bridge (Option 11C) could require two separate full closures.

Depending upon the Build option and the contractor's means and methods, construction equipment may at times fully block the channel. Full, temporary blockage of the channel due to barges and work boats would be more likely to occur during construction of the Bascule Bridge (Option 4S) or the short span Vertical Lift Bridge (Option 8A). With Options 4S and 8A, the contractor's flexibility to work on either side of the river would be limited. Once the new bridge foundations are constructed in the east channel, the east channel becomes fully (and permanently) blocked, and all construction is limited to the west channel. At that stage of construction, channel restrictions or channel blockages are likely to occur. With the long span Vertical Lift Bridge (Option 11C), the contractor would have more flexibility to work on either side of the river, allowing one channel to remain open for much of the construction period.

Horizontal restrictions consist of activities during which the channel is partially blocked and the flow of vessels is restricted. Horizontal restrictions will be required during certain construction periods of the Build Alternative, such as during installation and use of temporary supports, removal of existing piers in the river, and installation of a new fender system. Horizontal restrictions also will be required due to the location of construction equipment in the river, such as barges and work boats.

Vertical restrictions consist of activities during which a fixed (non-movable) structure is placed over the channel, limiting the height of vessels allowed to pass through the channel at the bridge. Vertical restrictions during the in-water work period are anticipated, including when the swing span is not operable during relocation and/or removal of the existing control house, when the swing span is immobilized to allow construction in the east channel, when temporary channel spans are in place, and when one or both proposed movable spans are in place but not yet operable.

Due to the location of the east lift span tower foundation and elimination of the eastern intermediate approach span pier, the long span Vertical Lift Bridge (Option 11C) would require less work time in the river. Option 11C would allow the existing swing span to remain open for marine traffic for up to 14 months during foundation, wall and superstructure work. The long span Vertical Lift Bridge (Option 11C) would require a vertical navigation restriction for as few as 16 months, as opposed to an estimated 34-month vertical navigation restriction in the short span Vertical Lift Bridge (Option 8A) and an estimated 37-month vertical navigation restriction in the Bascule Bridge (Option 4S). If the run-around alignment were used, vertical navigation restrictions for Option 4S would be extended by approximately three months to complete installation of run-around bridge foundation and superstructure elements within the path of the swing span, during which the swing span will be immobilized.

Mitigation of adverse effects to marine users and water-dependent facilities during project construction will be varied and developed on a case-by-case basis. For example, vertical restrictions will affect barge and tug movements. One possible solution would be to provide tugboat-to-tugboat barge hand-offs at the vertical constraint. This would require the temporary posting of a tugboat upstream or downstream of the bridge to meet the incoming or outgoing tugboat and barge, as well as accommodations for secure transfer of the barge beneath the bridge. Depending upon the use of the run-around alignment and timing of the bridge opening restriction, a smaller harbor work tug, or lower profile tug, may be needed to assist in the transfers. Another potential mitigation measure may be to assist the upstream businesses that typically use barges for transporting aggregate with using trucks as an alternative means of transportation during the period of navigation constraints.

Taller vessels, such as sailboats or powerboats with fixed equipment extending above the vertical clearance, may be accommodated through temporary relocation to marine facilities south of Walk Bridge, or to other harbors nearby for winter storage, summer use, or both. For vessels requiring longer-term boat repairs or winter storage at upstream facilities, dropping sailboat masts downstream of Walk Bridge would facilitate passage to upstream facilities. This would require establishing agreements with a marine facility downstream of the bridge for dropping and stepping (raising) masts. Depending upon the mast type and boat, it may be possible for the vessel to carry the mast on-board through the construction area to its destination.

Smaller boats using the river, including rowing shells, generally will have access through the project construction area. With the exception of limited channel closures for specific bridge demolition and construction activities, as well as restrictions or closures due to construction equipment, the west channel would be available for smaller boats without vertical clearance challenges in all three Build Alternative options. Due to the construction flexibility of the long span Vertical Lift Bridge (Option 11C), smaller boats would incur less impacts in Option 11C than in either Option 4S or Option 8A.

CTDOT will coordinate channel closures with the City of Norwalk, USCG, USACE, and waterway users. In cooperation with USCG, USACE, the City of Norwalk, and the Norwalk Harbor Management Commission, CTDOT will continue to work with commercial and recreational marine users, including rowing groups, to develop mitigation strategies to address impacts to marine users during the project construction period.

5.3.3. Traffic, Transit, Parking, Pedestrians, and Bicyclists

Temporary adverse impacts to project area roadways are expected with the Build Alternative in the areas of North Water Street, Fort Point Street, and Goldstein Place due to partial lane closures or full street closures. These temporary impacts generally will be similar for the Bascule or Vertical Lift Bridge options. Full closure to public access of a portion of Goldstein Place, roughly from the back of existing buildings on Liberty Square north to the dead end is required, as properties north of this point on Goldstein Place will be temporarily needed during construction. Access to businesses on Liberty Square will be maintained. Partial lane closures and full street closures of North Water Street will be needed at times to safely conduct certain construction activities. During periods of partial and full closures, pedestrian and vehicular access to adjacent buildings and parking will be maintained. Partial lane closures of about a month and full street closures of Fort Point Street also will be needed at times to safely conduct certain construction activities. Full closures will generally be of short duration, typically on weekends. Access to businesses and downtown locations will be maintained, and disruptions from construction will be minimized to the extent possible.

There are no Norwalk Transit District (NTD) WHEELS buses that pass directly by these temporary lane or street closures on North Water Street or Fort Point Street. Therefore, an impact on these services is not anticipated.

If temporary closure of the NPA's North Water Street parking lot is necessary due to the temporary construction easement, ample replacement parking is available nearby, including the NPA's Haviland Street and Webster Street lots and the Maritime Garage. Similarly due to this easement, the portion of the NRVT adjacent to this parking lot might be closed to the public during construction. North Water Street and its sidewalks can be used by pedestrians and bicyclists. The Sheffield Island and Maritime Aquarium ferry docks also will be temporarily closed and relocated elsewhere in Norwalk Harbor. Section 5.3.12 describes potential impacts to ferry operations. Temporary lane or street closures of North Water Street may have an effect on existing routing to the Maritime Garage at 11 North Water Street. Except as previously noted, access to this and other parking facilities will be maintained and not be affected, but some patrons may need to follow detour routes at times when a full street closure is in effect at the Walk Bridge. Detour routing with appropriate signage and traffic control will be used for temporary street closures of North Water Street and Fort Point Street. CTDOT will finalize the detour routes during advanced design phases in coordination with the City of Norwalk.

In addition to the temporary closure of a small section of the NRVT, as previously noted, disruptions to pedestrian and bicycle circulation may occur during construction; however, these impacts would be short-term in nature. Signage and flagging should be employed during construction to minimize impacts to pedestrian and bicyclist safety.

5.3.4. Land Use, Temporary Easements, and Displacements

In addition to the nine parcels to be acquired (as described in Section 3.6), CTDOT will require temporary easements on 12 parcels in South Norwalk and East Norwalk during construction of the Build Alternative. CTDOT will expand one existing easement (at the WWTP site) and will acquire 11 new full-parcel and partial-parcel easements. Temporary easements consist of access easements and construction easements. Temporary access easements will be minimally intrusive, and will provide access to the railroad ROW during construction. Construction easements will provide space for all aspects of construction, including equipment assembly and staging, equipment and materials storage, and river access for loading and unloading materials, equipment, and bridge elements. It is anticipated that the temporary easements will be in place through the duration of construction. In cooperation with the property owners and as design advances, CTDOT will determine the size of the temporary easements to be required. Properties in South Norwalk and East Norwalk would be similarly impacted in the three Build options.

As shown in Table 3-5, of the 12 temporary easements required for the project, six of the easements will not involve any displaced uses. At 18 Marshall Street (Parcel 2/24/8), the historic Lock Building site currently used by multiple businesses, CTDOT will potentially acquire access and construction easements on an area currently used for employee parking, including accessible parking, and service van delivery. South of the Stroffolino Bridge in South Norwalk, displaced uses on Water Street include a privately-owned parking area and a vacant warehouse. Temporary access and construction easements also will be required on the City of Norwalk's Maritime Aquarium property (Parcels 2/19/3 and 2/19/2) and the NPA's North Water Street parking lot (Parcel 2/19/1). Potential impacts to Parcel 2/19/3 include removal of the tensile structure, relocation of outdoor animal exhibits, and modifications to existing outdoor animal exhibits. In coordination with the City of Norwalk and the Maritime Aquarium, CTDOT is evaluating potential impacts to Parcel 2/19/2 (IMAX Theater). Potential impacts to Parcel 2/19/1 include temporary closure of the NPA's North Water Street parking facility.

If existing parking at the Lock Building (18 Marshall Street) or the NPA's North Water Street facility is affected, ample replacement parking is available nearby, including the NPA's Maritime Garage, and the 50 Webster Street lot and 8 Haviland Street lots. For employees of the office building at 68 Water Street, private parking and on-street parking is available in the vicinity. As needed, CTDOT will work with affected property owners to arrange for suitable temporary replacement parking.

As discussed in Section 5.3.2, restrictions on navigation during construction will affect upstream uses, including at least five industrial users/businesses and four recreational boatyards or clubs. This will be a temporary impact to navigation, and CTDOT will work with affected users and businesses to communicate regarding scheduled periods of access limitation and to identify appropriate mitigation options.

5.3.5. Socioeconomics

Construction-related socioeconomic impacts of the Build Alternative will include both temporary adverse impacts to land-based and water-dependent businesses and short-term economic gains due to construction jobs.

Access Impacts

As previously described, channel restrictions and a limited number of full channel closures will occur over the approximate four-year construction period. All Build options would incur these temporary impacts. The long span Vertical Lift Bridge option (Option 11C) would require the least amount and shortest duration of channel closures over the construction period, resulting in the least impact to water-based businesses. The Bascule Bridge option (Option 4S) would require the greatest amount and longest duration of channel closures, resulting in the greatest impact to water-based businesses. CTDOT has conducted meetings with water-based businesses upriver from Walk Bridge to ascertain their requirements during construction. Business owners indicated that channel closures of more than seven to ten days could be detrimental to their operations.

Both land-based and marine-based construction activities will occur around the Maritime Aquarium. Required construction easements on Parcels 2/19/2 and 2/19/3 may affect some of the Aquarium's facilities and operations. CTDOT has initiated meetings with the Maritime Aquarium to understand facility requirements and to apprise the Aquarium of potential construction impacts. In coordination with the Aquarium and the City of Norwalk, CTDOT is evaluating potential impacts to Parcel 2/19/2 (IMAX Theater). CTDOT will continue to work with the City and the Aquarium to determine the economic effects of these impacts, and to develop appropriate mitigation measures, including compensation.

Pedestrian and vehicular access to businesses and other downtown locations, including the Maritime Parking Garage, will be maintained, and disruptions from construction will be minimized to the extent possible. Potential parking impacts may occur at the NPA's North Water Street parking facility and at two private business sites in South Norwalk due to construction easements. CTDOT will coordinate with the City of Norwalk and stakeholders to minimize adverse effects of the project construction upon local land-based and water-based businesses. CTDOT will develop a business coordination plan, which will entail providing regular construction updates to the business community, including regular navigable channel impact updates on the project website.

Construction Job Impacts

The Build Alternative will result in temporary benefits to the local economy through new construction jobs and construction-related spending. USDOT estimates that there are 13,000 short-term job-years created per one billion dollars of government investment (or $76,923 per job-year in 2014 dollars).[1] This job-year estimate includes direct on-site jobs, indirect jobs in supplier industries, and jobs that are induced in consumer goods and services industries as workers with direct and indirect jobs spend their increased incomes. Based upon this federal guidance, and the anticipated construction costs and construction duration for each option, Table 5-1 presents the estimated range of job-years generated each year during construction for the three Build Alternative options.

[1] USDOT, *TIGER Benefit-Cost Analysis (BCA) Resource Guide*, updated 3/27/2015, a supplement to the *2015 Benefit-Cost Analysis Guidance for TIGER Grant Applicants.* (http://www.dot.gov/tiger/guidance)

Table 5-1—Potential Construction Period Job-Years per Build Alternative Option

Build Option	Construction Cost Range (in 2020 dollars)	Construction Duration (months)	Range of Job-Years Generated Each Year During Construction
Bascule Bridge (Option 4S)	$330 to $365 million	44	1,100 to 1,200
Short Span Vertical Lift Bridge (Option 8A)	$380 to $415 million	40	1,300 to 1,500
Long Span Vertical Lift Bridge (Option 11C)	$425 to $460 million	37	1,600 to 1,700

5.3.6. Water Quality

Construction activities are the most probable source of potential releases of soils or sediments, or entrained contaminants, which can contribute to water quality impacts. Work in the Norwalk River will be unavoidable and will require disturbance to sediments for construction of new piers, temporary trestles, work areas, dredging and removal of existing piers. Land based work similarly will expose soils which have the potential to erode, or get dispersed by wind and eventually settle in water bodies. Water quality controls will be implemented during construction and where necessary to control releases of sediments or minimize turbidity in the Norwalk River.

CTDOT will employ Best Management Practices (BMPs) while conducting all work within the water. CTDOT will remove existing granite piers and timber support piles within cofferdams to allow work to be conducted in the dry and to protect against releases of sediments and potential contaminants to the watercourse. Drilled shafts for the new bridge will be installed using sheet pile marine enclosures or oversized pipe enclosures to isolate work and to protect against releases of sediments to the water. Installation of contractor trestles and fender piles (and run-around bents if the run-around alignment is used with the Bascule Bridge option) likely will be constructed using some form of hydraulic vibro–hammer, then seated with either a diesel or hydraulic impact hammer. The Build Alternative will require confined excavation of sediment associated with the installation of piers, fenders, and contractor work elements. The Bascule Bridge option will require the removal of approximately 6,800 cy of confined sediment while the Vertical Lift Bridge options will require approximately 8,200 cy and 7,600 cy of confined sediment removal for the short span Vertical Lift Bridge option and the long span Vertical Lift Bridge option respectively.

The run-around alignment, if used for the Bascule Bridge option, would be constructed in one of two ways: it would be constructed as an open deck structure, where all runoff would fall directly into the river; or it would be constructed as a waterproof, steel pan closed ballasted deck, where runoff would be collected, and either directly discharged into the river or channeled landward to some means of temporary water treatment such as an oil/water separator. Rail wheel greasers may be used as a noise control measure due to the tight radius of the run-around track. Using a closed ballasted deck system will help protect from oil and grease releases to the river.

CTDOT will conduct dredging in two locations to widen the navigation channel necessary to support the expanded width of the new bridge span. Approximately 4,100 cy of dredging will be required in the Bascule Bridge option and the short span Vertical Lift Bridge option, and approximately 4,900 cy of dredging will be required in the long span Vertical Lift Bridge option. Channel dredging will be conducted using a hydraulic clamshell bucket during the approved in-water work months, typically November through January where containment is not required. Similarly, CTDOT likely will use a clamshell bucket system to excavate approximately 4,200 cy of sediment for installation of the permanent submarine utility cable and the submarine bridge controls, and removal of the temporary submarine cable installed as part of the CP-243 Interlocking Project.[2] It is anticipated that both the channel dredging and conduit installation work will be conducted in unconfined water during the appropriate allowable work windows.

Sediment requiring management from confined and unconfined excavation and dredging totals approximately 15,100 cy for the Bascule Bridge option and approximately 16,700 cy of sediment for the two Vertical Lift Bridge options. CTDOT's Office of Environmental Compliance (OEP) will conduct sediment testing and will investigate sediment disposal options, including upland, off shore, or in-water (confined aquatic disposal [CAD]) methods. Pending the results of the sediment testing, up to 100 percent of the excavated and dredged sediments will be dewatered at an adjacent staging or construction site, and then removed for reuse/recycling/disposal at an off-site land-based facility, an offshore disposal location, or an in-water CAD location in accordance with reuse/recycling/disposal regulations. Decanted water from the dredged materials will be tested and appropriately treated and returned to the river or disposed off-site in accordance with CTDOT specifications and permit requirements.

The submarine trench backfill will consist of clean material matching the grain size characteristics of the removed sediments, and placed to restore the riverbed to its original state.

To create a temporary working surface and access area, a small area on the west bank near the Build Alternative's western movable bridge span pier will be filled with gravel and stone. Containment methods (such as turbidity curtains, sheeting, geotextile encapsulation) will be required for this contractor-proposed gravel and stone work area. The turbidity curtains will extend from the surface to the bottom of the river around the work area to ensure that sediment does not release to the river. Depending upon the fill materials, geotextile fabric encapsulation may be used to contain fine sediments within the fill. It is expected that this fill will be removed following completion of the project. Silt curtain containment also will be used during the removal of the contractor work area.

For discharges into waters of the U.S., a Section 401 Water Quality Certification will be required from CTDEEP and a Section 404 General Permit will be required from USACE. These permits will stipulate that this work is consistent with the federal Clean Water Act and the Connecticut Water Quality Standards. A National Pollutant Discharge Elimination System (NPDES) permit will also be required as administered by the State of Connecticut via a General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.[3]

Pursuant to Section 402 of the Clean Water Act and CGS Section 22a-430b, General Conditions Applicable to Water Discharge Permits and Procedures and Criteria for Issuing Water Discharge Permits, the project will require a site-specific Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will identify potential pollutant source areas and describe BMPs to be used for erosion and sedimentation control, temporary stormwater management, dust control, and site stabilization. All land-based activities will use erosion and sedimentation control BMPs to limit debris and runoff from entering the watercourse or offsite areas. The SWPPP will be completed during the project's final design phase and will be implemented by the Construction Manager/General Contractor (CM/GC).

5.3.7. Tidal and Freshwater Wetlands

Temporary impacts are defined as reversible impacts, indicating that the environmental resources will return to pre-disturbance conditions once the construction activities are completed and the areas are

[2] The CP-243 Interlocking Project is described in Section 3.12. The extent of removal of the temporary cable will be determined as design advances and during permit applications in accordance with federal and state requirements.
[3] United States Environmental Protection Agency. *Administration of the NPDES Stormwater Permit Program in New England*. Accessed February 2016 from: http://www3.epa.gov/region1/npdes/stormwater/administration.html.

restored. Temporary impacts to tidal and freshwater wetlands include indirect impacts due to shading of the contractor construction trestles, the run-around alignment, and contractor access and staging from the shore. Temporary loss of tidal wetland habitats will occur as a result of construction of the run-around alignment (if used, for the Bascule Bridge option), contractor staging/access, and from temporary contractor construction trestles (associated with all three Build Alternative options).

In the Build Alternative, the construction of the temporary contractor construction trestles located to the north and south of the existing Walk Bridge will result in the temporary indirect impact of approximately 1,900 sf of vegetated tidal wetlands due to shading for the Bascule Bridge option and 1,500 sf for either Vertical Lift Bridge option. The construction of contractor staging and access areas will result in the temporary indirect impact of approximately 900 sf of vegetated tidal wetlands for the Bascule Bridge option and 1,000 sf for either Vertical Lift Bridge option due to contractor staging and access areas in close proximity or spanning tidal wetlands. In total, between 2,500 and 2,800 sf of temporary indirect impact will occur to estuarine intertidal emergent wetlands. These areas will be restored after construction of the replacement bridge is completed, the contractor trestles have been removed, and other aspects of the construction are completed

There will be no temporary impacts to freshwater wetlands as a result of the construction phase for the Build Alternative. The impacts to the lone freshwater wetland are permanent.

5.3.8. Floodplains

Most of the area surrounding the bridge falls within the 100-year floodplain; as a result, many of the construction activities will take place in this resource. The activities associated with construction, including the contractor trestles, construction staging/access, and possible run-around alignment (Bascule Bridge option only), will encompass a total of approximately 230,000 sf of floodplain. The majority of this area, however, will be used for construction staging activities and access to the railroad ROW or the waterway; it will likely not alter the capacity of the area for flood storage, or inhibit any existing avenues for flood water movement.

During temporary construction work, the increase in the number and types of structures in the water at the bridge opening will contribute toward flow restrictions. Examples of structures include temporary trestle works for the contractor, work embankment, the run-around tracks, and cofferdam containment during removal of the existing piers. Additionally, at some point during the construction period, both the existing bridge piers and some of the new bridge piers will be located in the river simultaneously.

CTDOT will analyze the temporary conditions to assess effects and, if needed, will take steps to mitigate effects. The hydraulic analyses performed for the permitting phase of the project will include an evaluation of the temporary conditions, and will require approval from CT DEEP. Upon completion of the Walk Bridge Replacement Project, temporary features affecting the ground and floodplain will be restored.

5.3.9. Terrestrial Resources

Although construction activities have the potential to impact some terrestrial species, these impacts will be largely addressed via a combination of avoidance measures (construction phasing or sequencing, seasonal restrictions, etc.) and BMPs. Should any generation of surplus soil materials from upland areas occur, it will be managed in accordance with state and federal regulations for soil reuse/recycling/disposal. Loss of herbaceous coverage will be temporary, since upon completion of the bridge approach construction activity, all exposed bare soil areas will be stabilized via re-seeding.

No mitigation is needed for temporary impacts to characteristic terrestrial fauna, which are anticipated to be negligible.

5.3.10. Aquatic Resources

Temporary loss of intertidal habitat including mudflats, and subtidal habitat will occur as a result of construction of the run-around alignment (if used, for the Bascule Bridge option), and from contractor staging/access, temporary contractor construction trestles, and cofferdams used for removal of existing piers. The run-around alignment construction (if used) would impact approximately 50 sf of intertidal flat and 150 sf of subtidal habitat. These temporary impacts would not be applicable to either Vertical Lift Bridge option, which would not use the run-around alignment.

Temporary indirect impact also will occur due to the construction of contractor staging and access areas, impacting approximately 6,700 sf of intertidal flat and approximately 700 sf of subtidal habitat. The use of contractor trestles will temporarily impact approximately 100 sf of intertidal flat and 400 sf of subtidal habitat. Temporary impacts also will result from the use of cofferdams for removal of the existing piers, impacting approximately 700 sf of intertidal flat and 4,800 sf of subtidal habitat. Except where indicated, these impacts would apply to all three of the Build Alternative options.

Work requiring structures that contact the benthic environment, such as installing new support piles and fender piles and removing old piles and piers, will be conducted in accordance with CTDOT's Best Management Practices.[4] To minimize bottom sediment disturbance during construction of the replacement bridge, new drilled shaft pilings will be installed using either sheet pile marine enclosures or oversized pipe enclosures. This construction method, which would be used with all three Build Alternative options, will minimize turbidity and protect the water quality of the river. Water from inside the casing (and sheet pile enclosures) will be pumped to a treatment (i.e., settling or filtering) area to remove suspended sediments before being returned to the river, in accordance with the 2002 Erosion and Sedimentation Guidelines and CTDOT's Best Management Practices.

Other piles, such as those used to support contractor trestles and the run-around alignment (if needed) will be smaller diameter piles that are advanced directly through the unconsolidated sediment down to bedrock or a competent subsurface formation. The footprint of the casings and piles will represent a temporary loss of benthic habitat. Once construction activities are completed, they will be removed from the project area or cut below the sediment surface elevation, allowing the disturbed area to recolonize with benthic biota.

Dredging to install the bridge control submarine conduit would result in temporary impact to approximately 100 sf of intertidal flat and approximately 1,700 feet of subtidal habitat for the Bascule Bridge option. Because the bridge control cables in either of the Vertical Lift Bridge options would be located on the movable span, there would be no corresponding impacts associated with these options. Dredging to install the Metro-North submarine conduit will result in approximately 100 sf of impact to intertidal flat and 2,500 feet of subtidal habitat in the Build Alternative (any option). These portions of the benthic environment will be restored by the replacement of the removed material with clean fill of similar grain size characteristics as the native material removed to install the conduits. The surface will be naturally recolonized by benthic biota.

In sum, temporary impacts to habitat would include approximately 7,750 sf of impact to estuarine intertidal habitat, and approximately 10,250 sf of impact to estuarine subtidal habitat with the Bascule

[4] CTDOT, Standard Specifications for Roads, Bridges, Facilities, and Incidental Construction, Form 817, Section 1.10, Environmental Compliance. 2016

Bridge option. Essentially the same or slightly less impacts to intertidal habitats would occur with either of the Vertical Lift Bridge options (approximately 8,400 sf of impacts to subtidal habitat).

The intertidal and subtidal areas will be restored after construction of the replacement bridge, the contractor trestles have been removed, and other aspects of the construction are completed. During construction, incorporation of BMPs and low-impact, in-water construction methods will minimize temporary water quality impacts.

Estuarine fish species are adapted to survive frequent environmental fluctuations characteristic of estuaries such as temperature, salinity, and chemical changes. However, prolonged or permanent alterations of the physical and chemical parameters of their habitats due to human activities can be detrimental to the fish that reside in these habitats, resulting in behavioral and physical impairment. Therefore, the following measures will be utilized as appropriate for the protection of water resources during bridge demolition and construction of the new bridge to minimize any impact to finfish, shellfish, and other aquatic resources:

- Management of turbid water generated inside casing or cofferdam containments;
- Replacement of native materials cut from the submarine conduit alignments with clean fill matching grain size characteristics;
- Mechanical removal of select existing bridge components;
- Separation and removal of sediment-laden water from containment areas (e.g., inside cofferdams, and inside casings); and
- Avoidance of construction blasting.

These measures will be implemented regardless of which Build Alternative option is pursued.

CTDOT will prepare an EFH Assessment pursuant to the Magnuson-Stevens Fishery Conservation and Management Act for the Build Alternative as the design is further refined and as the contractor's means and methods of construction are advanced.

If elevated levels of pollutants of concern are found during sampling and testing required during the permitting phase of the project, additional BMPs may be warranted. If required, these BMPs will be evaluated and implemented through coordination with the regulatory agencies. Therefore, since BMPs will be incorporated into the project, and since impacts to the channel bottom will be regulated under the dredging permit process, no additional mitigation is needed for temporary impacts to water resources. The need for mitigation will continue to be assessed as project design advances.

Compensatory mitigation for habitat displacement due to the construction phase impacts is anticipated to use a 1:1 ratio for temporary direct impacts to intertidal and subtidal habitats, and for indirect shading impacts to tidal vegetated wetlands. This will involve in-place restoration or enhancement of temporary impact areas. This also will include restoring tidal marsh areas that may be temporarily impacted from trestle platform shading, and other compensatory mitigation options as determined in coordination with the USACE and CTDEEP through project permits.

5.3.11. Endangered, Threatened, and Special Concern Species

Endangered, threatened, and special concern species live in the project area; CTDOT's focus during construction activities will be to first avoid, then minimize disruption to these species and their habitats.

As noted in Section 3.15.3, the state endangered Peregrine Falcon was recently observed nesting on “High Tower 529.” A potential construction period impact to the Peregrine Falcon is the temporary disruption of nesting on the high tower structures should falcons choose to nest in the project area and construction activities coincide with nesting season. To address the potential presence of nesting Peregrine Falcons in the project area, the contractor will be required to coordinate through the Resident Engineer at least ten days prior to the commencement of any construction activities to arrange for a CTDOT Environmental Inspector from the Office of Environmental Planning (OEP) (or an authorized delegate) to be available to meet and discuss proper protocol for maintaining environmental commitments made for the protection of this species and its habitat. The inspector will notify workers if a Peregrine Falcon is reported in the project area, and all workers will be apprised of the laws protecting them. Photographs and the laws protecting Peregrine Falcons will be posted in the Contractor’s and CTDOT field offices. Species identification sheets will be obtained from CTDEEP or OEP. Any observations of this species will be immediately reported to OEP through the Resident Engineer.

Table 5-2 identifies the seasonal occurrence of federally-listed marine species in Long Island Sound according to NMFS. There is a chance that two sturgeon species and four sea turtles may occur within the Norwalk River or Harbor. Further consultation with NMFS Northeast Regional Office (NERO) may be required as the project design advances. In-water work with potential to temporarily impact these species (i.e., dredging the navigation channel and the installation and removal of utility conduits) will likely be subject to seasonal time of year restrictions when the federal trust species are not expected to occur in the Norwalk River estuary. Therefore, potential temporary impacts to these species will be avoided.

Table 5-2—Seasonal Occurrence of Federally-listed Marine Species Reported to Occur in Long Island Sound

Species	Status / Time of Occurrence in Coastal Long Island Sound Waters
Leatherback Sea Turtle	Enter northern waters in spring, maximum numbers occur in summer, retraction of turtles southward in autumn
Loggerhead Sea Turtle	Migration into New England waters in the spring, maximum numbers peaking in the summer, followed by a southward retraction of numbers in autumn
Atlantic Ridley Sea Turtle	Occurrence in northeastern waters documented by cold- stunned individuals stranded on beaches in autumn months, but distributional data lacking across all seasons.
Green Sea Turtle	Rarely encountered in New England waters.
Shortnosed Sturgeon	Only breeding population in CT is in the Connecticut River (but occasionally strays are reported in the Housatonic and Thames Rivers). After spawning upriver in April-May, they return to the lower tidal estuary between Haddam and Old Saybrook where they remain until June-July. Afterwards they retreat offshore to warmer waters in winter
Atlantic Sturgeon	Rarely seen in CT. Live in saltwater, occasionally entering freshwater rivers in April – June to spawn. After spawning, females return to ocean waters. Males may linger until fall. Young reside in river for 2-7 years before returning to ocean.

Sources: Klemens, 1993; Jacobs and Odonell, 2009.

Additional consultation with NMFS will occur for review and concurrence during the permitting process as final construction details are identified. Since no hibernacula or maternity roosts are reported to occur within one-quarter-mile of the project area, as determined by CTDEEP,[5] specific alternative mitigation measures to protect the Northern Long-eared Bat are neither required nor proposed.

The potential concern for state special concern Common Tern and the state threatened Great Egret may be the temporary disruption of their foraging activities along the Norwalk River in immediate proximity due to turbidity induced from in-water work (e.g., dredging). However, since certain in-water work will be enclosed, and the river dredging will be scheduled to occur during the late fall to late winter dredging window when these species have migrated south, no permanent impact to these species is anticipated. To protect the Great Egret, Common Tern, the two sturgeon species, the four marine turtles, and EFH-designated fish species, no in-water work with potential to cause substantial and prolonged turbidity events will occur outside of the construction window established in the requisite permits, without use of proper controls. In addition, BMPs will be employed to avoid the deposition of demolition debris or other construction materials in the water and intertidal habitats. Therefore, no additional mitigation is anticipated.

The USFWS IPaC tool identified 24 migratory birds of Conservation Concern which have distributional ranges overlapping the project site and immediate vicinity. No impact is expected to occur to the majority of the migratory birds, because they are not expected to be present in the project vicinity due to the lack of suitable migratory stopover habitat. There is the potential for temporary construction impacts to affect four threatened or endangered migratory bird species in the vicinity of Walk Bridge. Table 5-3 identifies the threatened or endangered species from the IPaC list that are likely to be encountered at the site, the potential temporary impacts due to construction, and proposed conservation measures. As indicated in Table 5-3, measures will be taken to avoid and/or minimize impacts to the species during construction.

Table 5-3—Selected List of Migratory Birds of Conservation Concern in the Vicinity of Walk Bridge

Species Common Name / *Scientific Name*	Applicable Season	CT Status	Potential Impact	Conservation Measure
Bald Eagle *Haliaeetus leucocephalus*	Year round	Threatened	Disruption of foraging / winter roosting	Conduct vegetation clearing in early December before many of the eagles arrive in the area; monitor for eagle presence during construction
Least Tern *Sterna antillarum*	Breeding	Threatened	Disruption of foraging	BMPs to protect water quality
Pied-billed Grebe *Podilymbus podiceps*	Year-round	Endangered	Disruption of foraging outside of breeding season; Not expected to occur as a breeding resident	BMPs to protect water quality. This species was not reported by the CTDEEP NDDB as known to occur in the project area as a resident breeder
Snowy Egret *Egretta thula*	Breeding	Threatened	Temporary disruption(s) in foraging	Avoidance. In-water work with potential to disrupt foraging (dredging) will occur when this migratory species is essentially absent from CT

Source: USFWS, IPaC Report, January 2015.

[5]CTDEEP, “Northern long-eared bat Areas of Concern in Connecticut to Assist with Federal Endangered Species Act Compliance,” February 1, 2016.

5.3.12. Water-Dependent Uses

Existing water-dependent uses to be displaced by construction of the Build Alternative will include uses at 11 Goldstein Place (Parcel 3/1/25). Additionally, operations of the Sheffield Island Ferry and the Maritime Aquarium vessel will be impacted by project construction.

For the duration of the construction period, these impacted water-dependent uses will need to be relocated. Marina users displaced by the closure of Coastwise Boatworks (11 Goldstein Place) could be accommodated through a variety of solutions. One possible mitigation measure would be dispersal of marina users to other nearby marine facilities located upstream or downstream of Walk Bridge, or to nearby harbors, and as appropriate considering vertical clearance requirements. Discussions with the City of Norwalk indicate that a currently closed upstream marina may be available for temporary use by the current operator of Coastwise Boatworks. Use of the marina may be facilitated through lease or purchase, and potentially could become the long term solution to the displacement. Similarly, rowers based at the Coastwise Boatworks site may relocate to other facilities in the harbor or upriver from the site. It is anticipated that the Sheffield Ferry and Aquarium vessel operations will be relocated to docking facilities in Norwalk Harbor.

CTDOT has participated in several meetings with water-dependent users, including community-based and area-wide rowing groups, to determine their existing use of the Norwalk River and potential construction period impacts. Working in coordination with the City of Norwalk, the Norwalk Harbor Management Commission, rowing organizations, the Norwalk Seaport Association, and the Maritime Aquarium, CTDOT will continue to explore mitigation opportunities for addressing temporary impacts to marina users, rowers, and ferry and vessel operations.

Section 5.3.3 addresses potential temporary impacts to the pedestrian/bicycle path fronting the WWTP property and the pedestrian/bicycle path along the western side of the river at the Aquarium property. Following construction of the project, the pedestrian/bicycle paths and access to the paths will be restored to pre-construction conditions.

5.3.13. Parklands, Public Recreation, and Community Facilities

Given its close proximity to the bridge and due to the required construction easements, the Maritime Aquarium facilities will be impacted by the project. Potential impacts include removal of the tensile structure and modification and relocation of the outdoor animal exhibits currently located north of the bridge. South of the bridge, the construction easements potentially may affect use of the IMAX Theater. In coordination with the City of Norwalk and the Maritime Aquarium, CTDOT is evaluating impacts to the IMAX Theater. CTDOT is coordinating with the Maritime Aquarium to avoid or minimize impacts on aquarium animals, facilities, and operations to the extent possible.

As noted in Section 5.3.3, construction easements south of the IMAX Theater might potentially require temporary closure of the NPA's North Water Street parking lot and the adjacent portion of the NRVT. It is anticipated that the Sheffield Island and Maritime Aquarium ferry docks will be temporarily relocated elsewhere in Norwalk Harbor.

A temporary construction staging area will be located on the grounds of the Norwalk WWTP. Temporary construction activities will directly affect both the WWTP property and the Harbor Loop Trail where it extends through the WWTP property. This may affect the Harbor Loop Trail, but impacts will be limited by the fact that only a small portion at the end of the existing trail at Walk Bridge will be affected. The construction of the north-south pedestrian/bicycle connection at the southern end of the Harbor Loop Trail may also result in temporary impacts to this portion of the trail. The operation of the WWTP will not be affected by the temporary construction staging.

Temporary construction activities may result in visual and noise impacts on users of the riverfront parks and trails. Construction activities and staging will occur in close proximity to the back and sides of the interlocking building, which houses the SONO Switch Tower Museum. Temporary impacts to the Switch Tower Museum are not anticipated at this time.

CTDOT has conducted consultation with the City of Norwalk, and will continue coordination regarding the temporary use of City-owned property, including parks or trails, during construction. Temporary park impacts will be mitigated to the extent possible by minimizing impacts from noise, as described in Section 5.3.16.

5.3.14. Visual Resources

The construction activities will involve temporary visual impacts due to construction staging, including use of temporary trestles in the water, and the introduction of the temporary run-around alignment in the river on the north side of the bridge, if this construction option is employed. These construction staging areas will be more visible from vantage points along the river, including parks, trails, and adjoining uses/buildings with water views.

During the construction period, views of the river will be changed. The temporary run-around tracks (if this option is employed) will be visible north of the bridge. Trestles and barges on the river, as well as construction and storage areas, also will be highly visible on the waterfront and around the Maritime Aquarium facility and other affected portions of the downtown. The potential removal of the Maritime Aquarium's tensile building in the northwest quadrant of the bridge would be a change to this viewshed.

5.3.15. Air Quality

Demolition and construction activities can result in short-term increases in dust and equipment-related particulate emissions in and around the project area. Equipment-related particulate emissions can be minimized if the equipment is well maintained. The potential air quality impacts will be short-term, occurring only while demolition and construction work is in progress.

Air quality impacts during construction will be generated by motor vehicle, machinery, and particulate emissions resulting from earthwork and other construction activities. Construction vehicle activity may result in increased motor vehicle emissions within certain areas. 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.

Several air quality construction mitigation best practices are available to assist in reducing diesel emission impacts from construction equipment. Off-road diesel engines can contribute substantially to the levels of particulate matter and nitrogen oxides in the air. In recent years, 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. To address this, CTDOT and FTA can implement several strategies to reduce emissions from the older engines that are in operation today.

Reducing pollutant emissions from older off-road diesel engines can occur through a variety of strategies, including the following: reducing idling, properly maintaining equipment, using cleaner fuel, and retrofitting diesel engines with diesel-emission control devices. By reducing unnecessary idling at the construction site, emissions will be reduced, and fuel will be saved. Proper maintenance of the diesel engine also will allow the engine to perform better and emit less pollution through burning fuel more efficiently. 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 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. In the final design phase, CTDOT will consider including the measures on a voluntary or mandatory basis.

5.3.16. Noise and Vibration

The construction noise and vibration assessment was prepared according to the guidelines presented in FTA's guidance manual. At this stage in the project development, it is not feasible to perform a detailed analysis. However, following the FTA guidelines, it is possible to identify areas of potential impact that will need more detailed attention, as during final design and construction planning prior to contractor mobilization. The construction is projected to last up to four years. The project will be built while maintaining train traffic through the construction site. Work will most likely be scheduled with special tasks occurring at night when train operations are significantly lower than during the day. CTDOT anticipates that both daytime and nighttime construction noise will occur in the project area.

A general noise assessment was prepared by dividing the project area into four segments;

- At-grade track work west of the Walk Bridge;
- Demolition and re-construction of the Walk Bridge;
- At-grade track work east of the Walk Bridge; and
- The primary work staging area at 11 Goldstein Place.

The two noisiest pieces of anticipated construction equipment were then identified for each segment. The equipment had maximum noise source levels ranging from 101 to 88 dBA. The following is a list of equipment selected, in order with loudest piece of equipment first:

- Diesel hammer to drive piles for the temporary trestles along the shore of and in the river in all four quadrants of the Walk Bridge construction site, and adjacent to the proposed staging area southwest of Washington Street;
- Impact hammer to bust rivets during demolition of the existing Walk Bridge;
- Vibratory hammer to drive temporary sheet piles along the at-grade track sections to retain the existing fill during construction of new retaining walls;
- Rail saw to cut the rails to exact length prior to being welded together; and
- Crane to lift raw materials and finished bridge components.

The two noisiest pieces of construction equipment to be used on the at-grade track work west and east of the Walk Bridge will be the vibratory hammer and the rail saw. The construction equipment that will create the most noise for the Walk Bridge (in-water) segment will be diesel hammers and the impact hammer for busting rivets. The diesel hammer will be loudest piece of equipment during construction of the loading trestle adjacent to 11 Goldstein Place. Once the loading trestle is built, the loudest piece of equipment will be a crane.

Table 5-4 presents the FTA's construction noise assessment criteria for different land uses. Even though most of the equipment will never be used simultaneously, the two noisiest project construction sources were combined into one source located at the center of each construction section to develop a maximum one-hour Leq noise level. These noise levels were then used to identify areas abutting the construction project where noise levels will exceed the values in Table 5-4.

Table 5-4—FTA Construction Noise Assessment Criteria

Land Use	One-hour Leq (dBA)	
	Day	Night
Residential	90	80
Commercial	100	100
Industrial	100	100

Source: FTA Transit Noise and Vibration Impact Assessment, page 12-7

The 80 dBA Leq area encompasses a number of residential areas and the aquarium. Residences include properties along Water Street and N. Water Street from Hanford Place north to Ann Street, plus other properties on Elizabeth, Haviland, Washington, N. Main, and Marshall Streets west of the Norwalk River. East of the river, the 80 dBA Leq area includes properties along Goldstein Place, Fort Point Street, and Van Zant Street.

Considerably fewer properties are located in the 90 dBA Leq area than in the 80 dBA Leq area. At the center of the project, the aquarium is included in the 90 dBA zone. Along the at-grade track sections west and east of the river, only properties within 115 feet of the 4-track centerline are located in the 90 dBA Leq area and will be affected. There are no residential properties located within the 90 dBA area surrounding the primary construction staging area at 11 Goldstein Place.

The Bascule Bridge (Option 4S) potentially includes the construction of a run-around alignment to maintain train service through the corridor. The run-around would be constructed on a concrete deck with a ballasted track north of the existing Walk Bridge and slightly closer to the aquarium. Train speed on the run-around would be 15 mph compared to the existing limit of 45 mph on the Walk Bridge. The run-around would raise the train noise levels 1 dB at the aquarium.

As final design and construction planning continues, CTDOT will consider the following mitigation measures:

- Install temporary noise barriers between noise-sensitive receptors and noisy stationary equipment;
- Locate stationary equipment as far from residential areas as possible;
- Designate dedicated truck routes to keep construction trucks from residential areas; and
- Schedule noisy operations to be performed simultaneously, as the slightly louder noise levels will be offset by less exposure to the public.

Throughout the construction duration, CTDOT will keep the public informed of proposed construction schedules, noisy activities and nighttime work.

The Maritime Aquarium has provided the noise criteria presented in Table 5-5. CTDOT is working with the aquarium to ensure proper interpretation of these guidelines for the protection of its fish and animals.

Table 5-5—Aquarium Noise Level Guidelines

Species	Noise Level Guidelines	
	Normal	Short Term
Fish	85 dB	110 dB
Harbor Seals	85 dB	110 dB
Meerkats	80 dB	90 dB
Reptiles	85 dB	110 dB

Source: The Maritime Aquarium at Norwalk,

The FTA guidance manual provides a method to assess potential damage from construction-generated vibration levels, based on the peak particle velocity (PPV) in inches/second and human annoyance, expressed in terms of VdB,. The vibration criteria shown in Table 5-6, excerpted from the FTA guidance manual, were developed to be applied during the environmental assessment process to identify locations that will be addressed during final design.

Table 5-6—FTA Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: FTA Transit Noise and Vibration Impact Assessment, Table 12-3

The FTA source data for diesel hammers and vibratory hammers were provided in an upper range and a typical range. Applying the upper range indicates that a PPV of 0.5 in/sec would be exceeded at 50 feet from the pile driving for the temporary trestles along the shore of and in the river in all four quadrants of the Walk Bridge construction site, and adjacent to the proposed staging area southwest of Washington Street. The 0.12 in/sec criteria would be exceeded within 140 feet of the pile driving. The typical range would only result in an exceedance of the 0.3 in/sec criteria within 50 feet of the pile driving. At a distance of 100 feet, the vibration levels would be below both the 0.2 in/sec criteria and the more stringent 0.12 in/sec criteria. Depending on the construction, the aquarium and IMAX Theater could be within the area of influence for the pile driving.

The vibratory hammer will be used to install temporary sheet piles along the at-grade track sections west and east of the Walk Bridge. The upper range source data for the vibratory hammer will create exceedances of the 0.2 in/sec criteria at 55 feet and the 0.12 in/sec criteria at 85 feet. The typical range for a vibratory hammer will not exceed any of the criteria at 50 feet.

Human annoyance from the construction vibration could extend much farther into the community than the PPV exceedances. The upper range source data for pile driving has the potential to create annoyance out to distance of 500 feet from the pile driving activities, and the typical range can extend 300 feet from the source. Annoyance from an upper range vibratory hammer would be the same as a typical pile driving operation. The typical range vibratory hammer has the potential to create annoyance within 100 feet of the source.

A vibratory compactor will create annoyance within 140 feet of the compactor. The use of a compactor is proposed during the construction of the northwest access road, located between the aquarium's outside exhibit and Walk Bridge; and during the construction of the gravel pad under the new bridge approaches between the aquarium and the IMAX Theater. Both instances could be a source of annoyance to persons visiting the aquarium facilities.

Hoe rams for breaking piers or bridge abutments, large bulldozers, drilled shafts and loaded trucks would create annoyance for residences located within 75 feet of these sources.

CTDOT is committed to preventing vibration damage to buildings in the areas affected by the pile driving and the use of the vibratory hammer. Mitigation measures could include:

- Conducting pre-construction surveys of potentially affected buildings to determine the appropriate building category and conditions of the structure;
- Establishing vibration limits;
- Developing a vibration monitoring program;
- Conducting post-construction surveys;
- Establishing dedicated truck routes that would keep construction trucks from residential areas;
- Phasing construction activities that create vibration so that multiple sources of vibration do not occur at the same time; and
- Keeping the public informed of proposed construction schedules, especially identifying activities known to be a source of vibration.

CTDOT is participating in ongoing discussions with the Maritime Aquarium so that construction vibration will not adversely affect the aquarium's fish and mammals.

CTDOT will discuss the need for vibration mitigation measures with NMFS and CTDEEP, including addressing potential vibration impacts on fish living/migrating in the Norwalk River, as design progresses and as permit applications are prepared for the Build Alternative.

5.3.17. Cultural Resources

During construction, potential impacts to historic properties that are adjacent to the project generally will not differ from construction-period impacts to other properties. The one area of special concern is vibration from construction-vehicle traffic, compaction to create access facilities, excavation and backfilling, and pile-driving. As indicated in Section 5.3.16, construction-vehicle traffic is not expected to generate vibration levels that would be damage-causing. However, other construction-period vibration impacts could affect buildings that are not in good structural condition. Many of the historic buildings that abut the project area are well over 100 years old, and they may not have the same physical resistance to vibration as modern buildings. These buildings include the Interlocking Tower (SoNo Switch Tower Museum) and other historic buildings on the north side of Washington Street in the South Main and Washington Streets Historic District; the two former factory complexes (Norwalk Lock Company and Norwalk Iron Works) north of the railroad ROW on North Water Street; the circa 1910 commercial building at 68 Water Street; and the buildings that make up the potential Liberty Square Historic District, on the east side of the Norwalk River. All of these historic buildings are adjacent to construction staging/access areas.

As indicated in Section 3.22.3, the temporary access easement at Parcel 2/19/3 will be minimally intrusive, and is not expected to affect the former Norwalk Iron Works Building. The construction easement potentially will require the removal of the modern tensile structure adjoining the historic structure. Provided no physical damage occurs to the historic building due its removal, the removal of the modern structure will not impact the historic building. In fact, its removal may restore the appearance and integrity of the historic building.

Pre-construction inspection of building elements susceptible to damage, documentation of the buildings' pre-existing states, condition assessments by a structural engineer, and real-time monitoring of vibration levels may be required during construction. CTDOT will coordinate with adjacent property owners to establish protocols for conducting pre-construction and construction survey and monitoring activities, as required.

The potential for construction-period impacts to archaeological resources is discussed in detail in Section 3.22.3, since there is no meaningful distinction in terms of temporary versus permanent impacts with regard to disturbance of significant archaeological remains. Stipulations in the MOA regarding historic properties include the implementation of an Archaeological Treatment Plan that will account for project impacts to archaeological resources.

5.3.18. Hazardous and Contaminated Materials

The construction of the Built Alternative will result in potential impacts to environmental risk sites and from hazardous material. Based on the age of Walk Bridge and overhead contact system (including high towers), it is probable that the existing bridge and support facilities contain lead-based paint (LBP), ACM, and polychlorinated biphenyl (PCB)-containing equipment, as well as other contaminants. It is likely that creosote and other contaminants are present in the existing bridge foundations and fender system, and the approximate 5,900 linear feet of existing rail and ties to be demolished and replaced.

To prevent the exposure of workers and the surrounding community to contamination during construction of the Walk Bridge Replacement Project, CTDOT will implement a number of protective measures. During design, CTDOT will conduct its due diligence relative to contaminated material investigations. As a part of this, sampling of soil, sediment, groundwater and other media anticipated to be impacted by project construction will be completed during the design phase of the project. CTDOT will also survey and evaluate structures for ACM, lead-based paint, and potential PCB-containing equipment prior to dismantling/demolishing the existing bridge, control tower, OCS, and high towers.

CTDOT will develop specifications for the removal of ACM impacted by construction and/or demolition operations in accordance with all applicable federal and state regulations. Obsolete equipment containing PCBs will be removed and properly disposed per federal and state regulations. Appropriate engineering controls required by the regulations, such as containment, dust control measures and the use of personal protection equipment, will be used to minimize exposure. Demolition activities will be conducted in accordance with OSHA and state regulations. CTDOT will direct the contractor to provide Connecticut Department of Public Health (CTDPH) with advance notification prior to abatement and removal activities.

Construction of new bridge piers, fenders, ancillary structures, and contractor work trestles, as well as the channel dredging, will require the management and disposal of approximately 15,100 cy of dredged sediments for the Bascule Bridge option and approximately 16,700 cy of dredged sediments for the two Vertical Lift Bridge options. On-site management and off-site disposal of excavated soils, resulting from the construction of new land-based bridge piers, also may be required. CTDOT is completing testing of the river sediments, soils, and groundwater to be impacted. During final design, CTDOT will prepare specifications for the management, dewatering, and off-site disposal of excavated soil and dredged sediment. Temporary waste stockpile area(s) will be constructed, managed and dismantled in accordance with CTDEEP regulatory and permit requirements. CTDOT has identified approved upland facility sites for the disposal of excess soil and sediments. In cooperation with CTDEEP and USACE, and depending upon the results of sediment testing, CTDOT will investigate disposal options for the dredged material, including land-based, offshore, or in-water (CAD) disposal methods.

5.3.19. Safety and Security

CTDOT's construction specifications require development of a Safety and Health Plan specific to the Walk Bridge Replacement Project. This plan will conform to the Occupational Safety and Health Administration (OSHA) regulations and reflect site-specific conditions and protocols to be followed during project construction based on contamination detected during subsurface investigations conducted during the design phase of the project.

Prior to construction start, CTDOT will require the contractor to develop an overall site safety plan. The safety plan will address construction worker and site safety, site security, and public safety, including safety of adjacent properties.

The site-specific public safety plan will be designed to prevent public exposures, including protection of the public from nuisance conditions (such as construction noise and dust), avoid disrupting public routes and services, and maintain a continuous separation between the construction areas and public spaces. The plan also will include an emergency action plan to identify procedures to be followed in the event of an emergency.

CTDOT's construction specifications include supplemental specifications for addressing public health and safety issues, including rodent and pest control.[6]

5.3.20. Public Utilities and Service

There will generally be no effect on, or disruption to, local public utilities during construction. Most of the construction activities will not take place where public utilities exist. However, there are several areas where construction is near public utilities or on or over public streets, such as North Water Street, Fort Point Street, and Goldstein Place. In areas where construction may affect public utilities or take place on public streets, the owning utility will be contacted to locate the utility, and care will be taken to avoid disruption to the utility and interruption of service in accordance with CTDOT construction specifications.

5.3.21. Title VI and Environmental Justice

Construction may incur short-term impacts on adjoining neighborhoods, including environmental justice (EJ) and Limited English Proficiency (LEP) populations. Section 3.26 presents an overview of the demographic characteristics for the EJ communities of concern (defined by the Census Tracts) identified by the SWRPA regional planning agency. Table 5-7 presents the minority, low-income, and LEP characteristics of the four block groups immediately adjoining the project site potentially affected by project construction.

[6] CTDOT. Supplemental Specifications to the Standard Specifications for Roads, Bridges, Facilities and Incidental Construction. Form 816, 2004. January 2016

Table 5-7—Minority, Low-Income, and LEP Characteristics for Study Area Census Blocks

EJ Category	Tract 441 Block Group 1	Tract 441 Block Group 2	Tract 442 Block Group 2	Tract 442 Block Group 3
% Minorities	69.2%	69.3%	71.7%	60.4%
% Below Poverty	21.9%	25.7%	12.7%	5.7%
Per Capita Income	$39,012	$49,312	$19,330	$41,932
% LEP (individuals over age 5)	23.3%	18.2%	30.2%	14.8%
% LEP (households)	13.32%	12.9%	18.41	9.0%

Notes: Poverty thresholds are updated annually for changes in inflation and the cost of living, and dollar value thresholds vary by family size and composition. The 2014 poverty thresholds used by the U.S. Census Bureau included $12,316 for an individual under the age of 65 without children and was $11,354 for an individual 65 years or older.
Source: U.S. Census Bureau 2010 Decennial Census, Table P2, Hispanic or Latino, and Not Hispanic or Latino by Race; 2014 American Community Survey 5-year Estimate, B17021: Poverty Status of Individuals in the Past 12 Months by Living Arrangement; B19301: Per Capita Income in the Past 12 Months (in 2014 Inflation-Adjusted Dollars); B16002: Household Language by Household Limited English Speaking Status; and B16004: Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over.

The census block groups encompassing the project site have minority populations of 60.4 percent to 71.7 percent, and three of the four block groups have higher percentages of low-income populations (12.7 percent to 25.7 percent) than the city, county, and state as a whole. Block Group 3 in Tract 442 to the southeast (encompassing the Goldstein Place and Liberty Square neighborhoods) has a relatively low percentage (6 percent) of low-income residents. Per capita income for the southwestern Block Group 2 in Tract 441 (including the Ironworks residential development and other recent or pending developments in SONO) was higher than per capita income for the state and city (but slightly lower than that for the county).

The surrounding block groups had 22 percent LEP for the population over 5 years of age in 2014, which was higher than the percentages for the state, county, and city as a whole. These block groups had a combined percentage of LEP households of 13.4 percent in 2014, higher than that for the city, county, and state. For LEP households in these block groups, the majority (61 percent to 84 percent) are Spanish speaking, and the percentages of Spanish speaking LEP individuals over age 5 ranged from 54 percent to 96 percent of the total block group LEP population.

Potential impacts to EJ populations during construction will include temporary visual effects, temporary traffic detours in the immediate area of the bridge construction, and temporary increases in noise and vibration, and air quality emissions. These impacts are short-term and will not be disproportionately adverse. These impacts will occur to all adjoining properties, including newly constructed, high-end developments built adjacent to the railroad (e.g., Ironworks Building). The majority of the adjoining parcels and land uses fronting on the railroad and Walk Bridge in the SONO District are either commercial uses (accommodating mixed uses and residential use) or institutional in nature.

All three Build options will have similar impacts on EJ communities, although the long span Vertical Lift Bridge will lessen the duration of construction impacts. The environmental justice impacts resulting from permanent property displacements are addressed in Section 3.26.

Mitigation measures, including potential noise/vibration mitigation (such as pre-construction surveys and vibration monitoring) and measures to reduce dust emissions or air quality impacts, are described in the preceding sections.

CTDOT will implement a Public Involvement Program during construction to provide information on construction activities that will include outreach to EJ communities, as described in Section 3.26. Public involvement will include use of the project website, project newsletters, public meetings, and press releases to provide updates on project construction. Outreach performed to date has included contacting city officials, community and neighborhood organizations to identify EJ contacts and groups and to develop means of communicating and coordinating with these entities. A Spanish-language project fact sheet has been developed, posted in appropriate locations, and distributed, and public meeting notices have been posted and sent to these grassroots organizations.

Construction updates posted on the project website will include language translation features. Outreach to LEP populations will include language translation in newspapers in general circulation to EJ populations and translation of public notices and key project updates, including Spanish and Haitian Creole translations of the project factsheet for the project's public hearing on the EA/EIE. A Local Presence Plan will include community outreach, in train stations, pop-up kiosks, and attendance at local events, as well as outreach beyond the project limits to include commuters, to provide construction updates and information on project construction activities, including the coordination of the project with other CTDOT construction projects.

6. Summary of Resource Commitments

Chapter 6 presents a description of irreversible and irretrievable commitment of resources and the relationship between the short-term use of the environment and long-term productivity.

6.1. Irreversible and Irretrievable Commitment of Resources

Irreversible resource commitments involve the use or destruction of a specific resource that cannot be replaced. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored due to the action. In both cases, permanent loss of the resource occurs.

The No Build Alternative would not require an immediate increase in irreversible and irretrievable commitment of resources, including natural, human, and monetary resources, beyond those resources currently required for the ongoing operation and maintenance of Walk Bridge. Due its age and deteriorating condition, however, it is expected that over time, the commitment of human and monetary resources toward the operation of the bridge will increase. Metro-North reports that due to recent bridge failures along the NHL, it employs a maintenance staff of six bridge mechanics, engineers, and other bridge personnel to address emergencies.[1]

Federal and state funds will be required for the construction of the Build Alternative. State funds will be required for continued operation and maintenance of the project for the extent of its useful life. These monetary resources are irretrievable.

Construction materials that will be required for the Build Alternative include steel, concrete, aggregate and bituminous material, and wood. Labor, energy, and natural resources will be required to produce construction materials. These resources are irretrievable; however, they are not in short supply, and their use will not adversely impact their continued availability.

In accordance with Connecticut's State Solid Waste Management Plan,[2] CTDOT's policy is to recycle and reuse resources where feasible. CTDOT will explore opportunities to reuse the construction demolition materials in proposed areas of retained fill.

Table 6-1 presents a summary table of environmental resources that will be permanently impacted by the project. Permanent impacts would be similar with the Bascule Bridge option and the two Vertical Lift Bridge options. Also presented are the proposed compensatory measures; compensation for impacts will be determined in consultation with federal and state regulatory agencies during the permitting stage of the Build Alternative.

[1] http://www.ctpost.com/local/article/Movable-New-Haven-Line-drawbridges-a-concern-1344286.php
[2] CT Department of Environmental Protection, State of Connecticut, State Solid Waste Management Plan, amended December 2006. Approved December 20, 2006.

Table 6-1 – Environmental Resource Commitments of the Walk Bridge Replacement Project

Environmental Resource	Permanent Impacts (sf)			Proposed Mitigation
	Bascule Bridge	Vertical Lift Bridge (8A)	Vertical Lift Bridge (11C)	
Tidal Wetlands	3,100	2,500	2,500	Restoration of invasive species/degraded tidal wetlands at 4:1 ratio
Freshwater Wetlands	600	600	600	Restoration or replacement in-kind, out-of-kind wetland creation, invasive species removal, or a combination.
Floodplain	15,000	19,500	19,500	Improvement in hydraulic conditions; no flood storage mitigation needed.
Intertidal Flats	900	900	900	Restoration of invasive species degraded tidal wetlands at 4:1 ratio
Subtidal Habitat	1,600	1,400	1,200	Net gain of subtidal habitat due to removal of existing bridge substructure; no mitigation needed.

6.2. Relationship between Short-Term uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA requires an assessment of the relationship between the project's short-term uses of the environment and the project's long-term benefits and productivity. Short-term is defined as the construction period, which is the time period when the majority of environmental impacts will occur. Long-term is defined as the 100-year expected life span of the Build Alternative. Long-term effects also relate to the sustainability of the project and the project's consistency with local, regional, and state-wide planning and policies.

The No Build Alternative would not involve any project-related construction, and therefore would not incur short-term uses of the environment. However, the ongoing maintenance of the No Build Alternative would not extend the useful life of Walk Bridge; therefore, it would not enhance the long-term productivity of the structure. Further, the No Build Alternative would not be consistent with the regional and state TIP or the regional and state transportation goals to replace Walk Bridge, which would contribute toward more reliable NHL service for passenger, commuters, and freight operators.

The Build Alternative's short-term uses of the environment are identified in Chapter 5. The work in the waterway, including demolition of the existing bridge, excavation of sediments, and dredging will create short-term impacts. Land construction activities, including track replacement and replacement of the Fort Point Street Bridge, also will create temporary adverse impacts. Short-term uses and corresponding effects will include the following: water quality and aquatic resource impacts; air quality, noise, and vibration impacts; excavation, management, and disposal of potentially impacted river sediments; and traffic delays and detours in South Norwalk and East Norwalk within the vicinity of the project boundaries. The type of short-term impacts would be similar with the three Build Alternative options.

It is anticipated that construction of the Walk Bridge Replacement Project will take up to four years. The duration of project construction would differ among the Build Alternative options. CTDOT estimates that construction of the Bascule Bridge (Option 4S) would take approximately 47 months, with an estimated 37-month long two-track outage and vertical navigation restriction. With the use of a run-around track structure, construction time would be extended. CTDOT estimates that construction of the short span Vertical Lift Bridge (Option 8A) would take approximately 44 months, with an estimated 34-month two-track outage and vertical navigation restriction. CTDOT estimates that construction of the long span Vertical Lift Bridge (Option 11C) would take approximately 40 months, with an estimated 30-month two-track outage and an estimated 16-month vertical navigation restriction.

Property acquisitions and easements, as identified in Section 3.6, are required for the construction and maintenance of the project. Prior to using the acquisition parcels, CTDOT will manage the sites in accordance with its due diligence requirements, as described in Section 3.23. While the parcel acquisitions are identified as permanent impacts, CTDOT's intention is to own and use the sites only for the duration of project construction. Following the completion of construction, CTDOT will sell the parcels acquired for construction staging, returning them to the local real estate market for sale and redevelopment. CTDOT will retain access rights on all four quadrants of the replacement bridge for access, operations, and maintenance.

The Build Alternative will result in short-term and permanent impacts to tidal and freshwater wetlands. It is anticipated that following construction, tidal wetlands which will incur temporary impacts from activities such as trestle shading, will be restored. CTDOT's restoration of degraded saltmarsh along the Norwalk River as part of the anticipated compensatory mitigation for permanent wetland impacts will result in long-term benefits to production and aesthetics of intertidal habitat along this stretch of the Norwalk River. CTDOT also will mitigate for the loss of freshwater wetlands. While the Build Alternative will adversely impact floodplain, the removal of the existing bridge and channel dredging will improve channel hydraulics through the bridge span.

The construction period will produce a short-term benefit to the local and regional economy through direct on-site jobs, indirect jobs in supplier industries, and jobs that are induced in consumer goods and services industries as workers with direct and indirect jobs spend their increased incomes. The estimated range of job-years generated each year during construction for the three Build Alternative options is as follows: 1,100 to 1,200 job-years for the Bascule Bridge (Option 4S); 1,300 to 1,500 job-years for the short span Vertical Lift Bridge (Option 8A); and 1,600 to 1,700 job-years for the long span Vertical Lift Bridge (Option 11C).

The Build Alternative will result in substantial long-term benefits to rail transportation along the NHL. As indicated in Section 3.27, the incremental effect of the project, when added to CTDOT's other NHL improvement projects, will substantially benefit the region, State of Connecticut, and the entire NEC. The project is consistent with local, regional, and state-wide transportation goals and the regional and statewide TIP, as well as the long-range plans of the NEC Commission.

The project's improvements to marine transportation will positively impact the waterway users, the City of Norwalk and the State of Connecticut through the improved marine-based commerce. Additionally, the improved marine navigation conditions also will contribute to beneficial land use impacts. Current marine-based businesses will be more likely to expand and new marine-based businesses will be more likely to locate up-river, expanding the water-dependent land uses. The project is consistent with the State of Connecticut's Maritime Policy for economic and recreational development of Connecticut ports and harbors.

7. Permits, Approvals, and Certifications

Chapter 7 identifies federal and state coordination, permits, approvals, and certifications required for construction and operation of the Preferred Alternative.

CTDOT will be responsible for applying for and obtaining federal and state approvals for the construction and operation of the Preferred Alternative. Throughout the preparation of the EA/EIE, CTDOT has conducted coordination efforts with federal, state, and local agencies to identify issues and concerns associated with the bridge replacement. CTDOT will apply to federal and state agencies for permits and authorizations at approximately the project's 60 percent design phase. Permits and approvals likely applicable to the project are identified in Sections 7.1 and 7.2.

7.1. Federal Requirements

Table 7-1 lists federal requirements for the construction and operation of the Preferred Alternative, consisting of project coordination, reviews, permits, and notices. Also included is the agency responsible for issuing the approval/permit.

Table 7-1—Federal Requirements for Project Construction and Operation

Federal Regulation	Issuing Agency	Approval/Permit
National Environmental Policy Act (42 USC 4321 et seq)	FTA	Review and Finding
Section 4(f), U.S. Department of Transportation Act (49 USC 303)	FTA	Individual Evaluation and Finding for potential use of Section 4(f) properties
Executive Order 11988, Floodplain Protection, as amended by Executive Order 13690, Federal Flood Risk Management	FTA	Review for impact to floodplain
Executive Order 11990, Wetlands Protection	FTA	Review for impact to wetlands
Executive Order 12898, Environmental Justice	FTA	Review for assessment of impact to EJ communities
Clean Air Act (42 USC 7401 et seq)	FTA	Conformity Determination
Section 106, National Historic Preservation Act (36 CFR 800)	FTA	Memorandum of Agreement
Section 7, Endangered Species Act (16 USC 1531 et seq)	NOAA/NMFS	Biological Evaluation
Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq)	NOAA/NMFS	Essential Fish Habitat Assessment
Coastal Zone Management Act/Connecticut Coastal Management Act (16 USC 1451 et seq)	CTDEEP	Consistency Review
Section 9 of the Rivers and Harbors Act (33 USC 491)	USCG	Permit for construction of new bridge
Section 10 of the Rivers and Harbors Act (33 USC 403)	USACE	Permit for dredging and filling in navigable waters/ impacts to waters and wetlands of the U.S.
Section 404 of the Clean Water Act (33 USC 1344)		
Section 14 of the Rivers and Harbors Act (33 USC 408)	USACE	Permit for impact to federal navigation channel (USACE civil works project)
49 CFR 77; Safe, Efficient Use and Preservation of the Navigable Airspace	FAA	Notice of Proposed Construction or Alteration

7.2. State Requirements

Table 7-2 lists state requirements for the construction and operation of the Preferred Alternative, consisting of project reviews, permits, and authorizations. Chapter 3 contains additional discussion of review requirements regarding permits or approvals identified in Table 7-2.

Table 7-2—State Requirements for Project Construction and Operation

Federal/State Regulation	Issuing Agency	Approval/Permit
Connecticut Environmental Policy Act (CGS Section 22a-1-22a-1h)	CTDOT/CT Office of Policy and Management	Record of Decision/Review and Concurrence
Title VI Program/FTA Circular 4702.1B of October 1, 2012	CTDOT	Environmental Equity Review
Connecticut Endangered Species Act (CGS Section 26-303)	CTDEEP	Natural Diversity Database Review
Connecticut Coastal Management Act; and Tidal Wetlands Regulations (CGS Section 22a-30-1)	CTDEEP	Structures, Dredge and Fill, and Tidal Wetlands Permit
Section 401 of the Clean Water Act (33 USC 1341); Connecticut Surface Water Quality Standards (CGS Section 221-426)	CTDEEP	Water Quality Certification
Connecticut Flood Management Program (CGS Sections 25-68b - 25-68h)	CTDEEP	Flood Management Certification
CGS Section 22a-36 to 22a-45	CTDEEP	Inland Wetlands General Permit
Section 402 of the Clean Water Act (33 USC 1342); General Conditions Applicable to Water Discharge Permits and Procedures and Criteria for Issuing Water Discharge Permits(CGS Section 22a-430b)	CTDEEP	General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activity
Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (42 USC 4601 et seq); Uniform Relocation Assistance Act (CGS Section 8-266 et seq)	CTDOT	Review/relocation assistance
CGS Section 22a-134, Hazardous Materials	CTDEEP	Review of potential for hazardous material impacts, including identification of high-risk sites, site investigations, and environmental audits
CGS Section 22a-133z and 22a-208a	CTDEEP	General Permit for Contaminated Soil and/or Sediment Management
CGS Chapter 446d and 446k, RCSA Sections 22a-208a-1, 22a-209-1, and 22a-209-8	CTDEEP	Authorization for Disposal of Special Waste
CGS Section 22a-430(b)	CTDEEP	General Permit for the Discharge of Groundwater Remediation Wastewater

Other permits and approvals also may be required, depending upon further design. Examples of additional permit and approval requirements include utility line relocation and bridge demolition activities. The relocation of the overhead electric transmission lines may require approval from the Connecticut Siting Council (CSC). Should CTDOT lead the transmission line relocation, then approval from the CSC may not be required. Should the utility company (Eversource) lead the transmission line relocation effort, then CSC review and approval, including a Certificate of Environmental Compatibility and Public Need, would be required. NEPA review and site-specific permits also could be required for the utility line relocation. Should testing indicate that the existing bridge and support facilities contain asbestos containing materials (ACM), advance notification to the CT Department of Public Health (CTDPH) of abatement and/or demolition activities will be required.

7.3. Local Consultations and Reviews

As the Walk Bridge Replacement Project is a state-sponsored project, CTDOT is not required to obtain local permits. Since the Transportation Commissioner's emergency declaration in July 2014, however, CTDOT has participated in local consultations and reviews to identify community concerns and priorities. In addition to coordinating with the City of Norwalk, CTDOT will continue to coordinate with local government organizations, particularly the Norwalk Harbor Management Commission and the Norwalk Historical Commission, through the design and construction of the project. Chapter 8 includes additional information regarding agency coordination.

Formal consultation with local agencies is required as part of the state permitting process. For example, the application for the Structures, Dredge and Fill, and Tidal Wetlands Permit requires local consultations and reviews from the Norwalk Harbor Management Commission and the Norwalk Shellfish Commission.

7.4. Contractor Requirements

In addition to the permit requirements identified in Table 7-1 and Table 7-2 for which CTDOT is responsible, other parties, such as the project's Construction Manager/General Contractor (CM/GC) or project contractors, may be required to obtain permits from the State of Connecticut and/or City of Norwalk related to construction, demolition and occupancy activities, including construction demolition notifications and/or approvals, building permit, and temporary use/occupancy permits.

8. Public Involvement and Agency Coordination

8.1. Introduction

Chapter 8 summarizes the public involvement, agency coordination, and Section 106 consultation activities conducted for the Walk Bridge Replacement Project.

CTDOT has developed a communications management plan and an agency coordination plan, which detail requirements and methods for public and agency involvement through the completion of the project. Appendix 2 provides supporting documentation, including public and agency scoping materials, public meeting presentation and response materials, invitations and responses from cooperating and participating agencies, project partnering, and Section 106 consultation data.

8.2. Public Involvement

In accordance with NEPA and CEPA requirements, Section 106 consultation procedures, FTA's *Environmental Review Process Guidance* (draft),[1] and federal and state EJ and Title VI directives, CTDOT provided extensive public involvement and agency coordination opportunities in the preparation and review of the EA/EIE.

Table 8-1 provides a list of public involvement activities that CTDOT has conducted as of August 18, 2016.

Table 8-1 – Walk Bridge Public Outreach Activities

Date	Activity
February 24, 2015	CEPA Public Scoping Session
October 13, 2015	Stakeholder Meeting for the Maritime Aquarium
November 18, 2015	Norwalk Seaport Association Meeting
November 19, 2015	Stakeholder Meeting for the Maritime Aquarium
November 20, 2015	Public Outreach Meeting
December 2-3, 2015	Project Partnering Workshop
February 8, 2016	Walk Stakeholders Meeting
March 23, 2016	Rowers' Meeting
May 3, 2016	Upstream Businesses Coordination Meeting
May 11, 2016	Public Information Meeting
June 23, 2016	Project Partnering Workshop
July 14, 2106	Meeting with Legislators/City of Norwalk
August 16, 2016	Project Open House

8.2.1. CEPA Public Scoping

CTDOT conducted the CEPA public scoping session on February 24, 2015 at Norwalk City Hall. Per CEPA requirements, the scoping session was noticed in the Environmental Monitor on February 3, 2015. CTDOT notified approximately 160 stakeholders and adjacent property owners of the public scoping session through a direct mailing invitation. Additionally, press releases were disseminated to news outlets to advertise the public scoping session.

[1] The Environmental Review Process Guidance (proposed revised guidance for public comment, 3/12/2015) was developed by FTA and the Federal Highway Administration.

Approximately 160 people attended the public scoping session. The following is a summary of general requests from the public scoping session:

- Balance the interests of all water uses in and around the bridge, including barge traffic, boating, and rowing, including coordinating with the Stroffolino Bridge openings;
- Avoid negatively affecting local business owners by taking properties or affecting access to them during project construction;
- Preserve or echo, to the extent possible, the iconic look and historical features of the bridge, while also improving the bridge's operations; and,
- Accomplish other transportation needs such as completing missing bike path/trail links under the bridge on both sides of the river and providing other local road network connections.

8.2.2. Project Website

CTDOT launched the project website, www.walkbridgect.com, in February 2015, prior to the public scoping session, and updates the website on a regular basis. The CTDOT website (www.ct.gov/dot) provides a link to the Walk Bridge Project website. The project website includes an overview of the project, with a discussion of bridge needs and concerns, potential solutions, and project benefits; "frequently asked questions;" and a project documents library, which contains meeting materials and project documents, including project factsheet updates. The project website contains a Google translate option. The website also provides opportunities for the public to get involved in the project through public meetings, direct mailings, or direct contact with the project team. CTDOT regularly maintains and updates social media activity including Facebook, Twitter, and Instagram accounts.

The Walk Bridge Replacement Project EA/EIE has been posted to the project website for public review during the public comment period.

Throughout project design and construction, CTDOT will post design and construction updates on the project website.

8.2.3. Project Contact List

CTDOT has a project contact list of approximately 400 individuals (as of August 2016). Of that list, the majority of contacts were developed through meetings with CTDOT regarding the design development and environmental review process, including the public scoping session and public information meeting.

8.2.4. Additional Community Outreach

CTDOT's ongoing outreach with community groups includes abutting neighborhoods and residents; local businesses and community organizations; the traveling public (rail/motorists); and marine users, including the community rowing groups utilizing the Norwalk River.

CTDOT held a public information meeting on May 11, 2016, to update the public of the project, identify concerns and address questions. The meeting, held in the Community Room of Norwalk City Hall, was conducted in two sessions, from 4:30 to 6:30 pm, and from 7:00 to 9:00 pm, to solicit a wide audience. Each session included a presentation on the Walk Bridge Replacement Project; a question and answer period; and an open house during which displays were available for viewing and project team members were available for informal discussion. The public information meeting also provided an update on the design of the new bridge and related projects, environmental reviews, and construction schedule. CTDOT held an open house on August 16, 2016 from 6:30 to 8:00 pm in the lobby of the IMAX Theater at the Maritime Aquarium, 10 North Water Street, Norwalk. This was an informal open house where the public was able to speak one-on-one with CTDOT staff, ask questions and view informational graphics about the project.

As cited in Section 3.26, CTDOT has conducted outreach to LEP and EJ communities through advertisement of meetings in a Spanish newspaper, contacts with community and neighborhood organizations with LEP and EJ participation, and translation of project materials distributed at meetings.

CTDOT will conduct a public hearing on the EA/EIE and will obtain additional community input and comment through the 45-day public comment period.

CTDOT will maintain a local office through project construction to facilitate community outreach. The local office is currently the Fender Repair Project Field Office, located adjacent to the project site at 15 North Water Street in the Maritime Garage Building in South Norwalk. The local office will provide opportunities for the public to attend regularly scheduled open house events to talk with project staff, view project displays, and obtain updated project information. The local office events and hours will be advertised on the website, social media, and through the media. Signage in the local office windows will display public information, the website address, and other contact information.

CTDOT will continue to conduct community outreach through project design and construction. Outreach will include public meetings, open houses, group presentations and tours, media press conferences, information tables at community-wide events, and informational kiosks. CTDOT will continue to coordinate with the City of Norwalk to identify community organizations and develop methods for outreach to EJ and LEP groups.

8.3. Agency Coordination

Table 8-2 is a list of federal, state, and local agencies involved in the development and review of the Walk Bridge Replacement Project EA/EIE.

8.3.1. Lead and Sponsoring Agencies

FTA is the Lead Federal Agency for the environmental review of the Walk Bridge Replacement Project, and is responsible for NEPA compliance and issuing its finding of the project relative to anticipated environmental impacts.

CTDOT is the Sponsoring Agency for the Walk Bridge Replacement Project. CTDOT is responsible for preparing the environmental review document in compliance with NEPA and CEPA and other federal and state regulations and policies. In addition to coordinating with FTA regarding compliance with NEPA, CTDOT is coordinating with the Connecticut Office of Policy and Management (OPM) regarding compliance with CEPA, including preparing the Record of Decision document for OPM's review and approval.

8.3.2. Cooperating and Participating Agencies

Cooperating Agencies have jurisdiction by law or special expertise regarding the environmental impacts that may result due to the project. CTDOT invited four federal agencies and one state agency to participate in the development of the EA/EIE as Cooperating Agencies. Participating Agencies are federal, state, tribal, or local agencies that have a special interest in the project. CTDOT invited four agencies to participate in the development of the EA/EIE as Participating Agencies. Cooperating and Participating Agencies reviewed the EA/EIE, including review of the project's anticipated impacts and proposed mitigation.

Table 8-2—Walk Bridge Replacement Project Agency Involvement

Agency	Role
Federal Transit Administration	Lead Federal Agency
CT Department of Transportation	Sponsoring Agency
US Coast Guard	Cooperating Agency
US Army Corps of Engineers	Invited Cooperating Agency
US Environmental Protection Agency	Invited Cooperating Agency
Federal Railroad Administration	Invited Cooperating Agency
National Marine Fisheries Service/ Greater Atlantic Regional Fisheries Office	Participating Agency
CT Department of Energy and Environmental Protection	Participating Agency
City of Norwalk	Participating Agency
Western Connecticut Council of Governments	Participating Agency
State Historic Preservation Office, CT Department of Economic and Community Development, Offices of Culture and Tourism	Invited Cooperating Agency and Section 106 stakeholder
Tribal Historic Preservation Officer (THPO), Mashantucket Pequot Tribal Nation	Section 106 stakeholder
THPO, Mohegan Tribal Nation Cultural Department	Section 106 stakeholder
Norwalk Historical Commission	Section 106 stakeholder
Norwalk Historical Society	Section 106 stakeholder
Norwalk Preservation Trust	Section 106 stakeholder
SONO Switch Tower Museum	Section 106 stakeholder

8.3.3. Agency Scoping Session

CTDOT held an agency scoping session on March 5, 2015. Both federal and state agencies participated in the session and provided comments on the proposed scope of the project EA/EIE. The agencies acknowledged the high priority of the project. They provided input regarding potential alternatives to be evaluated, including a fixed span alternative. They also reviewed and confirmed permit requirements.

8.3.4. Other Federal and State Coordination

CTDOT submitted requests to federal and state agencies for information specific to the environmental evaluations conducted for the EA/EIE.

Since CTDOT's initial coordination meetings with USACE, USCG, and CTDEEP in September and October 2014, CTDOT has conducted ongoing informational meetings with the federal and state agencies to apprise them of the status of the project and to solicit their input regarding their concerns about the project, including bridge design and operations, and permitting requirements. CTDOT will continue to meet with the agencies throughout project design and construction.

8.3.5. Local Coordination

CTDOT's ongoing coordination activities with the City of Norwalk include meetings with the Norwalk Harbor Management Commission and its Walk Bridge subcommittee, the Norwalk Harbormaster, the Mayor, the Norwalk Board of Selectmen, and the Norwalk Historical Commission to provide project updates and solicit municipal information.

8.4. Other Outreach Activities

8.4.1. Railroad and Utility Coordination

CTDOT is conducting conceptual design coordination meetings with NHL service providers, including Metro-North, CSX and P&W Railroad, regarding coordinating the project construction with ongoing train operations. CTDOT also is conducting coordination meetings with Metro-North and Eversource Energy regarding signaling and communications for the project, including replacement of the utility functions located on the existing high towers.

8.4.2. Project Partnering

CTDOT conducted project partnering workshops with a comprehensive group of project stakeholders in December 2015 and June 2016. Partnering is a facilitated working session approach to project development that brings together a wide array of entities with different interests and perspectives of the project to share ideas and concerns, and to provide input to guide the project from design through construction and operation. The goal of partnering is to help resolve issues, build understanding, improve communications, and gain consensus as the project progresses.

Walk Bridge Replacement Project stakeholders participating in the partnering workshops included representatives from the City of Norwalk, Norwalk Harbor Management Commission, and Norwalk Historic Commission; adjacent facility owners; state and federal environmental agencies; consultant designers; construction contractors; CTDOT as the project owner; and Metro-North as the rail operator. The objectives of the first partnering session, held on December 2-3, 2015, were to establish the partnering process and the partnering relationships among project team members. The objectives of the second partnering session, held on June 23, 2016, were to address more specific design and construction issues, including coordination with other area-wide projects, project outreach and communication with City stakeholders and local businesses, environmental permitting issues, and project safety and security.

8.5. Section 106 Coordination

8.5.1. Project Historic Stakeholders

The Connecticut State Historic Preservation Office (CTSHPO), four local historical associations, and two Tribal Nations are participating in the review of the project as Section 106 stakeholders, as shown in Table 8-2.

At the initiation of the Walk Bridge Replacement Project, CTDOT met with representatives from CTSHPO and project historic stakeholders to ascertain project issues. CTDOT anticipates that its outreach and consultation activities with CTSHPO and local historic stakeholders will continue through the EA/EIE process, Section 106 consultation, and CTSHPO's review and approval of the Memorandum of Agreement (MOA). CTDOT will continue to coordinate with local historic stakeholders through project completion.

8.5.2. Design Charrettes

CTDOT sponsored two design charrettes in Norwalk with project historic stakeholders through the preparation of the 30 percent design. The purpose of the design charrettes was to identify historic stakeholder concerns and solicit historic stakeholder input on key design elements of the replacement bridge.

For the first charrette, held on August 13, 2015, CTDOT presented alternative concepts on different aspects of the bridge design and solicited feedback from project stakeholders. There were 22 attendees, including project historic stakeholders, and agency and consultant representatives. CTDOT used the results of the first charrette to inform project design. Based on a review of conceptual design renderings, project historic stakeholders provided input on the designs of the superstructure, control house, east and west abutments, approach span, pedestrian trails, and high towers.

CTDOT held the second charrette on February 24, 2016, to update project historic stakeholders, gather input on project elements, establish dialog on historic elements and project effects, and gather information to develop the project MOA. There were 30 attendees, including project historic stakeholders, the City of Norwalk, and agency and consultant representatives. Attendees reviewed the project's progress to date, including a review of historic resources, archaeological resources, and bridge design updates. The group discussed other design components of the project, including the control house, west approach span, bridge approach span options, east and west abutments and walls, and high towers. Potential mitigation concepts focused on above-ground resources, as archaeological resources are unknown at this time. It was determined that mitigation measures must be rail-related and local, and could include interactive elements for children on swing bridges, booklets, traveling exhibits, and science, technology, engineering and math (STEM) programming on rail bridges.

CTDOT's third charrette with project historic stakeholders and the City of Norwalk is proposed to be held concurrent with or immediately following the public review of the EA/EIE. In the third charrette, CTDOT will update stakeholders on the below-ground cultural resource investigations and work with stakeholders to finalize project mitigation presented in the MOA.

9. Draft Section 4(f) Evaluation

9.1. Section 4(f) Protections and Definitions

This chapter presents the Draft Section 4(f) Evaluation for the Walk Bridge Replacement Project. Pursuant to Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966 (49 U.S.C. §303 and 23 U.S.C. §138), U.S. DOT agencies cannot approve the use of publicly owned parks and recreational areas of national, state, or local significance; publicly owned wildlife and waterfowl refuges of national, state, or local significance; or historic sites of national, state, or local significance regardless of ownership; unless:

- There is no feasible and prudent avoidance alternative to the use of the land; and
- The project includes all possible means to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- The use, including any measures to minimize harm (such as avoidance, minimization, or enhancement measures) will have a *de minimis* impact on the property.

In general, for transportation projects, a Section 4(f) "use" occurs when:

- Land from a Section 4(f) property is **permanently incorporated** into a transportation facility either by purchase or easement acquisition; or
- There is a **temporary occupancy** of land from a Section 4(f) property that is adverse in terms of the statute's preservation purpose as determined by the criteria set forth in 23 CFR §774.13(d); or
- Land from a Section 4(f) property is not incorporated into the project but the proximity effects of the project are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired (**constructive use** of the property as determined by the criteria set forth in 23 CFR §774.15).

In 2005, revision to the Section 4(f) regulations [Section 6009(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)] allows U.S. DOT agencies to approve transportation projects once U.S. DOT determines that the use will involve a "*de minimis*" impact. A determination of *de minimis* impacts may be made for use of Section 4(f) property that is minor in nature, and requires agency coordination with the officials having jurisdiction over the 4(f) property and opportunities for public involvement. A *de minimis* impact is one that, taking into account avoidance, minimization, and mitigation, results in no adverse effects to the activities, features, or attributes qualifying a park, recreation area, or historic site for Section 4(f) protection.

This Section 4(f) evaluation includes a summary of the project purpose and need, a summary of the project alternatives analysis and determination of the alternative that causes the least overall harm, a description of the Section 4(f) resources in the project area that will be used, and identification of measures to minimize harm. Per the Section 4(f) regulations, if a feasible and prudent alternative exists that avoids all Section 4(f) resources, it must be selected. If no feasible and prudent avoidance alternative exists, only the alternative that causes the least overall harm and includes all possible planning to minimize harm to Section 4(f) property may be approved.

9.2. Project Purpose and Need/Background

9.2.1. Project Purpose and Need

The purpose of the Walk Bridge Replacement Project is to restore or replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service, offer operational flexibility and ease of maintenance, and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River.

Upgrades to the Walk Bridge, through rehabilitation or replacement, are needed to increase bridge reliability, incorporate bridge redundancy, and provide a sustainable bridge for significant weather events, thereby accommodating current and future rail and marine traffic. Specifically, the Connecticut Department of Transportation (CTDOT) and the Federal Transit Administration (FTA) are undertaking the project to address the following needs, or deficiencies, of the existing Walk Bridge:

- Structure Age and Deterioration
- Decreasing Reliability
- Lack of Resiliency
- Safety Standards
- Lack of Redundancy
- Limited Operational Flexibility
- Difficulty of Maintenance
- Reduced Rail Capacity and Efficiency
- Reduced Dependability and Capacity for Marine Traffic
- Lack of Sustainability

9.2.2. Background

Walk Bridge carries Amtrak[1] intercity and high-speed passenger service on the Northeast Corridor (NEC) and is also used for the New Haven Line (NHL) of Metro-North Railroad commuter service, in addition to freight service. Amtrak intercity and high speed passenger rail serves more intercity travelers within the Northeast than all airlines combined. According to a 2013 report, the NHL, one of three main lines of Metro-North, was the busiest single commuter rail line in the United States.[2] In 2014, the NHL had 39.61 million riders.[3] Walk Bridge is the northern boundary of the Norwalk Harbor, a major port with over 2,300 moorings and berthing spaces and between 2,000 to 3,000 commercial vessel trips per year to port facilities.

Walk Bridge, constructed in 1896, is a four-span swing bridge that carries four tracks spanning 564 feet over the Norwalk River, as shown in Figure 9-1, a photograph of the existing bridge. The fixed spans consist of eight 15-feet deep Warren trusses, two per track; and the swing span consists of three planes of

[1] National Railroad Passenger Corporation
[2] Northeast Corridor Infrastructure and Operations Advisory Commission, *Critical Infrastructure Needs on the Northeast Corridor*, January 2013.
[3] Metropolitan Transportation Authority, "2014 Ridership Report, Metro North Railroad Executive Summary," excerpt from Joint Metro-North and Long Island Committees, April 2015.

double intersection Warren trusses with stringers and floor beams. Power for the trains is supplied by an overhead contact system (OCS). High towers on both sides of the Norwalk River support overhead power transmission lines (Eversource Energy) and Metro-North power and communication lines.

The existing bridge is approximately 120 years old and the deteriorating condition of Walk Bridge has been extensively documented over the years.[4] A detailed fatigue analysis was completed in 2005, and it indicated that major portions of the bridge have exceeded their fatigue life and require replacement. In 2011, Walk Bridge failed 12 times out of 138 openings, and in 2013, the bridge failed 16 times out of 271 openings. Closing the bridge after a failure can take up to two hours. In May and June 2014, in two separate but similar incidents within a two-week time span, Walk Bridge failed to properly close, impacting thousands of passengers for extended periods of time. In an emergency action in July 2014, the United States Coast Guard (USCG) issued a temporary deviation from the Walk Bridge operating schedule to allow the bridge to open only after an eight-hour advance notice under a revised operating schedule.[5] Also in July 2014, the Commissioner of CTDOT issued an Emergency Declaration for Walk Bridge.[6]

Figure 9-1—View of Walk Bridge, looking northeast

A properly functioning Walk Bridge is important to both the local and regional economy. Walk Bridge is a vital link in the NEC, which connects Washington, DC to Boston, MA and includes major cities such as Philadelphia and New York City. Metro-North provides commuter rail service to New York City from Connecticut communities as far north as New Haven, Waterbury, and Danbury. According to the NEC Commission,[7] the NEC carries more than 700,000 passengers per day, including a workforce that

[4] Documentation of the deteriorating condition of Walk Bridge includes the Transportation Strategy Board, "Strategic Framework for Investing in Connecticut's Transportation Infrastructure: Economic Growth – Infrastructure Preservation – Sustainable Communities," January 2011; CTDOT, Accelerated Bridge Construction Study, March 2014 (draft).
[5] 79 Federal Register 41644 (July 17, 2014). The USCG has subsequently revised this schedule.
[6] CTDOT, *Emergency Declaration Railroad Swing Bridge No. 04288R, Norwalk, Connecticut*, July 8, 2014.
[7] NEC Commission. *Northeast Corridor Five-year Capital Plan, Fiscal Years 2016-2020*. April 2015

contributes $50 billion annually to the national gross domestic product. An unexpected loss of all NEC service for one day alone could cost the nation nearly $100 million in added highway congestion, productivity losses, and other transportation impacts.

9.3. Alternatives Analysis

CTDOT initially investigated more than 70 different design concepts within the following three groups of alternatives:

- The **No Build (No Action) Alternative** would continue the existing operations and maintenance of the historic swing (movable) bridge. Although the No Build would completely avoid the "use" of any Section 4(f) resources, it must be eliminated from further evaluation because it would not meet any project needs and would continue to result in unacceptable safety and operational problems. Therefore, the No Build is not a feasible and prudent avoidance alternative.
- The **Rehabilitation Alternative** would require rehabilitation or replacement of the existing Walk Bridge elements that would extend the bridge's design life by an additional 100 years, which is comparable to a new bridge's design life. To remedy corrosion, section loss and insufficient load ratings, all elements exhibiting minor section loss would be strengthened, and all elements exhibiting major section loss would be replaced. Although some swing span machinery has been replaced, the amounts of current and predicted deterioration and wear are an issue that can only be eliminated by replacement of all operation machinery. Additionally, a complete replacement of the obsolete electrical service would be necessary to improve its electrical rating.

  Repairs or partial replacements have been accomplished over the past 10 years on fender systems as well as on some track, signal and communication systems. However, in order to extend their functionality in the long term, full replacement of the fenders and track, signal, and communication systems is warranted. Experience suggests that ongoing deterioration of the bridge and its associated systems would require remedial measures that the Connecticut State Historic Preservation Officer (CTSHPO) has in the past considered to be adverse effects, due to the necessary diminishment of the historic bridge's integrity of materials and design. The Rehabilitation Alternative would not meet the project needs nor can it be considered a feasible and prudent avoidance alternative.
- The **Replacement Alternative** would require demolition of the existing bridge and constructing a new bridge. Various types of bridges for the replacement alternative have been evaluated, including demolishing the existing bridge and constructing a new movable bridge, of either the bascule type or vertical lift type, on the same general alignment, or constructing a fixed bridge on the same general alignment. The fixed bridge options were not advanced for further consideration because they are not feasible and prudent alternatives; they would not meet purpose and need, or they would be up to three times as costly as the movable bridges, or they would entail considerable environmental impacts. The Replacement Alternative (Build Alternative) is discussed as one overall alternative for the purposes of this Section 4(f) Evaluation since for the movable bridge replacement type options, the "use" of the Section 4(f) resources would be the same.
- The **Build on New Location without Using the Historic Bridge Alternative** would require constructing a new bridge parallel to the existing bridge. Under this alternative the existing bridge would not be demolished; it would remain in place. This would require significant cost for continued maintenance and preservation of the existing bridge, in addition to the cost and maintenance of constructing and maintaining a new bridge. The existing bridge is already located at the only feasible and prudent alignment. In order to provide the same level of railroad service, the railroad tracks would need to be significantly reconfigured, which would cause much greater ROW impacts to both Section 4(f) properties and non-Section 4(f) properties. For these reasons, this is not a feasible and prudent avoidance alternative.

CTDOT held a public scoping meeting on February 24, 2015, an agency scoping meeting on March 5, 2015, and a public information meeting on May 11, 2016 to present and discuss bridge alternatives. With input from those meetings, CTDOT concluded that the evaluation of alternatives would focus on replacement of the bridge. Chapter 2 of the EA/EIE provides further details on the alternatives not advanced for further evaluation and on the proposed options evaluated in the EA/EIE.

Feasible and Prudent Avoidance Alternatives to Use of Section 4(f) Resources

Only the No Build Alternative would entirely avoid the Section 4(f) use of historic resources: the bridge/railroad and associated structures and closely adjoining industrial buildings and districts that developed as a result of the access provided by the railroad. The Rehabilitation Alternative is assumed to constitute an adverse effect, since it would alter significantly the historic integrity of the bridge. Neither the No Build Alternative nor the Rehabilitation Alternative would address the functionality and reliability of the navigational opening and rail link provided by the existing bridge. The Build on New Location without Using the Historic Bridge Alternative would avoid demolition of the existing bridge, however, would require significant additional Section 4(f) and non-Section 4(f) ROW. There are no feasible and prudent avoidance alternatives to the Replacement Alternative.

9.4. Use of Section 4(f) Resources

The following section describes existing parklands, public recreation areas, and historic/archaeological sites subject to protection under Section 4(f) and addresses potential impacts on those resources subject to Section 4(f) protection. There were no wildlife or waterfowl refuges identified within the project area.

9.4.1. Existing Parklands and Public Recreation Areas

Figure 9-2 shows Section 4(f) parklands and public recreation areas in the vicinity of Walk Bridge. This section describes the parklands and public recreation areas that will be used by the project.

In 1987, Connecticut enacted legislation to establish a state heritage park system.[8] State heritage parks were to be established as urban cultural parks “without boundaries” (unlike conventional state parks) that integrate historical sites and attractions with estuaries and other natural resources. Recent legislation enacted in 2014 streamlines the establishment of the State Heritage Parks statewide.[9]

Norwalk River Valley Trail and Adjoining Parks: The Norwalk River Valley Trail (NRVT) system aims to build 38 miles of multi-purpose trail and currently exists on both sides of the Norwalk River in the vicinity of Walk Bridge. Where it extends along the west side of the Norwalk River north of the Maritime Aquarium property, it includes the **Heritage Trail**. The City-owned **Norwalk Heritage Park** was created as part of the original State Heritage Trail project as a waterfront development project incorporating the city’s maritime history and the city’s aquarium and museums. North of the Maritime Aquarium and employee parking lot, it includes a pavilion, a pier that can be used by visitors for fishing on the water,[10] and educational signage. Further to the north, the NRVT has been dedicated as the Spc. Wilfredo Perez Trail in honor of a local serviceman and includes a memorial plaque where it extends north along North Water Street, across from the Maritime Yards development. **North Water Street Park** is located on the NRVT and is located the south of the Pavilion/Fishing Pier at Maritime Aquarium. It consists of a field along the river’s edge that is used for passive recreation.

[8] Connecticut State Legislature, Public Act 87-340, *An Act Creating a Statewide Heritage Park System*, 1987, codified at CGS Sections 23-10h and 23-10i.
[9] Connecticut State Legislature, Public Act No. 14-43, *An Act Concerning the Heritage Parks Advisory Boards*, 2014.
[10] CT DEEP’s Connecticut Coastal Access Guide refers to the park as “Maritime Aquarium Park” or “Maritime Aquarium Pavilion.”

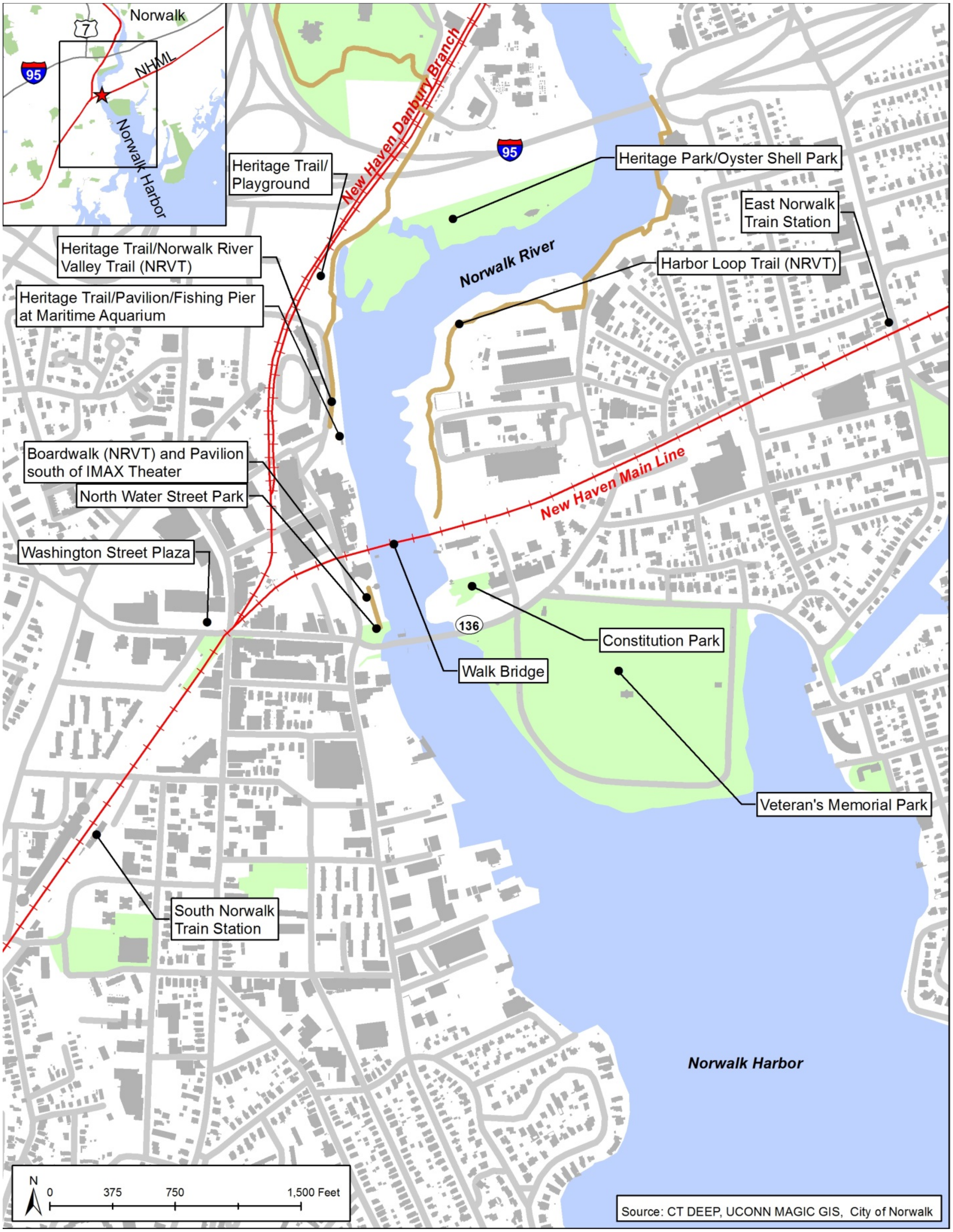


Figure 9-2—Section 4(f) Parklands and Public Recreation Areas in the Vicinity of Walk Bridge

Approximately 1,500 feet upstream from Walk Bridge, the **Heritage Trail/NRVT** park includes a playground and **Oyster Shell Park**. Oyster Shell Park, part of the original Heritage Park grant, consists of a waterfront park that includes a central plaza constructed on the site of a former landfill, and a series of trails that connect with the NRVT.

The City's **Harbor Loop Trail, part of the NRVT system**, continues north along the opposite river bank where it extends through the WWTP property north of the bridge. This trail segment[11] runs north along the eastern bank of the river from Walk Bridge extending north beyond the I-95 Bridge.

Approximately, 1,000 feet west of the Walk Bridge, the **Washington Street Plaza** adjoins the rail corridor where it extends over the Washington Street and South Main Street intersection. The Washington Street Plaza, a hardscaped area with rows of trees on the north side of Washington Street, is considered to be a public park by the City of Norwalk. There will be no use of this resource, however, for this project.

Constitution Park: Approximately 450 feet south of Walk Bridge, Constitution Park, a small municipal park, occupies the eastern bank of the river northeast of the Stroffolino Bridge.

Veteran's Memorial Park: Veteran's Memorial Park occupies the southeast river bank, on the southeast side of the Stroffolino Bridge, approximately 900 feet downstream of Walk Bridge. Veteran's Memorial Park includes a public marina, boat launch site, a playground, ballfields, and a multi-use path overlooking Norwalk Harbor.

9.4.2. Impacts on Parklands and Public Recreation Areas

This section describes the Section 4(f) impact assessment and identifies potential impacts of the project on parklands and public recreation areas. Table 9-1 (located at the end of Section 9.4.2) summarizes the Section 4(f) uses of parklands and public recreation areas.

Criteria for Exceptions to Section 4(f) Use

Exceptions to Section 4(f) use include the following (under 23 CFR 774.13): temporary occupancy of land, and transportation enhancements/mitigation activities. For temporary occupancies of land that are so minimal as to not constitute a Section 4(f) use, the following conditions must be satisfied:

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

(2) The scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;

(3) There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;

(4) The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and

(5) There must be documented agreement of the officials with jurisdiction over the Section 4(f) resource regarding the above conditions.

[11] CT DEEP's Connecticut Coastal Access Guide refers to the trail here as known as the WWTP Waterfront Walkway.

Transportation enhancement projects and mitigation activities are also exempt from Section 4(f), where:

(1) The use of the Section 4(f) property is solely for the purpose of preserving or enhancing an activity, feature, or attribute that qualifies the property for Section 4(f) protection; and

(2) The officials with jurisdiction over the Section 4(f) resource agree in writing to the preceding.

Construction Period Impacts

A temporary construction staging area will be located on the grounds of the Norwalk Wastewater Treatment Plant (WWTP), and temporary construction activities may directly affect the Harbor Loop Trail where it extends through the WWTP property. Impacts on this section of the NRVT will be limited by the fact that the trail terminates at Walk Bridge as well as the temporary nature of the impact. Additionally, a small portion of the NRVT exists on the west side of the Norwalk River south of the Walk Bridge on a short segment of boardwalk. This area will be required temporarily for staging during construction. The trail terminates here on this side of the river and temporary impacts would not disrupt overall access or use of the NRVT. Since this portion of the NRVT terminates here, there will be no segmentation of the trail. The construction of the north-south pedestrian/bicycle connection at the southern end of the Harbor Loop Trail on the east side of the Norwalk River may also result in temporary impacts to this portion of the trail, but would not disrupt overall access since the trail terminates at the Walk Bridge on the east side of the river. Again, there will be no segmentation of the trail as the impacted portion is the terminus. Temporary impacts during construction to this trail qualify as an exception to Section 4(f) under 23 CFR 774.13.

Construction activities may result in temporary visual and noise impacts on users of the riverfront parks and trails, including the parks along the Heritage Trail/NRVT, and parks adjoining both the north and south sides of the Maritime Aquarium. However, the parks in the vicinity of the project are already subject to frequent, intermittent noise due to their proximity to the active rail line accommodating both passenger and freight traffic (approximately 155 trains per weekday), and ongoing construction activities from other downtown developments. Given the setting, nearby parks are not considered to be parks where quiet and serenity are important attributes. Therefore, project construction is not anticipated to result in a constructive use to adjoining parks and public recreation areas.

Permanent Impacts

In the Build Alternative, CTDOT will provide accommodations for a north-south pedestrian and bicycle connection to the Harbor Loop Trail on the east side of the river. This pedestrian/bicycle trail would connect to either Fort Point Street or Goldstein Place, or would continue south along the river to connect to Constitution Park. The latter option would involve impacts on Constitution Park, but would provide long-term recreational benefits, by connecting greenways along the river. The long-term recreation impacts of the project will be beneficial, by providing accommodations for a north-south pedestrian/bicycle connection with the Harbor Loop Trail on the east side of the Norwalk River. The project will help to complete the missing link in the NRVT/Harbor Loop Trail system at Walk Bridge, as shown in the Pedestrian and Bicycle Facilities section of Chapter 3 of the EA/EIE.

To mitigate for the loss of vegetated intertidal wetlands due to the Build Alternative, CTDOT will restore degraded tidal wetlands dominated by common reed (*Phragmites australis*), currently existing along the river and proximate to but outside of the project's immediate vicinity. CTDOT is evaluating potential sites for tidal wetland restoration, including sites that are located adjacent to or within the boundaries of Oyster Shell Park, and within Constitution Park and Veteran's Memorial Park, as discussed and shown in the Tidal Wetlands section of Chapter 3 of the EA/EIE. Although all of these sites may not be used, all are listed in Table 9-1.

Both the NRVT/Harbor Loop Trail and wetlands restoration were envisioned as part of waterfront improvements in the City of Norwalk's Oyster Shell Park Master Plan.[12]

The Build Alternative's only direct impacts to public parks and recreation areas would be the result of this trail/wetland mitigation construction. It has been determined that these impacts would qualify as an exception to Section 4(f) use.

FTA has issued an exception to the Section 4(f) use, based on the temporary nature of impacts and the nature of the major components of the work that will affect publicly accessible trails and parks. Per the Section 4(f) regulations, this work qualifies for exceptions to Section 4(f) use for: (1) temporary occupancy that does not constitute use and (2) for transportation enhancements/mitigation. There would be temporary impacts associated with construction, but substantial long-term benefits would accrue with construction of the trail and wetlands restoration/mitigation areas.

CTDOT consulted with City officials in a working session held February 5, 2016; the session included representatives from the Recreation and Parks, Planning and Zoning, Economic Development, Redevelopment, and Engineering Departments. Subsequently, CTDOT continued consultation with the City of Norwalk Recreation and Parks Director to review and clarify the significance of City parks relative to Section 4(f) and to review the proposed work relative wetlands restoration and pedestrian trail construction. The City of Norwalk's written concurrence on exceptions to the Section 4(f) use is pending.

Table 9-1—Anticipated Project Impacts to Section 4(f) Parklands and Public Recreation Areas

Parkland and Public Recreation Areas	Section 4(f) Protection/Use	
	Protection	Use
Heritage Trail/Pavilion and Fishing Pier at Maritime Aquarium	Park/Recreation Area	Potential wetlands restoration/ Exception to Section 4(f) Use
Heritage Trail/Norwalk River Valley Trail	Park/Recreation Area	Potential wetlands restoration/ Exception to Section 4(f) Use
Heritage Trail/Oyster Shell Park	Park/Recreation Area	Potential wetlands restoration/ Exception to Section 4(f) Use
Norwalk River Valley Trail/Harbor Loop Trail	Park/Recreation Area	Temporary construction staging/ Exception to Section 4(f) Use
Constitution Park	Park/Recreation Area	Potential wetlands restoration/ Exception to Section 4(f) Use
Veteran's Memorial Park	Park/Recreation Area	Potential wetlands restoration/ Exception to Section 4(f) Use

9.4.3. Existing Historic and Archaeological Resources

Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470f), requires that federally funded or permitted projects take into account the effects of their undertakings on historic and archaeological resources listed in or eligible for listing in the National Register of Historic Places (NR). This section presents a description of above-ground (standing) historic resources within the project area and archaeological (subsurface) resources/areas of archaeological sensitivity.

[12] City of Norwalk, Oyster Shell Park Master Plan, prepared for the City of Norwalk by BSC Group, May 17, 2006. Accessed November 9, 2015. http://ct-norwalk.civicplus.com/DocumentCenter/Home/View/1659.

Above-Ground Historic Resources

Listed, eligible, and potentially eligible historic resources fall into two categories: those that are railroad-related, chiefly parts of the existing railroad infrastructure; and those that are non-rail-related but adjacent to the Area of Potential Effect (APE).

Rail Line and Related Structures

The railroad structures in the project area are part of a linear district along the rail line between the New York/Connecticut border and New Haven Line (formerly known as the New York, New Haven, & Hartford Railroad). This linear railroad district and the railroad structures in the project area that are contributing elements to this and other districts are described as follows. NR-listed, eligible, and potentially eligible railroad-related historic structures located in the APE include the following resources shown in Figure 9-3.

New Haven Railroad Line and Catenary System: The New Haven Line has long been regarded as an important historic resource that includes a pioneering electrification system, numerous early railroad bridges, and historic trackside passenger stations, freight houses, and interlocking towers. The line was documented by the Historic American Engineering Record (HAER) in 1977 (HAER No. CT-11), and the line's signalization system was documented in 1982 (HAER No. CT-8). That same year, the American Society of Mechanical Engineers designated the electrification of the line a National Historic Engineering Landmark.[13] CTSHPO determined that the electrification of the line from New Haven to New York was eligible for listing in the NR (following the same boundaries as the HAER documentation). A report on the New Haven Railroad catenary system, prepared for CTDOT in 2000, recommended listing of the electrification of the line from New Haven to New York (Stewart 2000) under Criterion C. Because of the importance of the N Y, NH & H RR in the transportation history of Connecticut, and the impact of the railroad on the economic and social history of the communities it served, the overall rail line is eligible under Criterion A (broad patterns of history). The overall rail line is also eligible under Criterion C (example of a type, period, or method of construction) because of its pioneering electrification system and because collectively the various components of the line illustrate the railroad-engineering practices of the 19th and early 20th centuries. This approach, considering the entire rail line as a single National Register-eligible property (specifically as a linear historic district), is consistent with the approach taken by federal and state agencies in the New Haven-Hartford-Springfield Rail Corridor improvement project (Federal Railroad Administration 2012, Stipulation 13[14]) and other Connecticut projects involving historic rail lines.

Norwalk River Railroad Bridge (Walk Bridge): Walk Bridge was listed in the NR in 1987 as one of several significant movable railroad bridges along the Northeast Corridor in Connecticut.[15] In addition to its design significance as an example of period engineering (NR Criterion C), the bridge is important in Connecticut's transportation history because of the role of the NY, NH & H Railroad in consolidating rail service in the state (NR Criterion A). Walk Bridge is a deck-truss, rim-bearing swing bridge that carries four tracks of Metro-North between New Haven and New York, Amtrak passenger trains on the Boston/New York/Washington corridor, and freight trains operated by the Providence & Worcester Railroad. It was built in 1896 by the Pennsylvania Steel Company's Bridge and Construction Department

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[13] Not an official government designation.

[14] Federal Railroad Administration, *Programmatic Agreement Among the Federal Rail Administration, Federal Transit Administration, the Connecticut State Historic Preservation Office, the Massachusetts State Historic Preservation Office, and the Connecticut Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act As It Pertains to the New Haven-Hartford-Springfield High-Speed Intercity Passenger Rail Project*. Executed in August 2012. Online at http://www.nhhsrail.com/pdfs/ea/nhhs_pa.pdf, accessed March 30, 2016.

[15] United States Department of Interior, National Park Service. National Register of Historic Places Inventory – Nomination Form. "Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource." Received April 28, 1987. Date Entered June 12, 1987.

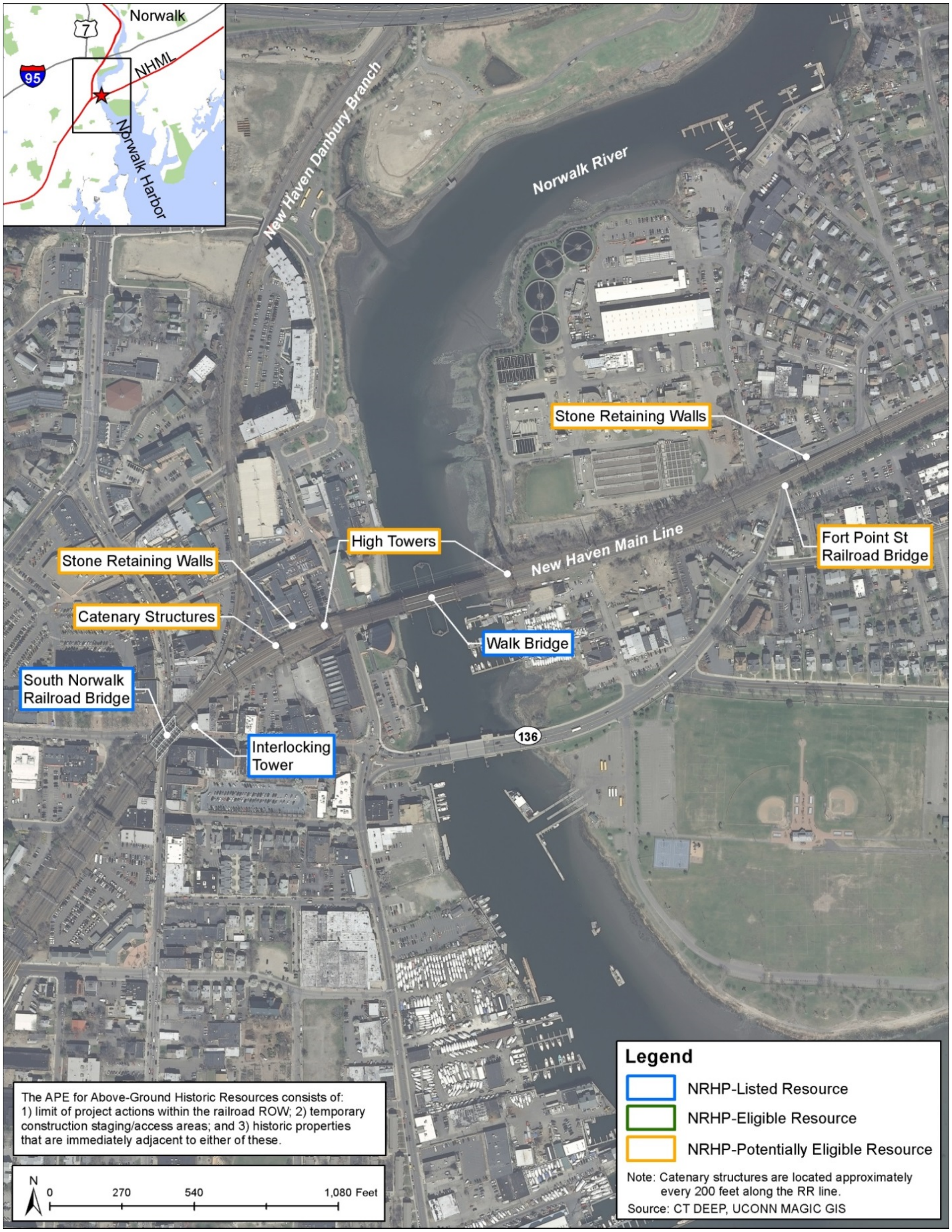

Figure 9-3–Railroad-Related Historic Structures in the APE

as part of the four-tracking and elevation of the NHL. This is the earliest movable bridge on the NEC, and it is the only rim-bearing, deck-truss swing bridge. The bridge consists of a steel superstructure and stone masonry piers and abutments. From east to west, the bridge includes two fixed deck-truss spans, each 120 feet, the 202-foot-long swing span, and another 120-foot fixed deck-truss span. The bridge is particularly notable for its swing-span mechanism, which utilizes a series of 96 rollers, set into a steel track atop a drum on the center pier, in order to operate the movable span. The bridge includes the approach span over North Water Street and two other approach spans.

High Towers and Catenary Support Structures: The electrification of the line was completed in 1914. In addition to numerous catenary support structures, most of which are original to the electrification, the system includes two high steel-lattice towers on both sides of the river to carry transmission lines over the channel. The Engineering Significance Statement for the bridge[16] does not explicitly address the catenary support structures and the two high transmission towers. However, these components are potentially eligible for the NR as contributing elements of the overall rail line as a linear historic resource (NR Criteria A and C). Moreover, in reviewing another project affecting overhead catenary electrification features, CTSHPO noted that the extant catenary system is an integral component of the country's first large-scale electrification of a main line railroad right-of-way and has found the New Haven Railroad Electrification and Catenary System to be a NR eligible entity.[17] The high towers and catenary support structures could also be considered contributing elements to that entity.

Stone Retaining Walls (Fort Point and North Water Streets): In the early 1890s, the four-tracking and elevation of the main line required lengthy cut-stone retaining walls for much of the railroad's right-of-way as it passed above city streets. The walls are found throughout the line, but the most notable examples within the APE can be found on Fort Point Street and west of the western approach span over North Water Street. These structures are potentially eligible for the NR as contributing resources to the potential linear historic district embracing the overall rail line (NR Criteria A and C).

Fort Point Street Railroad Bridge: The Fort Point Street Bridge dates from 1941, when the railroad replaced an earlier plate-girder at the site. It consists of a series of built-up steel beams spanning stone abutments that continue into the adjacent retaining walls for the elevated tracks. The stone abutments date from the reconstruction of the rail line in the 1890s. The bridge is a contributing resource to the eligible linear historic district (NR Criteria A and C).

South Norwalk Railroad Bridge over Washington and South Main Streets: This pin-connected steel-truss bridge was built in 1896 to carry four tracks over the intersection of Washington and South Main streets in South Norwalk. The abutment walls and stepped wing walls are built of quarry-faced granite blocks. This structure was listed in the NR as part of the South Main and Washington Streets Historic District and was the subject of HAER documentation (HAER No. CT-168). It is notable as an example of the work of the Berlin Iron Bridge Company, Connecticut's only large-scale 19th-century bridge fabricator. In addition to being a contributing resource of the listed historic district, the bridge is also a contributing resource to an eligible linear historic district embracing the entire New York to New Haven rail line under NR Criteria A and C.

Interlocking Tower: The interlocking tower controlled the juncture of the NY, NH & H main line and the Danbury & Norwalk branch line that led north to Danbury. In 1895, as part of the raising of the tracks of the main line, the tower was raised two stories. It is a rare survivor of its type, since it retains all of the original levers and switches, which were manually operated. This structure was listed in the NR as part of

[16] Stewart, Robert, *Engineering Significance Statement: Walk Bridge (No. 41.47) (Bridge No. 4288R), 1999*. Westport, CT: Historical Perspectives, Inc.

[17] Maddox, Dawn, Letter of Dawn Maddox, Deputy State Historic Preservation Officer, to Mark D. Neri, CTDOT Rail Operations, regarding Milford to West Haven catenary replacement project, November 22, 1999.

the South Main and Washington Streets Historic District. It also contributes to the overall significance of the rail line as an eligible linear historic district (NR Criteria A and C). Currently it is occupied as a historical site, the South Norwalk (SONO) Switch Tower Museum.

Adjacent Historic Resources That Are Not Directly Rail-Related

A number of listed, eligible, or potentially eligible historic-resource properties that are not rail-related are located in the project APE. These resources are shown in Figure 9-4. The adjacent historic resources all have important historical associations with the rail line. The industries in the area prospered in part because good rail transportation was available close by (both the Norwalk Lock Company and the Norwalk Iron Works at one time had dedicated sidings). The commercial and institutional buildings that came to dominate the streetscapes of South Norwalk located there largely because of its status as an important rail junction.

Industrial Buildings Historic District, North Water Street, South Norwalk (Norwalk Iron Works and Norwalk Lock Company Buildings). West of Walk Bridge and immediately north of the railroad right-of-way are two 19th-century brick factory complexes. The former Norwalk Lock Company buildings have been converted to office use, and the former Norwalk Iron Works complex has been incorporated into the Maritime Aquarium at Norwalk. Together these resources constitute a small, potentially-eligible historic district that recalls the important role of industry in Norwalk's economic history (NR Criterion A). In addition to their location adjacent to the railroad tracks, the two properties have historical associations with the railroad. The Norwalk Lock Company property was individually determined eligible for the NR by CTSHPO in 2000.

South Main and Washington Streets Historic District, South Norwalk. This NR-listed district is a T-shaped area of commercial buildings dating from the last quarter of the 19th century and the early years of the 20th century. As a whole, resources in the district are well-preserved examples of particular types of commercial architecture (NR Criterion C). They also represent Norwalk's economic and civic development and South Norwalk's role in particular as a harbor, railroad junction, and industrial center, which led to commercial expansion in the post-Civil War era (NR Criterion A). The railroad bisects the district; Walk Bridge, catenary support structures, and high towers are visible from a number of vantage points within the district. The district also includes as contributing components two rail-related structures, the Interlocking Tower and the South Norwalk Railroad Bridge over the intersection of South Main and Washington Streets.

Addition to the South Main and Washington Streets Historic District. The South Main and Washington Streets Historic District could logically be expanded to include three two- to three-story brick commercial buildings on Water Street: 50 Water Street (circa 1900), 68 Water Street (circa 1910), and 53 Water Street (1853) (NR Criteria A and C).

Liberty Square Historic District, East Norwalk. This row of late 19th-century and early 20th-century commercial buildings, two and three stories high, is a vestige of the continuation of South Norwalk's Washington Street commercial district into East Norwalk. This area is a potential NR-eligible district that would be significant on the local level because of its architectural qualities (NR Criterion C) and because of its historical associations with a late 19th-century period of economic expansion (NR Criterion A).

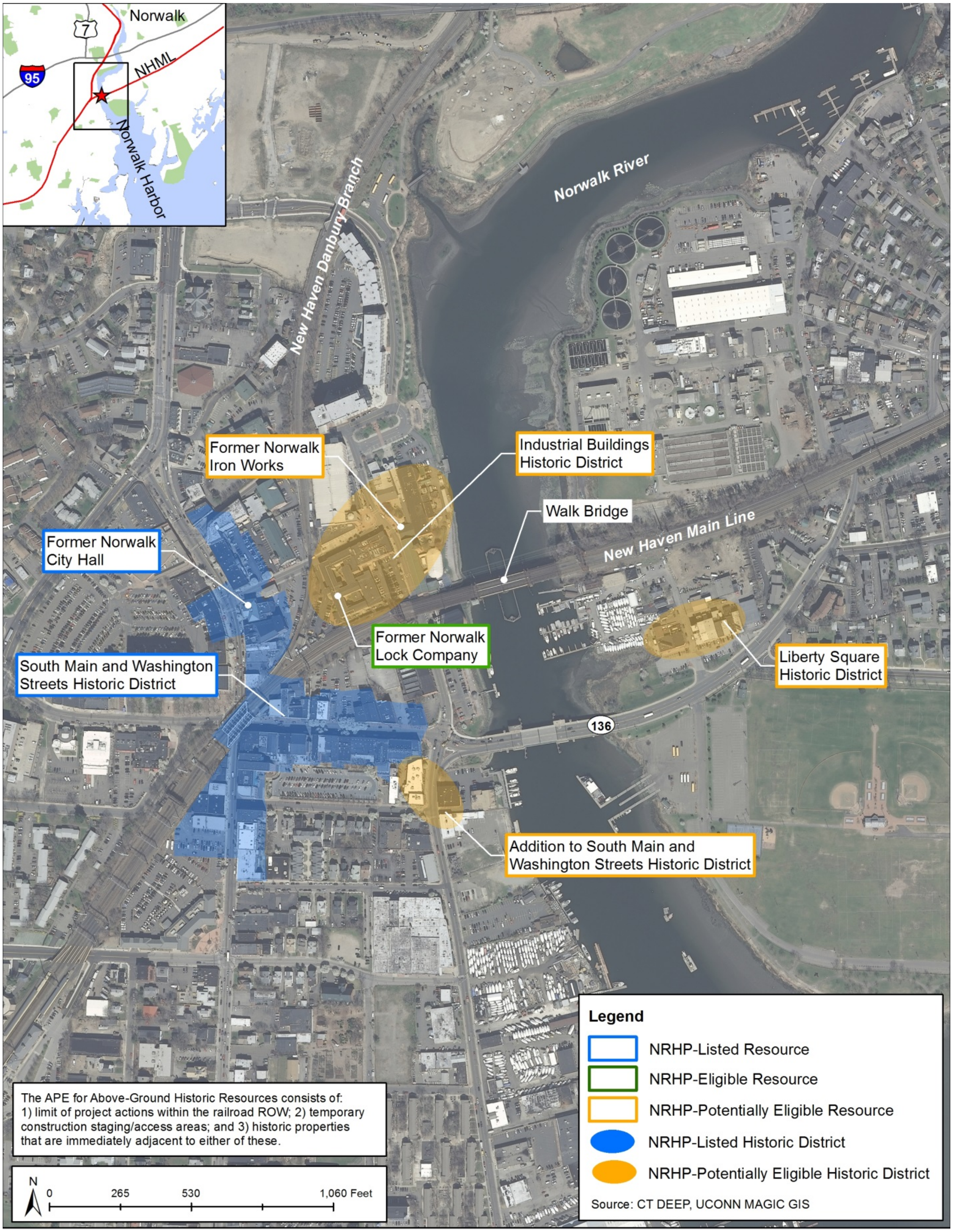

Figure 9-4–Standing Historic Properties in the APE That Are Not Directly Rail-Related

Archaeological Resources

An archaeological sensitivity assessment (Phase IA) was undertaken of the terrestrial, intertidal and underwater areas that will be affected by the project to identify existing archaeological resources and assess the potential for undiscovered archaeological (i.e., subsurface) resources that may be present within the APE. No subsurface testing was initially conducted due to of the large scale of the project, the potential for changes in the early design phases, and difficulty in manual testing (prior to construction) in this urbanized environment. Additional archaeological work is ongoing, and Phase IB testing is being conducted to confirm whether buried archaeological sites are actually present within the APE.

A combination of geoprobe investigation, machine-assisted and manual testing, and archaeological monitoring are being employed for terrestrial parcels to determine whether potentially significant archaeological resources have survived. A combination of vibracores and hand cores are being employed to determine whether potentially significant submerged archaeological resources have survived in intertidal and underwater portions of the APE.

9.4.4. Impacts on Historic and Archaeological Resources

This section presents an assessment of the proposed Walk Bridge Replacement Project's potential impacts under Section 4(f) and Section 106 on cultural resources, including above-ground resources and archaeologically sensitive areas. Table 9-2 (located at the end of Section 9.4.4) presents a summary of the Section 4(f) uses of cultural resources.

Criteria for Determining Section 4(f) Use

Under Section 4(f), use of a historic property occurs when the property is permanently incorporated into the transportation facility or when there is a temporary occupancy that is adverse under Section 4(f). In addition, a constructive use of a Section 4(f) resource (23 CFR 774.15) occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished.

FTA has determined that a constructive use occurs in the following situations: when the projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a property protected by Section 4(f); when the proximity of the proposed project substantially impairs aesthetic features or attributes of a property protected by Section 4(f), where such features or attributes are considered important contributing elements to the value of the property; when the project results in a restriction of access which substantially diminishes the utility of a significant publicly owned park, recreation area, or a historic site; or when the vibration impact from construction or operation of the project substantially impairs the use of a Section 4(f) property, such as projected vibration levels that are great enough to physically damage an historic building or substantially diminish the utility of the building, unless the damage is repaired and fully restored consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

FTA has reviewed the following situations and determined that a constructive use of a resource does not occur when:

- Compliance with the requirements of 36 CFR 800.5 for proximity impacts of the proposed action, on a site listed on or eligible for the National Register, results in an agreement of "no historic properties affected" or "no adverse effect;" or

- The projected operational noise levels of the proposed transit project do not exceed the noise impact criteria for a Section 4(f) activity in the FTA Guidelines For Transit Noise And Vibration Impact Assessment; or

- The projected noise levels exceed the relevant threshold in the preceding paragraph of this section because of high existing noise, but the increase in the projected noise levels if the proposed project is constructed, when compared with the projected noise levels if the project is not built, is barely perceptible (3 dBA or less); or

- Overall (combined) proximity impacts caused by a proposed project do not substantially impair the activities, features, or attributes that qualify a property for protection under Section 4(f); or

- Proximity impacts will be mitigated to a condition equivalent to, or better than, that which would occur if the project were not built, as determined after consultation with the official(s) with jurisdiction;

- Change in accessibility will not substantially diminish the utilization of the Section 4(f) property; or

- Vibration levels from project construction activities are mitigated, through advance planning and monitoring of the activities, to levels that do not cause a substantial impairment of protected activities, features, or attributes of the Section 4(f) property.

Construction Period Impacts

Construction-vehicle traffic is not expected to generate vibration levels that would be damage-causing. However, other construction-period vibration impacts could affect buildings that are not in good structural condition. There is a potential for vibration from construction equipment to exceed FTA criteria for vibration for building damage, depending on the location, equipment, and building type. Many of the historic buildings that abut the project area are well over 100 years old, and they may not have the same physical resistance to vibration as modern buildings. Many of the historic buildings adjacent to the track are classified as buildings extremely susceptible to building damage under the FTA Construction Vibration Damage Criteria. These historic buildings include:

- The Interlocking Tower (SONO Switch Tower Museum), the former Norwalk City Hall, and other historic buildings on the north side of Washington Street in the South Main and Washington Streets Historic District;

- The two former factory complexes (Norwalk Lock Company and Norwalk Iron Works) north of the railroad ROW on North Water Street;

- The circa 1910 commercial building at 68 Water Street, which is adjacent to a construction staging/access area; and

- The buildings that make up the potential Liberty Square Historic District, on the east side of the Norwalk River, which is adjacent to a construction staging/access area.

The potential for construction-period impacts to archaeological resources is presented in the Cultural Resources section in Chapter 3 of the EA/EIE, since there is no meaningful distinction in terms of temporary versus permanent impacts with regard to disturbance of significant archaeological remains.

CTDOT will incorporate the following protective measures during project construction as appropriate to prevent/address potential damage to historic buildings and to avoid a Section 4(f) constructive use:

- Conducting pre-construction inspections of building elements susceptible to damage,
- Documenting the buildings' pre-existing states;
- Conducting condition assessments by a structural engineer;
- Establishing vibration limits;
- Developing a vibration monitoring program;
- Real-time monitoring of vibration levels may be required during construction;
- Conducting post-construction surveys;
- Establishing dedicated truck routes that would keep construction trucks from residential areas;
- Phasing construction activities that create vibration so the multiple sources of vibration do not occur at the same time; and
- Updating the public regarding proposed construction schedules, especially identifying activities known to be a source of vibration.

CTDOT will coordinate with adjacent property owners to establish protocols for conducting pre-construction and construction survey and monitoring activities, as required.

Above-Ground Historic Resources – Permanent Use

The project will affect historic railroad structures in the APE that are listed in, eligible for listing in, or likely eligible for listing in the NR. The following project actions are expected to result in effects on historic resources:

- **Removal and replacement of the Norwalk River Railroad Bridge (Walk Bridge) and Fort Point Street Railroad Bridge:** The Build Alternative will result in the loss of existing Walk Bridge as a NR-listed resource and therefore result in an **adverse effect** to historic properties. The Build Alternative will include the replacement of the existing railroad bridge over Fort Point Street. Because it is a contributing component of the overall rail line as a NR-eligible linear resource, the bridge's replacement will be an **adverse effect** under Section 106. Replacement of these historic bridges would constitute a **Section 4(f) use**.
- **Removal of the High Towers and Removal/Replacement of the Catenary Support Structures:** The Build Alternative will remove the high steel lattice towers on either side of the river that carry transmission lines over the channel. Because the towers represent contributing components of the overall rail line as a NR-eligible linear resource, removal of the towers will result in an **adverse effect** under Section 106. The catenary support structures also contribute to the significance of the overall rail line as a NR-eligible linear resource; removal of the structures will result in an **adverse effect** under Section 106. Removal of the high towers and catenary support structures would constitute a **Section 4(f) use**. Replacement of the catenary system is included in the Build Alternative. Replacement of the utility functions currently existing on the high towers is a separate, independent project being performed by Eversource Energy.
- **Removal of Stone Retaining Walls and Construction of New Retaining Walls:** The project will require the replacement of the circa 1896 stone retaining walls west of Water Street and near the Fort

Point Street Railroad Bridge. These walls represent contributing components of the overall rail line as a NR-eligible linear resource; the removal of the walls will result in an **adverse effect**. Removal and replacement of the stone walls would constitute a **Section 4(f) use**.

- **Industrial Buildings Historic District (including Former Norwalk Ironworks/current Maritime Aquarium and Lock Building):** The project will require a permanent easement for access from the Former Norwalk Ironworks/current Maritime Aquarium. This easement will be for access in order to maintain the Norwalk River Railroad Bridge. Use of this resource cannot be avoided since its proximity to the bridge will allow access for maintenance and construction when required. No permanent impacts are anticipated to the Lock Building. Any impacts to the Lock Building are discussed below in the section regarding temporary use.
- **South Norwalk Railroad Bridge over Washington and South Main Streets.** The project's actions within the railroad ROW will begin at the end of the bridge with minor changes to the track geometry. These minor changes will have **no adverse effect** on the bridge itself or its overall setting, and **no Section 4(f) use** would occur.

Above-Ground Resources - Temporary Use

Creation and use of temporary construction staging/access areas could directly affect cultural resources that are not rail-related. The following paragraphs present a summary of recommended findings of effects of the project on NR listed, eligible, and potentially eligible properties that are not rail-related under Section 106.

- **Industrial Buildings Historic District (including Former Norwalk Ironworks/current Maritime Aquarium and Lock Building).**

  The parking areas of the former Norwalk Lock complex at 18 Marshall Street will be used for temporary construction staging/access areas. The structure itself will not be impacted. **This activity will not be considered to have an adverse effect,** provided that no physical damage occurs as a result of the preparation and use of the temporary construction staging/access areas**.** The use of the parking areas during construction is not expected to disrupt the utilization of the Norwalk Ironworks/current Maritime Aquarium and the Lock Building. Additionally, CTDOT will employ protective measures to minimize impacts to buildings. Accordingly, **the temporary use of the parking lot will qualify as an exception to Section 4(f) use.**

- **South Main and Washington Streets Historic District:** The project has the potential to affect the district because of the temporary construction staging/access area that will extend into the district north of Washington Street. Most of the access area is located in a strip of undeveloped land at the rear of the buildings; however, the area also includes the footprint of the interlocking tower (Switch Tower Museum). Provided no physical damage to any of the district's buildings occurs as a result of the preparation and use of the temporary construction staging/access area, **this activity will not be considered to have an adverse effect**. The project is not anticipated to impact the utilization of the SONO Switch Tower Museum. Additionally, CTDOT will employ protective measures to minimize impacts to properties during construction. Accordingly, **the temporary nature of the impacts to this parcel will qualify as an exception to Section 4(f) use.**
- **Addition to South Main and Washington Streets Historic District.** The South Main and Washington Streets Historic District could reasonably be enlarged to include additional commercial buildings at the north end of Water Street. One of these buildings, 68 Washington Street, a circa 1910 yellow-brick commercial building, is adjacent to a temporary construction staging/access area. The use of the adjacent property for construction staging and access will not use this parcel or affect the

utilization of 68 Washington Street during construction. Additionally, CTDOT will employ protective measures to minimize impacts to properties during construction. Accordingly, **there will not be a Section 4(f) use**.

- **Liberty Square Historic District.** This potentially eligible historic district is adjacent to a temporary construction staging/access area. Provided no physical damage to any of the district's buildings occurs as a result of the preparation and use of the temporary construction staging/access area, **this activity will not be considered to have an adverse effect.** The temporary construction/access area adjacent to the historic district will not affect the utilization of the district's buildings during construction. Additionally, CTDOT will employ protective measures to minimize impacts to properties during construction. Accordingly, **there will not be a Section 4(f) use.**

The options for the Build Alternative would be similar in their effects on standing historic properties. Operational noise from the railroad tracks will not result in long-term noise impacts or discernible increases. With regard to visual effects, the design for the elements of the replacement bridge will be as visually compatible as possible with the character of these adjacent historic properties. To date, CTDOT has sponsored two design charrettes in Norwalk with project historic stakeholders to identify historic stakeholder concerns and solicit historic stakeholder input on key design elements of the replacement bridge. CTDOT will continue to work with the historic stakeholders through the preparation and finalization of the EA/EIE and preliminary design.

Archaeological Resources

Section 4(f) protection only extends to those archaeological resources that are considered important for preservation in place. It is not anticipated that archaeological resources will be found that qualify for protection under Section 4(f). If this does occur, Section 4(f) will be addressed separately for archaeological resources (through a revision to the Section 4(f) Evaluation). An Archaeological Treatment Plan incorporated into the project's Memorandum of Agreement (MOA) presents a methodology for further archaeological Phase IB and Phase II testing, and if required, data recovery.

Table 9-2—Anticipated Project Impacts to Section 4(f) Historic Resources

Historic Sites/Districts	Protection	Project Impact and Section 106 Effect/Section 4(f) Use
Norwalk River Railroad Bridge (Walk Bridge)	National Register (NR) Listed	To be replaced: **Section 106 Adverse Effect/Section 4(f) Use**
High Towers	Contributing to a NR Eligible Linear Historic District	To be removed: **Section 106 Adverse Effect/Section 4(f) Use**
Catenary Support Structures	Contributing to a NR Eligible Linear Historic District	Some or all of the existing catenary support structures will be removed: **Section 106 Adverse Effect/Section 4(f) Use**
Stone Retaining Walls	Contributing to a NR Eligible Linear Historic District	To be removed: **Section 106 Adverse Effect/Section 4(f) Use**
Fort Point Street Railroad Bridge	Contributing to a NR Eligible Linear Historic District	To be removed: **Section 106 Adverse Effect/Section 4(f) Use**

Table 9-2—Anticipated Project Impacts to Section 4(f) Historic Resources

Historic Sites/Districts	Protection	Project Impact and Section 106 Effect/Section 4(f) Use
Industrial Buildings Historic District	Potentially Eligible for NR	Removal of the historic bridge, visual impact on the setting of the potentially eligible historic district**: Section 106 Indirect (Visual) Adverse Effect/** **2. Permanent easement is required from the Norwalk Iron Works which is a contributing resource to the District.**
Former Norwalk Iron Works (Maritime Aquarium)[a]	Potentially Eligible for NR	1. Removal of the historic bridge, visual impact on the setting of the potentially eligible historic district**: Section 106 Indirect (Visual) Adverse Effect/** **2. Permanent easement is required for access for maintenance and construction. Section 4(f) Use**
Norwalk Lock Company[b]	NR Eligible	1. Removal of the historic bridge, visual impact on the setting of the potentially eligible historic district**: Indirect (Visual) Adverse Effect,** and 2. Temporary use of parking areas for construction staging/access area: **No Adverse Effect conditional upon no damage / Section 4(f) Exception**
South Main and Washington Streets Historic District (Including Boundary Increases)	NR Listed	1. Removal/replacement of bridge and high towers will have a visual impact on the district's setting: **Indirect (Visual) Adverse Effect** and 2. Construction staging/access area along the edge of the district on the north side of Washington Street: **No Adverse Effect conditional upon no damage/ No Section 4(f) Use**
Addition to South Main and Washington Streets Historic District	Potentially Eligible for NR	Building at 68 Water Street is adjacent to construction staging/access area: **No Adverse Effect conditional upon no damage/ No Section 4(f) Use**
Liberty Square Historic District	Potentially Eligible for NR	Adjacent to construction staging/access area: **No Adverse Effect conditional upon no damage/ No Section 4(f) Use**
Interlocking Tower (Switch Tower Museum)	Contributing to a NR listed Historic District	Use of parcel for construction staging / access area. **No Adverse Effect conditional upon no damage / Section 4(f) Exception**

Notes:
a. Because it is now part of the Maritime Aquarium complex, which includes substantial new construction, the portion remaining from the former Iron Works would probably only be considered eligible as part of a historic district.
b. The Norwalk Lock Company complex has been determined individually eligible; it also contributes to a potentially eligible historic district.
c. Individually listed and also a contributing building within the South Main and Washington Streets Historic District.

9.5. Measures to Minimize Harm

This section identifies measures that CTDOT will implement to minimize harm to Section 4(f) resources, in addition to the construction period protective measures identified in Section 9.4.

CTDOT will consider incorporating protective measures during project construction to reduce impacts on Section 4(f) parks, public recreation areas and historic buildings, including:

- Using temporary noise barriers between noise-sensitive receptors and noisy stationary equipment;
- Establishing dedicated truck routes that would keep construction trucks from parks and recreational facilities and historic properties;
- Scheduling noisy operations to be performed simultaneously, the slightly louder noise levels will be offset by less exposure to the public; and
- Updating the public regarding proposed construction schedules, noisy activities, and nighttime work.

9.5.1. Parklands and Public Recreation Areas

Provision of a north-south pedestrian/bicycle connection on the east side of the Norwalk River will be incorporated into the Build Alternative as a mitigation measure, and will represent an improvement over existing conditions. Wetlands restoration within some of the parklands along the river was identified in and is consistent with the City's Master Plan for Oyster Shell Park, and will represent a project benefit. CTDOT will coordinate with the City of Norwalk regarding plans for trail and wetland restoration improvements within City parks for consistency with the City's plans.

Temporary use of the WWTP and construction of the trail connection along the east river bank will affect the southernmost section of Harbor Loop Trail, but the trail will be restored upon completion of construction.

The design of the bridge and abutments, and other elements, will be performed in coordination with CTSHPO, the City of Norwalk, and other stakeholders to minimize aesthetic impacts to the extent possible. Measures such as treatments of retaining walls and abutments and landscaping will be considered during final design to improve the appearance of the new bridge and project site.

CTDOT has conducted consultation with the City of Norwalk, and will continue coordination regarding the temporary use of City-owned property, including parks or trails, during construction. Temporary park impacts will be mitigated to the extent possible by minimizing impacts from noise, as described in Chapter 5 in the EA/EIE and in the following sections.

9.5.2. Historic and Archaeological Resources

Above-Ground Historic Resources

Adverse effects to above-ground resources will be mitigated through measures agreed upon during ongoing agency consultation. Stakeholder groups involved in consultation include the Norwalk Historical Commission, Norwalk Preservation Trust, Norwalk Historical Society, and the SONO Switch Tower Museum, as well as the Tribal Historic Preservation Offices (THPO) of the Mashantucket Pequot Tribal Nation and the Mohegan Tribe. A Draft Memorandum of Agreement (MOA) has been developed among FTA, CTDOT and CTSHPO regarding the Walk Bridge Replacement Project (contained in Appendix 1 of the EA/EIE). The MOA will be finalized following historic stakeholder and public review of the document. The final MOA will be approved by the signatory and concurring agencies.

Potential mitigation measures for this project include the following:

- **Pre-construction documentation of historic resources that will be lost:** Existing documentation prepared separately for Walk Bridge and the catenary structures will be reviewed and supplemented as appropriate, in coordination with FTA and CTSHPO. Written and photographic documentation will be prepared for other historic structures: high towers, stone retaining walls, interlocking tower (SONO Switch Tower Museum), Fort Point Street Railroad Bridge, and any historic trackside features. The documentation will include context views that incorporate the former Norwalk Lock Company buildings, the former Norwalk Iron Works buildings, and buildings of the South Main and Washington Streets Historic District.

- **Designs for new elements that will be visually compatible with adjacent historic properties:** Project designs will be developed to be compatible to the extent possible with the cultural and historic setting.
- **Reuse of stone to face new walls and/or bridge abutments and other salvage materials:** Consideration will be given to reuse stone removed from stone-faced walls and abutments in the new project design elements. In addition, CTDOT shall solicit interest in obtaining salvaged materials, such as catenary structures, to be used by organizations stipulated in the MOA for public education purposes.
- **Preparation of a Public Education Plan:** CTDOT will prepare a public education plan that that will incorporate at least three of the following activities: markers and other outdoor interpretive installations; school curriculum materials; walking tour guides, brochures, and other publications; web site (s); and local museum/library exhibits. The public-education plan may include other activities of a similar nature to substitute for the activities identified herein.

Archaeological Resources

In the event that archaeological resources are found that qualify for protection under Section 4(f), CTDOT will conduct a separate assessment. Mitigation measures will be refined once the types and significance of archaeological resources in the APE are known and the project impacts to those resources are defined. Stipulations in the MOA regarding historic properties include the implementation of an Archaeological Treatment Plan (Appendix A) that presents procedures for archaeological testing and data recovery to address project impacts to under-ground resources.

9.5.3. Least Overall Harm

The Replacement Alternative (Build Alternative) is discussed as one overall alternative for the purposes of this Section 4(f) Evaluation since, for the movable bridge replacement type options, the "use" of the Section 4(f) resources would be the same. The three build alternatives that have been carried through to the EA for analysis are a Bascule Bridge, a Short Span Vertical Lift Bridge, and a Long Span Vertical Lift Bridge; these are all movable bridge types. After much coordination and analysis, the Long Span Vertical Lift option has been identified as the preferred alternative. Below, these various options within the Build Alternative are discussed in terms of least overall harm per 23 CFR 774.3.

1. *The ability to mitigate adverse impacts to each Section (f) property (Including any measures that result in benefits to the property).* All three options within the Build Alternative would require the same mitigation measures since they would require use of the same use of Section 4(f) resources.

2. *The relative severities of remaining harm after mitigation, to the protected activities, attributes, or features that qualify each property for Section 4(f) protection.* All three options within the Build Alternative would require the same mitigation measures since they would require use of the same use of Section 4(f) resources.

3. *The relative significance of each Section 4(f) property.* All three options within the Build Alternative would require identical use of Section 4(f) resources; therefore the significance is the same for all options within the Build Alternative.

4. *The views of the officials with jurisdiction over each Section 4(f) property.* Any impacts to public park/recreation land qualify as Section 4(f) exceptions, therefore we will focus on the views of the officials with jurisdiction over any historic resources being used – the CTSHPO. CTSHPO has entered into a Memorandum of Agreement with the CTDOT and FTA regarding the mitigation measures to be incorporated due to the adverse effects to cultural resources from the Build Alternative. These mitigation measures would be similar for any of the three build alternatives. It should be noted, that there has been extensive coordination with the Norwalk Historical Commission and the Norwalk Historical Society and both feel that a potential advantage of a Vertical Lift Option is that it would reintroduce a prominent vertical element since the existing high towers must be removed.

5. *The degree to which each alternative meets the purpose and need.* After extensive analysis and evaluation, it has been determined in the EA that the preferred alternative – the Long Span Vertical Lift Bridge would best meet the purpose and need of the project. In addition to considering the project purpose and need, this was determined by considering engineering, constructability, potential impacts to rail and navigation traffic, estimated costs, and potential environmental impacts.

6. *After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f).* The anticipated environmental impacts of the three Build options are comparable; however there are considerable benefits to selecting the Long Span Vertical Lift Option. The Vertical Lift Option would have a much less significant impact on rail transportation since there would be a much shorter overall construction period and a shorter time for track outages. Regarding marine traffic, construction of the Long Span Vertical Lift Option would allow the contractor more flexibility during construction and one channel would remain open for marine traffic. Vertical restrictions would also occur for as few as 16 months, which is 18-24 months shorter than the other two build options. There are considerable advantages for engineering, constructability, and community disruption associated with the Long Span Vertical Lift Option compared to the other two build alternatives.

7. *Substantial differences in costs among the alternatives.* The estimated costs for the Long Span Vertical Lift Option are higher than the other two build options. At an estimated construction cost between $365 million and $415 million, this option would cost about 12 percent more than the Short Span Vertical Lift Option ($325 million -$375 million) and about 10 percent more than the Bascule Option ($330 million to $380 million). It has been determined however, that the Long Span Vertical Lift Option’s shorter construction duration, reduced disruption to rail traffic along the NEC and navigation traffic on the Norwalk River, and reduced adverse impacts to the community, outweigh the additional costs associated with the Long Span Vertical Lift Option.

Based on the evaluation of the above factors, it has been determined that the Long Span Vertical Lift Option is the option within the Build Alternative that causes the least overall harm.

9.6. Summary and Conclusions

The anticipated impacts to parks and recreation areas will qualify for exceptions to Section 4(f) use, as the work will involve either transportation enhancements/wetlands restoration or temporary occupancy. This work will include construction of the bicycle/pedestrian connection under Walk Bridge, providing a missing link in the NRVT, as well as wetlands restoration, envisioned as part of the parkland improvements identified in the City’s Oyster Shell Master Plan. Construction staging on the WWTP property will also affect the south end of the existing Harbor Loop Trail, where the trail will be constructed to extend under Walk Bridge. The NRVT will be used for construction staging on the western side of the Norwalk River, south of the Walk Bridge. These impacts represent temporary impacts and qualify as exceptions to Section 4(f) use.

Removal of the NR-listed historic swing-span bridge and the overhead catenary system and high towers of Walk Bridge will constitute adverse effects under Section 106 and a use under Section 4(f). Removal of the stone retaining walls and Fort Point Street Bridge also will constitute adverse effects under Section 106 and uses under Section 4(f). Pursuant to Section 106, it was determined that the project will produce an indirect (visual) adverse effect on the Industrial Buildings Historic District, including both the Former Norwalk Iron Works (Maritime Aquarium) and the Norwalk Lock Company, and on the South Main and Washington Streets Historic District. A permanent access easement will be required from the Norwalk Iron Works (Maritime Aquarium), which will constitute a Section 4(f) use of this property. Construction activities will be in close proximity to these properties, as well as to a potentially eligible historic district and historic district addition, the Addition to South Main and Washington Streets Historic District and the Liberty Square Historic District. Proximity to construction activities will result in a conditional Section 106 No Adverse Effect finding, but will not result in a Section 4(f) use.

All possible minimization measures have been explored and the MOA identifies mitigation measures for impacts on historic and archaeological resources, including documentation for historic resources that will be lost and design of new elements to be compatible to the extent possible with the historic setting. Protective measures implemented during the construction period will include pre-construction inspections, establishment of vibration limits and vibration monitoring, and post-construction surveys to prevent/minimize vibration impacts and damage to adjoining historic buildings and properties.

In conclusion, based on the evaluation of the No Build Alternative and Rehabilitation Alternative, FTA has determined that there are no feasible and prudent alternatives to the replacement of the Walk Bridge and the associated use of Section 4(f) resources. This alternative must be selected in order to meet the purpose and need of the project.

10. EA/EIE Circulation List

Federal

Advisory Council on Historic Preservation
Office of the Executive Director
Mr. John M. Fowler, Executive Director
401 F Street, NW, Suite 308
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11. Acronyms and Glossary of Terms

11.1. Acronyms and Abbreviations

ACM	Asbestos-containing Materials
ACS	American Community Survey
ADA	U.S. Americans with Disabilities Act
AIRS	US Aerometric Information Retrieval System
APA	Aquifer Protection Agency
APE	Area of Potential Effect
ATC	Automatic Train Control
BFE	Base Flood Elevation
BMP	Best Management Practice
C&D	Conservation and Development
CAD	Confined aquatic disposal
CCMA	Connecticut Coastal Management Act
CCTV	Closed Circuit Television
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CEPA	Connecticut Environmental Policy Act
CEQ	Council on Environmental Quality
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CGS	Connecticut General Statutes
CIRCA	Connecticut Institute for Resilience and Climate Adaptation
CJL	Coastal Jurisdiction Line
CLOMR	Conditional Letter of Map Revision

CM/GC	Construction Manager/General Contractor
CO	Carbon Monoxide
CP	Control Point
CPE	Corridor Preservation Exemption
CPSC	Contaminated or Potentially Contaminated Sites
CPUs	Central Processing Units
CSX	CSX Transportation
CT	Connecticut
CTA	Connecticut Transfer Act
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CTSHPO	Connecticut State Historic Preservation Office
CWCS	Comprehensive Wildlife Conservation Strategy
cy	Cubic Yards
dB	Decibel
DO	Dissolved Oxygen
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIE	Environmental Impact Evaluation
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	US Food and Drug Administration
FEMA	Federal Emergency Management Agency

FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FINDS	Facility Index System
FIRM	Flood Insurance Rate Map
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
HAER	Historic American Engineering Record
HTL	High Tide Line
HUD	Housing and Urban Development
I-95	Interstate Route 95
IMAX	Image Maximum
IPaC	Information for Planning and Conservation
IPCC	Intergovernmental Panel on Climate Change
ISSC	Interstate Shellfish Sanitation Conference
LEP	Limited English Proficiency
LGM	Locational Guide Map
LIS	Long Island Sound
LRTP	Long Range Transportation Plan
LUST	Leaking Underground Storage Tanks
LWCF	U.S. Land and Water Conservation Fund Act
LWDS	Leachate and Wastewater Discharge Site
MAGIC	Map and Geographic Information Center
MBTA	Migratory Bird Treaty Act
MCC	Motor Control Centers
MGP	Manufactured Gas Plant

MHW	Mean High Water
MMPA	Marine Mammal Protection Act
MNR	Metro North Railroad
MOA	Memorandum of Agreement
MOW	Maintenance-of-Way
Mph	Miles per hour
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MTA	Metropolitan Transit Authority
NACCS	North Atlantic Coast Comprehensive Study
NAVD88	North American Vertical Datum of 1988
NAAQS	National Ambient Air Quality Standards
NDDB	Natural Diversity Data Base
NEC	Northeast Corridor
NEFMC	New England Fisheries Management Commission
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office (of NMFS)
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFRAP	No Further Remedial Action Planned
NHL	New Haven Line
NHML	New Haven Main Line
NJTPA	New Jersey Transportation Planning Authority
NMFS	National Marine Fisheries Service
NHMC	Norwalk Harbor Management Commission
NO_2	Nitrogen Dioxide

NOAA	National Oceanic and Atmospheric Administration
NPA	Norwalk Parking Authority
NPDES	National Pollutant Discharge Elimination System
NR	National Register of Historic Places
NRCS	Natural Resource Conservation Service
NRVT	Norwalk River Valley Trail
NSSP	National Shellfish Sanitation Program
NTD	Norwalk Transit District
NWI	National Wetland Inventory
O_3	Ozone
OCS	Overhead Contact System
OEP	Office of Environmental Planning
OOC	Operation Control Center
OLISP	Office of Long Island Sound Programs
OPM	Office of Policy and Management
OSHA	Occupational Safety and Health Administration
OTP	On Time Performance
P&W	Providence and Worcester Railroad Company
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PLC	Programmable Logic Controller
$PM_{2.5}$	Particulate Matter, 2.5-micron
PM_{10}	Particulate Matter, 10-micron
PSE	Preliminary Site Evaluations
PTC	Positive Train Control
RCRA	Resource Conservation and Recovery Act

RCSA	Regulations of Connecticut State Agencies
ROW	Right-Of-Way
RPDD	Reed Putnam Design District – Subarea D
RPDE	Reed Putnam Design District – Subarea E
RSR	Remediation Standard Regulation
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SAV	Submerged Aquatic Vegetation
SDADB	Site Discovery and Assessment Database
SEH	Significant Environment Hazard
sf	square feet
SHPO	State Historic Preservation Office
SHWS	State Hazardous Waste Sites
SLE	Shore Line East
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SNEW	South Norwalk Electric and Water
SO_2	Sulfur Dioxide
SOGR	State of Good Repair
SoNo	South Norwalk
SQG	Small Quantity Generator
SR	State Register of Historic Places
SSI	Subsurface Site Investigation
SSO	State-managed Safety Oversight
STAT	Short Term Action Team
STIP	Statewide TIP
SVOCs	Semi-volatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan

SWRPA	South Western Regional Planning Agency
SWRMPO	South Western Region Metropolitan Planning Organization
THPO	Tribal Historic Preservation Office
TIP	Transportation Improvement Plan
TMDL	Total Maximum Daily Load
TOD	Transit-oriented Development
TPH	Total Petroleum Hydrocarbon
TRC	Transportation Reinvention Commission
TSGP	Transit Security Grant Program
TTCI	Transportation Technology Center
TTD	Third Taxing District
TVSS	Transient Voltage Surge Suppression
UCONN	University of Connecticut
US 1	United States Route 1
US 7	United States Route 7
USACE	United States Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDOT	U.S. Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tanks
VCP	Voluntary Cleanup Priority
VOCs	Volatile Organic Compounds
WCCOG	Western Connecticut Council of Governments

WPCA	Water Pollution Control Authority
WSDD	Washington Street Design District
WWTP	Wastewater Treatment Plant

11.2. Glossary of Terms

Abutment: A structure built to support the end of a bridge.

Adverse effect: An adverse effect (under 36 CFR 800.5(a)(1)) is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Alignment: The arrangement or positioning of railroad tracks.

Amtrak: America's national rail operator; also known as the National Railroad Passenger Corporation.

Approach: The part of the bridge that carries traffic from the land to the main parts of the bridge.

Approach span: The span connecting an abutment with the main span of a bridge.

Archaeological Site: Following National Register Bulletin No. 36, "Guidelines for Evaluating and Registering Archaeological Properties" (www.cr.nps.gov/nr/publications/bulletins/arch/), an ***archaeological site*** is "a location that contains the physical evidence of past human behavior that allows for its interpretation." The term ***archaeological site*** refers to those that are eligible for or are listed on the National Register (historic properties) as well as those that do not qualify for the National Register.

Area of Potential Effect: As defined in Section 106 of the National Historic Preservation Act, the geographic area within which a proposed project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.

AREMA (American Railway Engineering and Maintenance-of-Way Association): The organization that publishes recommended practices for the design, construction and maintenance of railway infrastructure.

Ballast deck bridge: A railroad bridge with a solid "U" shaped cross section, which supports a railroad track and the gravel or stone base supporting the track, with the bridge deck being closed to the roadway or waterway below.

Barge: A flat-bottomed boat for carrying freight, typically on canals and rivers, either under its own power or towed by another vessel.

Bascule bridge: A movable bridge with a counterweight that continuously balances a bridge span as it is raised or lowered. One end of the span pivots upward about a horizontal axis to allow waterway traffic to pass beneath the bridge.

Bathymetric data: Information about the depths and shapes of underwater terrain.

Bedrock: Solid rock beneath soil or other loose deposits.

Benthic resources: Anything associated with or occurring at the lowest level of a body of water.

Bobtail bridge: Another name for a swing span-type movable bridge that is comprised of two unequal span lengths.

Camber: A positive, upward curve built into a bridge beam or truss that compensates for some of the vertical load in order to provide a level traveling surface when trains cross a bridge.

Categorical exclusion (CE): A determination that a project or action does not involve significant impact to the environment.

Catenary: An overhead wire that carries power to trains.

Center-pivot: The pier or point on which a swing span bridge turns.

Channel hydraulics: The analysis of the water flow of a channel or river.

Cofferdam: A watertight enclosure constructed in waterlogged soil and pumped dry so that construction can take place within a waterway.

Communications-Based Train Control: A subway signaling system that uses telecommunications between train and track equipment to manage and control train traffic and individual trains on the line; the system improves safety and increases capacity by allowing trains to follow each other more closely.

Conductors/Cables: Provides overhead electric power transmission.

Connecticut Department of Energy and Environmental Protection: State agency whose primary function is the conserving, improving and protecting natural resources and the environment within Connecticut, as well as providing cheaper, cleaner and more reliable energy.

Connecticut Environmental Policy Act (CEPA): Identifies and evaluates the impacts of proposed State actions that could have the potential to significantly affect the environment.

Connecticut State Historic Preservation Officer (CTSHPO): The governmental program that manages historic preservation for the state of Connecticut, working to identify, register, and protect the buildings, sites, structures, districts and objects that comprise Connecticut's cultural heritage.

Conceptual Engineering: Design phase that describes the proposed system in terms of integrated ideas about purpose, functionality, behavior, and aesthetics.

Construction Engineering: Responsible for the design, management and oversight of projects within the construction phase.

Construction Manager-General Contractor: Plans, coordinates, budgets, and supervises construction projects from development to completion.

Construction Phasing: Separating a project into manageable sections with different completion dates where the stages of design and construction may overlap.

Constructive Use: A constructive use of a Section 4(f) resource (23 CFR 774.15) occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished.

Control House: A small facility placed on or adjacent to a movable bridge in which the switches, signals and personnel controlling the opening and closing of a movable span are located.

Critical Habitat: Specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species, and that have been formally described in the Federal Register.

CTDOT: Connecticut Department of Transportation, the state agency responsible for providing a safe and efficient intermodal transportation network.

***De Minimis* Impact:** Under the Section 4(f) regulations, a *de minimis* impact is one that, taking into account avoidance, minimization, and mitigation, results in no adverse effects to the activities, features, or attributes qualifying a park, recreation area, or historic site for Section 4(f) protection. A 2005 revision to the Section 4(f) regulations[1] allow U.S. DOT agencies to approve transportation projects once U.S. DOT determines that the use will involve a "*de minimis*" impact.

Deck Girder Rolling Lift Bascule: A movable span (leaf) that rotates on a horizontal axis to raise one end vertically. As the span rotates open, it also translates horizontally in the direction of the movement. A large counterweight is used to offset the weight of the raised leaf.

Deck Truss Swing Span: A type of movable bridge having truss supports underneath the railroad tracks; the span swings or pivots about a vertical axis while opening and closing.

Direct Fixation: A type of railroad track structure in which the rail is anchored directly to the bridge structure, eliminating the use of railroad ties.

Double-track Bridge: A bridge carrying two tracks.

Drilled Shaft Foundations: A type of bridge foundation in which concrete is placed within a hole drilled into the ground, providing deep foundations for the bridge and retaining walls. This program will employ a highly specialized technique to install the drilled shafts in hard rock.

Easements: A right to cross or otherwise use someone else's land for a specified public purpose.

Ecosystem: Dynamic and interrelating complex of plant and animal communities and their associated nonliving (e.g. physical and chemical) environment.

Eligible for National Register: If the agency official determines any of the National Register criteria are met and the SHPO/THPO agrees, the property shall be considered eligible for the National Register for Section 106 purposes.

Endangered: The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

[1] Section 6009(a) of SAFETEA-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users).

Endangered Species Act (ESA): Law designed for the purpose of protecting and recovering endangered or threatened species and the ecosystems upon which they depend.

Environmental Assessment: A level of environmental documentation prepared to detail impacts to the natural and man-made environment through study and analysis.

Environmental Permitting: Agreements that regulate activities that may impact a state's natural resources and environment.

Essential Fish Habitat: The surroundings required for aquatic species to spawn, breed, feed or grow to maturity, which are high priorities for conservation, management and research.

Estuary: A partially enclosed body of water along the coast where freshwater from rivers and streams meets and mixes with salt water from the ocean.

Fatigue Life: The amount of time that a steel structure or part of structure can handle repeated use before showing signs of wear or stress.

Federal Aviation Administration (FAA): A federal agency that provides a safe and efficient aerospace system by regulating civil and military aviation and U.S. commercial space transportation.

Federal Clean Water Act (CWA): Provides regulating standards for clean water quality in the waters of the United States.

Federal Navigation Channel: The limits of a defined channel or area where it is safe to operate a watercraft.

Federal Transit Administration (FTA): A federal agency that provides technical and financial assistance to local public transit systems.

Final Design: The last phase of a design project in which preparations of calculations, plans, and specifications for construction are made

Fixed Approach Spans: Portion of the bridge that carries traffic to the main part of the bridge and does not move to accommodate navigation. These spans are located outside the limits of the navigation channel.

Fixed Bridge: A bridge whose height above a waterway is set to accommodate navigation traffic without moving.

Floodplain: The part of the ground surface inundated with water on a recurring basis, usually associated with the one percent recurrence interval (100-year) flow.

Floor beams: Components of the bridge structure used to support the deck that span between and are supported by two parallel girders or trusses.

Fluvial: Produced by the action of a stream.

General Contractor: Responsible for the overall coordination of all aspects of a construction project.

Geometry: The three dimensional layout and measurements associated with the design and construction of railroad tracks.

Geotechnical Screening: Investigations of the ground, soil and rock used for identifying foundation types for proposed structures.

Girder: A main supporting beam that carries a load along its length by resisting bending.

Habitat: The location where a particular taxon of plant or animal lives and its surroundings (both living and nonliving) and includes the presence of a group of particular environmental conditions surrounding an organism including air, water, soil, mineral elements, moisture, temperature, and topography.

High Tower: A tall pier or frame supporting the cable of a suspension bridge.

Historic Property: As defined in 36 CFR 800.16(1), any prehistoric or historic district, site, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior.

Intertidal Habitat: An environment located in the narrow band between land and sea that is above water at low tide and underwater at high tide.

Life Cycle Costs: Upon being placed into service, the accumulation of all expenditures required for inspecting and maintaining the bridge or other asset during its projected life.

Listed Species: A species, subspecies, or distinct vertebrate population segment that has been added to the Federal lists of Endangered and Threatened Wildlife and Plants as they appear in sections 17.11 and 17.12 of Title 50 of the Code of Federal Regulations (50 CFR 17.11 and 17.12).

Marine Traffic: Water-going vessels traveling along a seaway, riverway, harbor or other navigable waterway.

Mashantucket Pequot Tribal Nation: Eastern Woodland people whose traditional homeland is Southeastern Connecticut.

Memorandum of Understanding (MOU): An agreement between two or more parties, indicating an intended common line of action.

Metro-North Railroad (MTA): The agency responsible for commuter railroad operations in New York and Connecticut.

Mitigation: Measures taken to minimize adverse environmental impacts.

Mohegan Tribal Nation: A sovereign, federally-recognized Indian Nation, with its own constitution and government.

Movable Span: A bridge across a navigable waterway that can be temporarily moved to allow for the passage of boats and barges.

Mud line: The seabed which determines channel depth.

National Environmental Policy Act (NEPA): Federal regulations outlining policies and procedures for documenting environmental impacts of a proposed action.

National Register of Historic Places: A federal listing of historic resources protected under the National Historic Preservation Act of 1966.

National Oceanic and Atmospheric Administration (NOAA): Federal agency that studies climate, weather, oceans and coasts.

Nautical Mile: A unit of distance set at 1,852 meters (about 6,076 feet).

Navigable Waters: Waters that provide a channel for commerce and transportation of people and goods. At the Walk Bridge project site, “navigable waters” means Long Island Sound, any cove, bay or inlet of Long Island Sound, and that portion of any tributary, river or stream that empties into Long Island Sound upstream to the first permanent obstruction to navigation for watercraft from Long Island Sound.

Navigation Study: An evaluation conducted for the purpose of determining the best plan for improving the movement of vessels through a waterway.

New Haven Line Railroad: Rail line operated by Metro-North railroad, consisting of the New Haven Main Line and the New Canaan, Danbury, and Waterbury Branch lines.

No-Build: The design alternative that serves as the baseline or benchmark by which to compare “Build” design alternatives and which assumes no action or only routine maintenance or improvements occur.

Northeast Corridor (NEC): The rail line running from Boston, Massachusetts to Washington, D.C. with branches serving other metropolitan areas. The Northeast Corridor is owned primarily by Amtrak and is used by Amtrak's Acela Express and Northeast Regional services in addition to several commuter and freight rail services. The Northeast Corridor is the busiest passenger rail line in the United States by ridership and service frequency.

Norwalk Harbor Management Commission: The board responsible for evaluating issues, making recommendations, and providing support for the vitality and quality of life associated with Norwalk Harbor and Long Island Sound.

Norwalk Historical Commission: Oversees historical properties and archives in Norwalk, Connecticut.

Norwalk Tribal Nation: One of the recognized Indian Nations in the United States, located in the state of Connecticut.

Office of Long Island Sound: An office of the Connecticut Department of Energy and Environmental Protection that oversees programs that impact the Long Island Sound and related coastal land and water.

Open-Deck Bridge: A railroad bridge constructed so that the railroad track and ties are directly connected to the bridge structure resulting in spaces between the railroad ties that are open to the road or stream being crossed beneath.

Open-Deck Through-Truss Lift Span: A truss that carries its traffic through the interior of the structure with cross-bracing between the parallel top and bottom chords. The deck is open and railroad track is connected directly to the bridge structure resulting is spaces that are open to the road or stream below. A lift span allows a portion of the bridge to move up and down to allow vessels to pass underneath.

Operational Redundancy: The ability to maintain train service on a limited number of tracks following an event that would have otherwise rendered all tracks inoperable.

Overhead Counterweights: Large weights used to offset the mass of a movable span and are located above the railroad tracks.

Pier: As an intermediate support used between bridge spans, the bridge pier is the main support for a bridge upon which the superstructure rests.

Pier Placement: Locating bridge piers that determines the length of new spans while clearing existing bridge piers, existing spans and other structural considerations.

Pile: A long steel or concrete column driven deep into the ground to form part of a bridge foundation or substructure.

Pit Pier: A pier type where a pit is dug below a bridge's existing footings then filled with concrete, brickwork or other materials. The narrow final gap between the new material and the existing footing is filled with dry packing materials or steel wedges that are rammed into the gap.

Pivot Pier: The central support of a swing span around which the movable span rotates.

Positive Train Control: Technology designed to automatically stop or slow a train before a collision occurs by sharing information on a train's location and safe passage via on board computer systems.

Preliminary Design: The first phase of the design process in which conceptual design is further refined.

Profiles: The cross sectional shape of a railway or roadway.

Rehabilitation: Method of correcting the deficiency of a deteriorated condition.

Reliability: The ability of a system or component to function under specified conditions for a determined amount of time.

Rest Piers: The bridge substructure supporting the end of a bascule span that does not have the counterweight.

Retaining Wall: A wall that holds back earth so that the width of a railroad embankment supporting tracks can be minimized.

Right-of-Way: Land dedicated to the transportation facility.

Rivers and Harbors Act: Federal legislation that requires approval for the construction for any dam, dike, bridge, or causeway in a navigable waterway of the U.S.

Ruderal: Growing where the natural vegetation cover has been disturbed by humans.

Run-Around Structure/Temporary Offset: A construction staging strategy to shift traffic around the primary project location, resulting in no interruptions to traffic during construction.

Section 106 National Historic Preservation Act: Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The procedures in this part define how federal agencies meet these statutory responsibilities.

Section 4(f): Under Section 4(f) of the U.S. DOT Act of 1966 (49 U.S.C. §303 and 23 U.S.C. §138), U.S. DOT agencies cannot approve the use of publicly owned parks, recreation areas, wildlife and waterfowl refuges, or historic sites, unless there is no feasible or practicable avoidance alternative to the use of the land and the project includes all possible means to minimize harm. These areas must be avoided if at all possible or impacts must be mitigated or determined to have a *de minimus*, or minor impact.

Service Life: Expected lifetime for acceptable period of use.

Single-Leaf Rolling Lift Bascule: A movable span having one portion that rotates about a horizontal axis that raises one end vertically to provide clearance for boat traffic. As the span rotates open, it also translates horizontally in the direction of the movement. A large counterweight is used to offset the weight of the moving span.

Span-Driven Vertical Lift Bridge: A movable deck bridge in which the deck may be raised vertically by synchronized machinery placed directly on the span.

Span Length: The horizontal distance between two support structures.

State Register of Historic Places: A state's list of historically significant properties. Not all state registered properties are listed on the National Register.

Steel Plate Girder: A type of bridge span configured in an I-shape in which the elements are welded together, consisting of top and bottom horizontal elements (flanges) and a single vertical element (web).

Stringers: A beam aligned with the length of a span which directly supports the railroad track and deck.

Structure Type: The type and combination of members connected together that form a wide range of structural possibilities.

Substructure: The portion of a bridge structure, including abutments and piers, that is the foundation supporting the superstructure and transferring bridge loads to the ground.

Subsurface: Earth material underground.

Sump Pump: A pump used to remove liquid or waste that has accumulated in a pit pier.

Superelevation: Tilting of the railroad tracks through a horizontal curve.

Superstructure: The portion of a bridge structure which is above the level of the foundation which carries the traffic load and passes that load to the substructure.

Swing Bridge: A movable deck bridge that opens by rotating about a vertical axis.

System Resiliency: The ability to return the bridge to use, either partially or completely, in a relatively short period of time in the aftermath of a compromising event.

Tidal Wetlands: Wetlands that border or lie beneath tidal waters that are protected from direct wave action.

Track Spacing: The distance between multiple rails on a railway.

Technically Feasible: The ability to implement a proposed action is possible from an engineering design and construction standpoint.

Threatened Species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range as defined in the Endangered Species Act.

Through Girder Trunnion Bascule: A movable span that rotates about a fixed point (the trunnion) to raise one end of the span vertically to provide clearance for boat traffic. A large counterweight is used to offset the weight of the moving portion of the span.

Through Truss Rolling Lift Bascule: A movable span type consisting of a truss superstructure that rotates about a horizontal axis, raising one end vertically to provide clearance for boat traffic. As the span rotates open, it also translates horizontally in the direction of the movement. A large counterweight is used to offset the weight of the moving span.

Through Truss Span Drive Vertical Lift: A movable span type consisting of a truss superstructure in which both ends of the span are simultaneously raised upward by synchronized machinery placed directly on the span. Towers at each end of the movable span guide the movement of the bridge and while also supporting large counterweights that offset the weight of the bridge.

Through Truss Tower Drive Vertical Lift: A movable span type consisting of a truss superstructure in which both ends of the span are simultaneously raised vertically and whose movement is guided by towers located at each end of the span. Large counterweights are placed at the top of each tower to offset the weight of the movable span. The top of the towers also support the bridge operating machinery.

Traffic Study: A detailed analysis of a transportation system supported by data collection.

Trestle: A bridge structure composed of bents or towers and supporting stringers or girders forming the floor system.

Trusses: A structure composed of slender members joined together at their end points.

Under-Deck Counterweights: Large weights used to offset the mass of a movable bridge and are located beneath the railroad track and deck of the bridge.

U.S. Army Corps of Engineers (USACE): A Federal agency under the Department of Defense involved with a range of public engineering services in peace and war.

U.S. Coast Guard (USCG): One of the five branches of United States' armed forces protecting interests in U.S. ports, inland waterways, along coasts, and on international waters. As a part of the Department of Homeland Security, the USCG has regulatory oversight of permitting the construction and maintenance of bridges crossing navigable waterways.

Use: A Section 4(f) "use" occurs when: (1) land from a Section 4(f) property is permanently incorporated into a transportation facility either by purchase or easement acquisition; or (2) there is a temporary occupancy of land from a Section 4(f) property that is adverse in terms of the statute's preservation purpose as determined by the criteria set forth in 23 CFR §774.13(d); or (3) land from a Section 4(f) property is not incorporated into the project but the proximity effects of the project are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired (constructive use of the property as determined by the criteria set forth in 23 CFR §774.15).

Utilities: Public mains for the purpose of electricity distribution, telecommunications, fiber optics, water mains, wastewater pipes, and the like.

Utility Relocations: The transfer of existing facilities to new locations that avoid conflict with a proposed construction project.

Vertical Lift Bridge: A type of movable span in which both ends of the span are simultaneously raised and lowered while being guided by large towers at both ends of the span.

Water-dependent use: A recreational, commercial, or industrial use or facility which requires direct access to, or location in, marine or tidal waters and which cannot be located inland. Some examples of water-dependent uses are marinas, boatyards, marine transportation facilities, and general public access.

Water Depth: The distance between the water surface and the underlying riverbed or seabed.

Waterway: A river, canal or other route for travel by water.

12. References

78 FR 78486 – Notice of Funding Availability for Resilience Projects in Response to Hurricane Sandy. http://www.gpo.gov/fdsys/granule/FR-2013-12-26/2013-30867.

81 FR 9 – Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern long-Eared Bat, Final Rule, January 14, 2016.

Adaptation Subcommittee to the Governor's Steering Committee on Climate Change, *The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health*, April 2010.

Anthony Mobilia, Norwalk Harbor Management Commission, Personal Communication, S. Walker, HNTB. January 9, 2016.

Apex Companies, LLC and FXM Associates. *Economic Impact Study of Maritime Industries in Connecticut*. Prepared for Connecticut Maritime Coalition, Inc. and Connecticut Department of Economic & Community Development. February 2010.

Baggerman, Anne. *National Register of Historic Places Inventory Form: Norwalk River Railroad Bridge* Washington, D.C: National Park Service, 1977.

Bailey, James Montgomery. *History of Danbury Connecticut 1684-1896*. New York, NY: Burr Printing House, 1896.

Baker, George P. *The Formation of the New England Railroad Systems*. Cambridge, MA: Harvard University Press, 1937.

Bates, R. L. and J.A. Jackson eds. *Dictionary of Geological Terms*. 1984.

Bevier, Louis. *State Geological and Natural History Survey of Connecticut Department of Environmental Protection.* Bulletin No. 113. 461pp. 1994.

BL Companies, Inc. *Preliminary Site Evaluations*, September and October 2015; prepared for CTDOT, BL Companies Project Number 14EC0022; CTDOT Project No. 301-76; Assignment No. 314-5074.

BL Companies, Inc. *Subsurface Site Investigations*, February 2016; prepared for CTDOT, BL Companies Project Number 14EC0028; CTDOT Project No. 301-76; Assignment No. 314-5178.

Bloom, Ralph. *Connecticut Historical Commission, Citywide (378 properties), reconnaissance-level, Norwalk Redevelopment Agency*, Connecticut Historic Preservation Collection, Archives and Special Collections at the Thomas J. Dodd Research Center, University of Connecticut Libraries, 1976.

Byron, Carl R. *Trackside along the New Haven, 1950-1956, with Arthur E. Mitchell*. Scotch Plains, NJ: Morningside Books, 2002.

Cassidy, Martin B. "Movable New Have Line drawbridges a concern." http://www.ctpost.com/local/article/Movable-New-Haven-Line-drawbridges-a-concern-1344286.php.

Chace, J. Jr., W.J. Barker and N. Hector. *Clark's Map of Fairfield County, Connecticut*. Philadelphia, PA: Richard Clark, 1856.

City of Norwalk, Aquifer Protection Agency, accessed August 19, 2015. http://www.norwalkct.org/index.aspx?NID=256.

City of Norwalk website, accessed August 4, 2015. www.norwalkct.org.

City of Norwalk Building Zone Regulations, Article 41 - Conservation Developments.

City of Norwalk Building Zone Regulations, Article 50 - Use Regulations Controlling Business Zones.

City of Norwalk Building Zone Regulations, Article 70 – Use Regulations Controlling Industrial Zones.

City of Norwalk Building Zone Regulations, Article 120 – Offstreet Parking and Loading Regulations.

City of Norwalk Building Zone Regulations, Article 70 - Use Regulations Controlling Industrial Zones.

City of Norwalk, CT, "City of Norwalk Plan of Conservation & Development," June 10, 2008.

City of Norwalk, CT, "South Norwalk TOD Pilot Program", April 24, 2014.

City of Norwalk, Oyster Shell Park Master Plan, prepared for the City of Norwalk by BSC Group, May 17, 2006, accessed November 9, 2015. http://ct-norwalk.civicplus.com/DocumentCenter/Home/View/1659 .

Clouette, Bruce. *Where Water Meets Land: Historic Movable Bridges of Connecticut*. Newington, CT: Connecticut Department of Transportation, 2004.

Clouette, Bruce. *Preliminary Report: Historic Resources Replacement of Bridge No. 04288R Norwalk River Railroad Bridge (Walk Bridge), Norwalk Connecticut*. Storrs, CT: Archaeological and Historical Services (AHS), Inc., 2015.

Clouette, Bruce. *New Haven-Hartford Springfield Rail Project Technical Report on Cultural Resources (Phase 1A Cultural Resources Survey) Connecticut State Project No. 170-2296*. Storrs, CT: AHS, Inc., 2012.

Clouette, Bruce. *Written and Photographic Documentation of the Atlantic Street Railroad Bridge, Stamford, Connecticut*. Storrs, CT: AHS, Inc., 2013.

Clouette, Bruce, Matthew Roth and John Herzan. *Movable Railroad Bridges on the Northeast Corridor in Connecticut TR.* Washington, D.C. National Park Service, 1986.

Clouette, Bruce and Sarah Sportman. *Memorandum Report: Historic and Archaeological Resources, 11 Goldstein Place, Replacement/Rehabilitation of Bridge No. 04288R, Norwalk River Railroad Bridge (Walk Bridge), Norwalk, Connecticut*. Storrs, CT: AHS, Inc., 2015.

Clouette, Bruce, Marguerite Carnell Rodney, and Stacey Vairo. *Historic Resources Evaluation Report, Walk Bridge Replacement Project*, Norwalk, Connecticut, State Project 0301-0176. Storrs, CT: AHS, Inc. August 2016.

Connecticut DEEP GIS Data, Open Space, DEEP Property and Parcels, accessed July 27, 2015. http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707.

Connecticut Department of Agriculture. *Shellfish Area Classification and Maps*, accessed August 9, 2015. http://www.ct.gov/doag/cwp/view.asp?a=3768&q=478054.

Connecticut Department of Construction Services, Environmental Planning. *Connecticut Environmental Policy Act Manual*, January 2012.

Connecticut Department of Energy and Environmental Control. *Flood Management Certification An Environmental Permitting Fact Sheet*. Accessed February 2016 from: http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324172&deepNav_GID=1643.

Connecticut Department of Energy and Environmental Protection. *401 Water Quality Certification, An Environmental Permitting Fact Sheet*. Accessed February 2016 from: http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324168&depNav_GID=1643.

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

Connecticut Department of Energy and Environmental Protection, Coastal Area Management Program, Coastal Resources, 1979, U.S. Geological Survey, Norfolk South Quadrangle.

Connecticut Department of Energy and Environmental Protection, Connecticut Coastal Access Guide, http://www.lisrc.uconn.edu/coastalaccess/publictrust.asp. Accessed 2/18/2016.

Connecticut Department of Energy and Environmental Protection, *Connecticut Climate Change Preparedness Plan: Adaptation Strategies for Agriculture, Infrastructure, Natural Resources and Public Health Climate Change Vulnerabilities*, 2013.

Connecticut Department of Energy and Environmental Protection. *Connecticut's Comprehensive Wildlife Conservation Strategy*. October 2005.

Connecticut Department of Energy and Environmental Protection. *Connecticut's Endangered, Threatened and Special Concern Species*. 2010. Accessed from: http://www.ct.gov/dep/cwp/view.asp?a=2702&q=323488&depNav_GID=1628.

Connecticut Department of Energy and Environmental Protection. *Connecticut's Wildlife Action Plan*, Accessed August 9, 2015 From: http://www.ct.gov/deep/cwp/view.asp?a=2723&q=329520&depNav_GID=1719.

Connecticut Department of Energy and Environmental Protection, Correspondence, from Dawn McKay Environmental Analyst 3, to Christopher Samorajczyk Connecticut Department of Transportation, November 17, 2014.

Connecticut Department of Energy and Environmental Protection, *Factsheet: City of Norwalk Water Quality and Stormwater Summary*.Connecticut Department of Energy and Environmental Protection, *Office of Long Island Sound Programs Coastal Jurisdiction Line Elevations*. Accessed September 2, 2015 from: http://www.ct.gov/deep/cwp/view.asp?a=2705&Q=511544&deepNAV_GID=1622.

Connecticut Department of Energy and Environmental Protection, The Public Trust; http://www.ct.gov/deep/cwp/view.asp?A=2705&Q=323792.

Connecticut Department of Environmental Protection, *Connecticut Coastal Management Manual*. 2000.

Connecticut Department of Environmental Protection, *Connecticut Water Quality Standards*. Bureau of Water Management. 2002.

Connecticut Department of Environmental Protection, *List of Connecticut Waterbodies Not Meeting Water Quality Standards*. Bureau of Water Management. 2004.

Connecticut Department of Environmental Protection, "Northern long-eared bat Areas of Concern in Connecticut to Assist with Federal Endangered Species Act Compliance," February 1, 2016.

Connecticut Department of Environmental Protection, State of Connecticut, State Solid Waste Management Plan, amended December 2006. Approved December 20, 2006.

Connecticut Department of Transportation, 2015 Statewide Transportation Improvement Program (as of 6/22/2016).

Connecticut Department of Transportation, Accelerated Bridge Construction Study, March 2014 (draft).

Connecticut Department of Transportation, Bridge Safety and Evaluation. River Use Survey, Walk Bridge No. 41.47 (Previously No. 04288R). Survey Date: October 1999. Prepared by CME Associates, Inc., Woodstock, CT.

Connecticut Department of Transportation, *Connecticut State Rail Plan, 2012-2016*, August 2012, Draft.

Connecticut Department of Transportation, *Emergency Declaration Railroad Swing Bridge No. 04288R, Norwalk, Connecticut*, July 8, 2014.

Connecticut Department of Transportation, "Let's Go, CT!, The State of Connecticut's Bold Vision for a Transportation Future," February 2015.

Connecticut Department of Transportation. *LetsGoCT! Fact Sheet*. March 2015.

Connecticut Department of Transportation, Metro-North Railroad Bridge over Norwalk River, Norwalk, CT. State Project 301-0040. Vessel Impact Study. February 16, 2009. Prepared by HNTB.

Connecticut Department of Transportation. *Optimizing the State of Connecticut Transportation Capital Infrastructure Program.* Transportation Infrastructure Capital Plan Report, 2015-2019. December 2014.

Connecticut Department of Transportation, Office of Rail Project, "*Relocation Feasibility Study High Towers Walk and Saga Movable Railroad Bridges, Final Submittal*", February 12, 2010.

Connecticut Department of Transportation Office of Strategic Planning & Projects, Bureau of Policy & Planning, *Transportation in Connecticut: The Existing System*, 2014.

Connecticut Department of Transportation, "Rail Bridge Conditions and Needs on the New Haven Line; *Let's Go CT*!" March 2015.

Connecticut Department of Transportation Short Team Action Team, *Emergency Repair and Reliability Report*, CTDOT Br. No. 04288R, July 17, 2014 (Final).

Connecticut Department of Transportation, "Upcoming CTDOT Projects: Norwalk & Westport," http://www.ct.gov/dot/lib/dot/documents/dpublicmeetingsminutes/westport-norwalk_projects_handout.pdf. Accessed 2/12/2016.

Connecticut Environmental Conditions Online. http://www.CTECO.uconn.edu.

Connecticut Environmental Conditions Online, *Connecticut Critical Habitats*. March 2011.

Connecticut Environmental Conditions Online, *Parent Materials Map*. Accessed August 24, 2015 from: http://www.cteco.uconn.edu/map_catalog.asp?town=103.

Connecticut Environmental Conditions Online, *Quaternary Geology Map*. Accessed August 24, 2015 from: http://www.cteco.uconn.edu/map_catalog.asp?town=103.

Connecticut Environmental Conditions Online, *Surficial Materials Map*. Accessed August 24, 2015 from: http://www.cteco.uconn.edu/map_catalog.asp?town=103.

Connecticut Office of Policy and Management. *Conservation & Development Policies: The Plan for Connecticut*, 2013-2018. Adopted by the Connecticut General Assembly, June 5, 2013.

Connecticut Railroad Commissioners *Annual Report*, 1853.

Connecticut State Legislature, Public Act No. 14-43, *An Act Concerning the Heritage Parks Advisory Boards*, 2014.

DeGraff, Richard M.; Rudis, Deborah D. *New England Wildlife: Habitat, Natural History, and Distribution*, 1986.

Disaster Declarations for Connecticut. https://www.fema.gov/disasters/grid/state-tribal-government/31. Accessed 12/03/2015.

Drummond, Wayne (ed.), *New York, New Haven and Hartford Railroad Mechanical Department Facilities Maps*. West Haven, CT: New Haven Railroad Historical and Technical Association, 1989.

eBird, *Veteran's Park*. Accessed August 26, 2015 From: http://ebird.org/ebird/hotspot/L284164.

Environmental Data Resources (EDR) Inc. Walk Bridge Replacement, Norwalk, CT Inquiry Number 4141952.2S, November 26, 2014.

Fairchild Aerial Survey, Aerial photographs of Connecticut. Connecticut State Library, Hartford, 1934.

Federal Emergency Management Agency. *Conditional Letter of Map Revision*. Accessed February 2016 from: https://www.fema.gov/conditional-letter-map-revision.

Federal Highway Administration, Federal Railroad Administration, United States Fish and Wildlife Service. *User's Guide for the Range-wide Programmatic Informal Consultation for Indiana and Northern Long-eared Bat*, *Version 1*, May 26, 2015.

Federal Railroad Administration, *Programmatic Agreement Among the Federal Rail Administration, Federal Transit Administration, the Connecticut State Historic Preservation Office, the Massachusetts State Historic Preservation Office, and the Connecticut Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act As It Pertains to the New Haven-Hartford-Springfield High-Speed Intercity Passenger Rail Project*. Executed in August 2012. http://www.nhhsrail.com/pdfs/ea/nhhs.

Fitzgerald & Halliday, "Norwalk Pedestrian & Bikeway Transportation Plan, Recommended Improvement Plan", January 2012.

Fitzgerald & Halliday, "Norwalk Swing Bridge Pathway Evaluation," 2016.

Friedland, K. *Status of Fisheries Resources of Northeastern United States*. 2001. Accessed from: www.nefsc.noaa.gov/sos/spsyn/af/sturgeon/sturg.pdf.

Federal Transit Adminstration, Buckled Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation, FTA Report No. 0001, August 2011.

Federal Transit Administration, Office of Budget and Policy, Transit and Climate Change Adaptation: Synthesis of FTA-Funded Pilot Projects, FTA Report No. 0069, August 2014. www.fta.dot.gov/documents/FTA_Report_No._0069.pdf.

Gosner, Kenneth L. *A Field Guide to the Atlantic Seashore*, *Invertebrates and Seaweeds of the Atlantic Coast from Bay of Fundy to Cape Hatteras*. 1978.

Grant, Lisa Wilson. *Norwalk*. Mount Pleasant, SC: Arcadia Publishing, 2014.

Hall, Edwin. *The Ancient Historical Records of Norwalk, Conn.* Norwalk: James Mallory and Company, 1847.

Hammerson, G. A. Connecticut Wildlife. *Biodiversity, Natural History, and Conservation*. 2004.

Harlow, Alvin F. *Steelways of New England*. New York, NY: Creative Age Press, 1946.

Haniseck, Greg. *Connecticut Birds by the Season*. The Connecticut Warbler. A Journal of Connecticut Ornithology. 25 (1) 1-44. January 2005.

Harris, Richard, Peter Fraboni, Nicole Cantatore, and Josh Cooper. *Harbor Watch, a Program of Earthplace. Report on Norwalk Harbor Juvenile Benthic Marine Fish.* May through October 2014.

Harris, Richard, Peter Fraboni, Nicole Cantatore, and Josh Cooper. *Water Quality Data Report For Norwalk Watershed*. 2014.

Harris, Richard, Peter Fraboni, Nicole Cantatore, and Josh Cooper. *Water Quality Report for the Silvermine River and Lower Norwalk River Storm Drain*s. 2014.

Hartford and New Haven Railroad Company, Annual Report to Stockholders, 1833.

Hartley, Scott. *New Haven Railroad: The Final Decades*. Piscataway, NJ: Railpace Company, 1992.

HNTB/FHI, *Replacement of the Walk Bridge Over the Norwalk River Norwalk, Connecticut. Wetland Field Investigation and Delineation*. 2015.

Hughes, R.N. *"Rocky Shore Communities: Catalysts to Understanding Predation." In: The Ecology of Rocky Coasts.* P.G. Moore and R. Seed, eds. Columbia University Press, New York. 467 pp. 1986.

Hurricane Sandy Rebuilding Task Force. Hurricane Sandy Rebuilding Strategy; Stronger Communities, A Resilient Region, August 2013. http://portal.hud.gov/hudportal/documents/huddoc?id=HSRebuildingStrategy.pdf.

Intergovernmental Panel on Climate Change, 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.

Jacobs, Robert P. and Eileen B. O'Donnell. *A Pictorial Guide to Freshwater Fishes of Connecticut*. Connecticut Department of Environmental Protection. Bulletin No. 42. 2009.

Jepsen, George, State of Connecticut Office of the Attorney General, Correspondence to The Honorable James Redeker, Commissioner, Connecticut Department of Transportation, October 23, 2014.

Kaplan, Eugene H., J.R. Welker, M.G. Kraus, and S. McCourt. *Some Factors affecting the Colonization of a Dredged Channel*. Marine Biology 32: 193-204. 1975.

Karr, Ronald D. *The Rail Lines of Southern New England, a Handbook of Railroad History*. Pepperell, MA: Branch Line Press, 1995.

Klemens, Michael W. *Amphibians and Reptiles of Connecticut and Adjacent Regions*. State Geological and Natural History Survey of Connecticut, Bulletin 112, 1993.

Krusic, R.A., Yamasaki, M., Neefus, C.D. and Pekins, P.J. *Bat habitat use in White Mountain National Forest*. The Journal of Wildlife Management, pp.625-631. 1996.

Library of Congress. Historic American Engineering Survey No. CT-11, Northeast Railroad Corridor, Amtrak Route between New York/Connecticut and Connecticut/Rhode Island State Lines, New Haven, New Haven County, CT., 1977. Accessed 7/18/2015. http://www.loc.gov/pictures/item/ct0338.

Library of Congress. Historic American Engineering Survey No. CT-8, New York, New Haven and Hartford Railroad, Automatic Signalization System, Long Island Sound shoreline between Stamford and New Haven, Stamford, Fairfield County, CT. 1982 Accessed 7/18/2015. http://www.loc.gov/pictures/item/ct0380.

Library of Congress. Historic American Engineering Survey No. CT-168, South Norwalk Railroad Bridge, South Main & Washington Streets, Norwalk, Fairfield County, CT. 1998 Accessed 7/23/15. http://www.loc.gov/pictures/collection/hh/item/ct0641/.

Long Island Sound Habitat Restoration Initiative, *Technical Support for Coastal Habitat Restoration; Submerged Aquatic Vegetation*.

Lynch, Peter E. Some New Haven Signals. *Shoreliner* 31, no. 1: 15-23., 2008.

MAGIC. http://magic.lib.uconn.edu/. Accessed July 27, 2015.

Metro-North Commuter Railroad Company, Connecticut Department of Transportation. Rehabilitation of the Norwalk Swing Bridge Engineering Significance Study prepared by Historical Perspectives, May 1999.

Metro-North Railroad, 2014 Customer Satisfaction Survey. http://web.mta.info/mta/news/books/docs/2014-MNR-CSS-Board-Presentation.pdf.

Metropolitan Transportation Authority, "2014 Ridership Report, Metro North Railroad Executive Summary," excerpt from Joint Metro-North and Long Island Committees, April 2015.

Metropolitan Transportation Authority, *Mission Statement, Measurements, and Performance Indicators Report Covering Fiscal Year 2014*, Submitted as part of the MTA 2014 Annual Report to the Governor.

Musick, J. A. *Sturgeons. Family Acipenseridae. In: Collette, B. and Grace Klein MacPhee. Eds. Bigelow and Schroder's Fishes of the Gulf of Maine*. 2002.

National Oceanic and Atmospheric Administration, *50 CFR 226*.

National Oceanic and Atmospheric Administration, *50 CFR 600 Subpart J*.

National Oceanic and Atmospheric Administration, *National Coastal Zone Management Act*, 1972.

National Oceanic and Atmospheric Administration. *EFH Text Descriptions and GIS Data Inventory*. Accessed: August 10, 2015.

National Oceanic and Atmospheric Administration, *Essential Fish Habitat Mapper v3.0*. Accessed August 24, 2015 From: http://www.habitat.noaa.gov/protection/efh/habitatmapper.html.

National Oceanic and Atmospheric Administration, *NOAA Tidal Predictions South Norwalk, Connecticut*. 2014.

National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Correspondence, December 19, 2014.

National Oceanic and Atmospheric Administration, National Marine Fisheries Service. *Status Review of Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus)*. 2007. Accessed from: http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/atlanticsturgeon2007.pdf.

National Oceanic Atmospheric Administration Nautical Chart 12364 – Long Island Sound- New Haven Harbor Entrance and Port Jefferson to Throgs Neck, Edition 40, July 2015, http://www.charts.noaa.gov/.

National Oceanic and Atmospheric Administration, Office of Protected Resources. *Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus)*. December 15, 2014. Accessed from: http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm.

National Oceanic and Atmospheric Administration, Office of Protected Resources. *Shortnose Sturgeon (Acipenser brevirostrum)*. September 30, 2014. Accessed from: http://www.nmfs.noaa.gov/pr/species/fish/shortnosesturgeon.htm.

National Park Service. National Register Bulletin "How to Apply the National Register Criteria for Evaluation." 1997. Accessed 7/27/2015. PDF at http://www.nps.gov/nr/publications/bulletins/pdfs/nrb15.pdf.

National Weather Service, National Hurricane Center. Saffir/Simpson Hurricane Wind Scale, http://www.nhc.noaa.gov/aboutsshws.php.

New England Fisheries Management Council. *New England Fishery Management Plan. Environmental Impact Statement. Regulatory Impact Review and Initial Regulatory Flexibility Analysis for the Northeast Multi-species Fishery*. 1986. Accessed from: http://s3.amazonaws.com/nefmc.org/MultiSpecies-FMP.pdf.

New Haven Colony Historical Society. "Bridge List, 1918." Manuscript charts, RG 18, New Haven, CT, 1918.

New York, New Haven & Hartford Railroad Electrification Collection. Collection Number: MSS 2002-0016 Series II, Connecticut Historic Preservation Collection, Archives and Special Collections at the Thomas J. Dodd Research Center, University of Connecticut Libraries.

New York, New Haven & Hartford Railroad Construction Photograph Collection. Collection Number: MSS 2002-0023, Connecticut Historic Preservation Collection, Archives and Special Collections at the Thomas J. Dodd Research Center, University of Connecticut Libraries, ca. 1890.

New York and New England Railroad. Annual report to Stockholders, 1880.

New York, New Haven and Hartford Railroad Company. Annual Report to Stockholders, 1872.

New York New Haven and Hartford Railroad , 1915 "Right of Way and Track Map from Woodland to New Haven," Valuation maps, Section V55, Sheet 22, June 30, 1915, New York New Haven and Hartford Railroad Collection, Dodd Research Center, University of Connecticut, Storrs.

Northeast Corridor Commission. *Northeast Corridor Five-year Capital Plan, Fiscal Years 206-2010*. April 2015.Northeast Corridor Infrastructure and Operations Advisory Commission, *Critical Infrastructure Needs on the Northeast Corridor*, January 2013.

The Northeast Corridor Infrastructure and Operations Advisory Commission, The Northeast Corridor and the American Economy, April 2014.

Norwalk, Town of. Assessor Records, Norwalk, Connecticut.

Norwalk Harbor Management Commission, *Norwalk Management Plan, 2009 Plan Amendments*, adopted August 11, 2009.

Norwalk Parking Authority website, www.norwalkpark.org, Accessed August 5, 2015.

Norwalk River Valley Trail, "Trail Maps-Norwalk: Norwalk Sections South of Deering Pond-Existing and Planned," http://www.nrvt-trail.com/trail-maps-norwalk.aspx. Accessed July 27, 2015.

Norwalk River Valley Trail website. http://www.nrvt-trail.com/. Accessed July 27, 2015.

Norwalk River Valley Trail website. http://www.nrvt-trail.com/. Accessed September 2, 2015.

Norwalk River Valley Trail, Fall 2015 Newsletter and Trail Map. http://myemail.constantcontact.com/Norwalk-River-Valley-Trail-Fall-Newsletter.html?soid=1104713004882&aid=nR_rzR1W5VM.

Norwalk River Watershed Initiative Committee, *Norwalk River Watershed Action Plan*. 2011.

Norwalk Seaport Association, Inc. website, www.seaport.org, Accessed August 4, 2015.

Norwalk Transit Authority website, www.norwalktransit.com, Accessed August 4, 2015.

Pau Stanton, Fitzgerald & Halliday, Inc., "Replacement of the Walk Bridge, Norwalk, Connecticut (State project 0301-0040), Summary of Research and Data Collection Efforts," Memorandum to Christian Brown and Kevin Slattery, HNTB, December 10, 2014.

Personal Communication, Daniel Forrest, CTSHPO, July 31, 2015.

Pinto, John Thomas, Ph.D. "Importance of Norwalk Harbor, a Mid-Sized Harbor, for Economic Growth and Development." Presentation to the State of Connecticut Port Authority Working Group. January 6, 2015.

Ray, Debra Wing, and Gloria Stewart. *Norwalk Being an Historical Account of that Connecticut Town*. Norwalk Historical Society, 1979.

Regional Plan Association, *Getting Back on Track; Unlocking the Full Potential of the New Haven Line*, January 2014, Revised February 2014.

"*Replacement of Norwalk Bridge on the Northeast Corridor*," prepared for the 2014 Hurricane Sandy Competitive Resilience Program.

Rhoads, D.C. and J.D. Germano. *Interpreting Long-Term Changes in Benthic Community Structure: A New Protocol*. Hydrobiologia 142: 291-308. 1986.

Roth, Matthew W. *Connecticut, an Inventory of Historic Engineering and Industrial Sites*. Washington, DC: Society for Industrial Archeology, 1981.

Rodgers, John. *Bedrock Geologic Map of Connecticut*. 1985.

Sanborn Map and Publishing Company. 1884-1930 Insurance maps of Norwalk. Connecticut State Library, Hartford, https://cslib.idm.oclc.org/login?url=http://sanborn.umi.com. Accessed 7/27/2015.

Schenck, Elizabeth Hubbel Godfrey. *The Historic of Fairfield, Fairfield County from the Settlement of the Town in 1639 to 1818*. Published by the author, 1889.

Selleck, Reverend Charles M. *Norwalk, Connecticut: Volume 1 and Supplement*. Published by the author, 1896.

South Western Region Metropolitan Planning Organization (SWRMPO). South Western Region 2015-2018 Transportation Improvement Program, Updated 3/17/16.

SWRMPO, South Western Region 2015-2018 Transportation Improvement Program (TIP), November 30, 2015, SWRPA ID 12-005, Project Number 0301-0040.

South Western Regional Planning Agency, *Transportation Planning Programs Including the Transportation Improvement Program 2012-2015 and the Long Range Transportation Plan 2011-2040*, August 2013.

Sportman, Sarah P., Ph.D. Report: *Archaeological Sensitivity Assessment, Walk Bridge Replacement Project*, Norwalk, Connecticut, State Project 0301-0176. Storrs, CT: AHS, Inc. August 2016.

State of Connecticut. *Coastal Management Act Sections 22a-20 through 22a-113.*

State of Connecticut. *Coastal Management Act Section 22a-92(c)(2)(A).*

State of Connecticut. *Coastal Management Act Section 22a-93(15)(G).*

State of Connecticut. *Connecticut Water Quality Standards Regulations Sections 22a-426-1 to 22a-426-9*.

State of Connecticut Department of Environmental Protection. *Connecticut Coastal Management Manual*, September 2000.

State of Connecticut Department of Transportation. *Stormwater Management Plan*, February 2014.

State of Connecticut. *Inland Wetlands and Watercourses Act, Connecticut General Statutes (CGS) Chapter 440, Section 22a-36 through Section 22a-45*.

State of Connecticut. *Structures, Dredging and Fill Act (CGS Ch. 446i Sec. 22a-359 - 22a-363f).*

State of Connecticut. *The Tidal Wetlands Act, Connecticut General Statutes (CGS) Chapter 440, Sections 22a-28 through 22a-35*.

Stewart, Robert. *Engineering Significance Statement: Walk Bridge (No. 41.47) (Bridge No. 4288R.* Westport, Connecticut: Historical Perspectives, Inc., 1999.

Stewart, Robert. *The New Haven Railroad Catenary System*. East Granby, CT: Historical Technologies Connecticut Historic Preservation Collection, Archives and Special Collections at the Thomas J. Dodd Research Center, University of Connecticut Libraries, 2000.

Taylor, W. R. *Marine Algae of the Northeastern Coast of North America*, 1978.

Tram Vo, Phuong, Huu Hao Ngo, Wenshan Guo, John L. Zhou, Andrzej Listowski, Bin Du, Qin Wei, Xuan Thanh Bui, *Stormwater quality management in rail transportation - Past, Present and Future*. January 2015.

Transit Noise and Vibration Impact Assessment, Prepared by Harris Miller Miller & Hanson, Inc., Federal Transit Administration, FTA-VA-90-1003-06, May 2006.

United States Department of Interior, National Park Service. National Register of Historic Places Inventory – Nomination Form. "Movable Railroad Bridges on the Northeast Corridor in Connecticut Thematic Resource." Received April 28, 1987. Date Entered June 12, 1987.

United States Environmental Protection Agency. *Administration of the NPDES Stormwater Permit Program in New England*. Accessed February 2016 from: http://www3.epa.gov/region1/npdes/stormwater/administration.html.

"Urban Renewal Plan for the Reed Putnam Area, Norwalk, Connecticut," Approved by the Norwalk Redevelopment Agency December 17, 1997.

US Army Corps of Engineers. *Corps of Engineers Wetland Delineation Manual*. January 1987.

US Army Corps of Engineers. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, January 2012.

US Army Corps of Engineers Navigation Data Center. http://www.navigationdatacenter.us/.

U.S. Department of Agriculture, Agriculture Stabilization and Marketing Service. Aerial photographs of Connecticut. Connecticut State Library, Hartford, 1951.

U.S. Department of Agriculture. *Web Soil Survey*. Accessed August 24, 2015 from: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

U.S. Department of Commerce. *Magnuson-Stevens Fishery Conservation and Management Act*, May 2007.

U.S. Department of Homeland Security . Critical Infrastructure Sectors. http://www.dhs.gov/critical-infrastructure-sectors.

U.S. Department of Homeland Security, United States Coast Guard. Local Notice to Mariners, District:1; Week: 06/15. 11 February 2015.

U.S. Environmental Protection Agency. *Administration of the NPDES Stormwater Permit Program in New England*. Accessed February 2016 from: http://www3.epa.gov/region1/npdes/stormwater/administration.html.

U.S. Environmental Protection Agency. *Clean Water Act, Section 303; Water Quality Standards and Implementation Plans*.U.S. Environmental Protection Agency. My Waters Mapper, Accessed 8-12-15 From: http://watersgeo.epa.gov/mwm/.

U.S. Environmental Protection Agency. "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas," 2010.

U.S. Environmental Protection Agency. *Water Quality Standards Regulation (40 CFR 131)*.

U.S. Fish and Wildlife Service, *2012 Eelgrass Survey for Eastern Long Island Sound, Connecticut and New York*. 2013.

U.S. Fish and Wildlife Service, Listing and Critical Habitat, Accessed August 9, 2015 From: http://www.fws.gov/endangered/what-we-do/critical-habitats.html.

U.S. Fish and Wildlife Service. *Endangered Species Act*, 1973.

U.S. Food and Drug Administration. *National Shellfish Sanitation Program, Guide for the Control of Molluscan Shellfish*, 2013 Revision.

USACE. *The North Atlantic Coast Comprehensive Study (NACCS): Resilient Adaptation to Increasing Risk.* Main Report. Appendix D. January 2015. http://www.nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_Appendix_D.pdf.

USACE. *The North Atlantic Coast Comprehensive Study (NACCS): Resilient Adaptation to Increasing Risk.* Main Report. Final Report. January 2015. http://www.nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_main_report.pdf.

Turner, Gregg M., and Melancthon W. Jacobus. *Connecticut Railroads, an Illustrated History*. Hartford, CT: Connecticut Historical Society, 1989.

WCCOG, Natural Hazard Mitigation Plan, Draft 2016-2021 Update for the South Western Region.

Western Connecticut Council of Governments. Going Forward: The Plan to Maintain & Improve Mobility. South Western Region Long Range Transportation Plan, 2015-2040. Draft. March 2015.

WPCA website: http://www.wpcanorwalk.org/. Accessed August 24, 2015.

Yates, M.D. and Muzika, R.M.. *Effect of forest structure and fragmentation on site occupancy of bat species in Missouri Ozark forests*. Journal of Wildlife Management, 70(5), pp.1238-1248. 2006.

Zeranski, Joseph D. and Thomas R. Baptist. *Connecticut Birds*. University Press of New England. Hanover, N.H. 328 pp. 1990.

Appendix 1 – Draft Memorandum of Agreement

Memorandum of Agreement (Draft 06/24/2016)

Appendix A	**Archaeological Treatment Plan**
Appendix B	**Institutions That May be Interested in Obtaining Salvaged Materials**

The following Technical Reports were prepared for the Walk Bridge Replacement Project and are available upon request from the Walk Bridge Program website at:
www.walkbridgect.com

Historic Resources Evaluation Report (August 2016)
Archaeological Sensitivity Assessment (August 2016)

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**MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
THE CONNECTICUT DEPARTMENT OF TRANSPORTATION,
AND
THE CONNECTICUT STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176**

WHEREAS, the Connecticut Department of Transportation (CTDOT), an agency of the State of Connecticut, proposes the replacement of the Walk Bridge, also known as the Norwalk River Railroad Bridge and State Bridge No. 04288R, across the Norwalk River in Norwalk, Connecticut (the Undertaking); and

WHEREAS, the U.S. Department of Transportation, Federal Transit Administration (FTA) is providing funding for the Undertaking, making it subject to the provisions of Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. § 306108) (NHPA) and its implementing regulations, 36 C.F.R. Part 800, et. seq.; and

WHEREAS, CTDOT has prepared technical reports for historic above-ground resources and archaeological resources potentially affected by the Undertaking (collectively, the Technical Reports), which Technical Reports have been reviewed and approved by FTA and the Connecticut State Historic Preservation Office (CTSHPO); and

WHEREAS, CTDOT has prepared an Archaeological Treatment Plan (Appendix A) to address areas of archaeological sensitivity identified in the archaeological technical report, as well as areas of sensitivity that could be identified as part of ongoing actions associated with the Undertaking, which plan has been reviewed and approved by FTA and CTSHPO and has been incorporated into this Memorandum of Agreement (MOA) as Appendix A; and

WHEREAS, the public has had an opportunity to comment on the Undertaking and the findings set forth in the Undertaking's associated Technical Reports; and

WHEREAS, the Norwalk Historical Commission, the Norwalk Historical Society, the Norwalk Preservation Trust, and the SONO Switch Tower Museum have participated in the consultation process pursuant to 36 C.F.R. Part 800, have been invited to concur in this MOA, and will continue to be consulted in the implementation of the MOA; and

WHEREAS, the Tribal Historic Preservation Officers (THPOs) of the Mashantucket Pequot Tribal Nation and the Mohegan Tribe of Indians of Connecticut have participated in the consultation process pursuant to 36 C.F.R. Part 800, have been invited to concur in this MOA;

WHEREAS, FTA, in consultation with CTSHPO, has (i) determined that the Undertaking will have unavoidable adverse effects to properties that are listed in or eligible for listing in the National Register of Historic Places (NRHP), including the Norwalk River Railroad Bridge (Walk Bridge), several contributing components of the New York to New Haven Rail Line (high towers, catenary structures, stone retaining walls, and Fort Point Street Railroad Bridge), the former Norwalk Lock Company buildings at 18 Marshall Street, the former Norwalk Iron Works buildings at 10 North Water Street, and the South Main and Washington Streets Historic District (collectively, the Historic Properties); and (ii) identified areas of possible sensitivity for significant archaeological remains; and

WHEREAS, FTA has notified the Advisory Council on Historic Preservation (the Council) of the adverse effects on the Historic Properties that were identified in the Technical Reports and has invited the Council to participate in this MOA, the Council having elected not to participate.

NOW, THEREFORE, FTA, CTDOT, and CTSHPO agree that the Undertaking shall be implemented with the following Stipulations to ensure that effects to the Historic Properties are taken into account:

STIPULATIONS:

1. CTDOT shall contact the Historic American Engineering Record (HAER) for advice as to the level of documentation that would be appropriate for recording the Walk Bridge. CTDOT shall retain a qualified consultant to prepare the documentation of the Walk Bridge as specified in HAER's response. CTDOT shall submit the documentation to FTA and CTSHPO for review and shall revise the documentation according to any comments. CTDOT shall submit the revised documentation to HAER and provide CTSHPO with two copies of the documentation upon completion.

2. CTDOT shall determine whether the documentation entitled "New Haven Railroad Catenary System," prepared by Historical Technologies in 2000 (the 2000 Documentation), adequately represents the catenary structures to be demolished as part of the Undertaking. If the catenary structures that were photographed and described in the 2000 Documentation are essentially identical to those proposed for demolition, CTDOT shall notify CTSHPO of this determination and no further documentation will be necessary. If the catenary structures to be demolished are not adequately represented in the 2000 Documentation, CTDOT will prepare additional written and photographic documentation of the catenary structures to the professional standards of CTSHPO. CTDOT shall submit the documentation to the FTA and CTSHPO for review and revise the documentation according to any comments. CTDOT shall submit the revised documentation to CTSHPO for permanent archiving and public accessibility.

3. CTDOT shall prepare written and photographic documentation of other historic structures on the New Haven Line, within the limits of the Undertaking, to the professional standards of CTSHPO. The documentation will address the high towers, stone retaining walls, interlocking tower (South Norwalk Switch Tower Museum), Fort Point Street Railroad Bridge, and any historic trackside features such as mileposts. The documentation will also provide context views that incorporate the former Norwalk Lock Company buildings, the former Norwalk Iron Works buildings, and the buildings of the South Main and Washington Streets Historic District. CTDOT shall submit the documentation to the FTA and CTSHPO for review and revise the documentation according to any comments. Upon completion, CTDOT shall submit the revised documentation to CTSHPO for permanent archiving and public accessibility.

4. CTDOT shall implement the Archaeological Treatment Plan set forth in Appendix A attached to this MOA and hereby incorporated herein in its entirety. If it is determined that archaeological properties that are eligible for listing in the NRHP are present, CTDOT shall consult with FTA and CSTHPO regarding measures to avoid affecting the properties or to mitigate adverse effects on the properties and shall implement the agreed-upon measures.

5. CTDOT shall prepare a public education plan for the Undertaking that will incorporate at least three (3) but no more than five (5) of the following activities: markers and other outdoor interpretive installations; school curriculum materials; walking tour guides, brochures, and other publications; web site(s); and local museum/library exhibits. The public education plan may include other activities of a similar nature to substitute for the activities identified herein. CTDOT will consult with local stakeholders in the development of the public education plan. CTDOT shall submit the public education

plan to FTA and CTSHPO for review, along with its recommendations as to how the public education plan will be implemented. Following consultation with and approval by FTA and CTSHPO, CTDOT shall implement the public education plan.

6. CTDOT shall attempt to solicit interest in obtaining salvaged material from the Undertaking, such as the catenary structures, to be used for public education purposes, from the institutions listed in Appendix B. Provided that it is feasible to do so, CTDOT shall use its best efforts to ensure that the salvaged material is removed in as intact a condition as possible. The recipient shall be required to accept the salvage material in its “AS-IS” condition and assume all liability, costs and expenses in connection with the salvaged material, including, without limitation, contamination, storage, and transportation. If CTDOT determines it is not feasible to salvage the material, CTDOT shall notify FTA and CTSHPO of the reason(s) that salvaging the material would not be feasible and CTDOT’s obligation to salvage the material shall cease.

7. Administrative Stipulations

<u>A. Dispute Resolution</u>

If at any time during the implementation of this MOA, CTDOT or CTSHPO objects to any action proposed or the manner in which the terms of this MOA are implemented and cannot resolve the issue between them, both parties shall immediately notify and consult with FTA in order to resolve the objection. If, within thirty (30) days of such written notice, FTA determines that such objection(s) cannot be resolved, FTA will forward all documentation relevant to the dispute to the Council. Within thirty (30) days after receipt of all pertinent documentation, the Council will provide FTA with recommendations, which FTA will take into account in reaching a final decision regarding the dispute.

If the Council does not provide comments regarding the dispute within thirty (30) days after receipt of adequate documentation, FTA may render a decision regarding the dispute. In reaching its decision, FTA will take into account all comments regarding the dispute from the parties to this MOA.

Any recommendations or comments provided by the Council will be understood to pertain only to the subject of the dispute; FTA’s responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remains unchanged.

FTA will notify all parties of its decision in writing before implementation of that portion of the Undertaking that was subject to dispute. FTA’s decision will be final.

<u>B. Amendments and Noncompliance</u>

If any signatory to this MOA determines that its terms will not or cannot be carried out or that an amendment to its terms must be made, that party shall immediately consult with the other signatories to develop an amendment to this MOA pursuant to 36 C.F.R. §§ 800.6(c)(7) and 800.6(c)(8). The amendment will be effective on the date a copy signed by all of the original signatories is filed with the Council. If the signatories cannot agree to appropriate terms to amend this MOA, any signatory may terminate this MOA in accordance with Stipulation 7.C.

<u>C. Termination</u>

If this MOA is not amended following the consultation set out in Stipulation 7.B, it may be terminated by any signatory. Within thirty (30) days following termination, FTA shall notify the signatories if it will initiate consultation to execute a new MOA with the signatories under 36 C.F.R. § 800.6(c)(1) or request the comments of the Council under 36 C.F.R. § 800.7(a) and proceed accordingly.

D. Duration

If the terms of this MOA have not been implemented within ten (10) years of its execution, this MOA shall be considered null and void. In such event, FTA shall so notify the parties to this MOA and, if FTA chooses to continue with the Undertaking, shall reinitiate review of the Undertaking in accordance with 36 C.F.R. Part 800, et. seq.

E. Timely Review

Materials provided by CTDOT to FTA and CTSHPO under Stipulations 1 through 4 shall be reviewed in a timely fashion by FTA and CTSHPO. FTA and CTSHPO will provide CTDOT with requests for revision and any other comments within thirty (30) days of receiving a draft document. CTDOT will revise the materials accordingly and re-submit to FTA and CTSHPO for approval. Disputes regarding revisions shall be resolved as in Stipulation 7.A. If no response is received within the thirty (30) day period, the document will be considered to be approved by the non-responding party.

F. Unanticipated Discoveries

If previously unidentified properties that are eligible for the NRHP are identified after the execution of this MOA, CTDOT and FTA shall notify CTSHPO immediately and begin consultation to develop an amendment to this MOA under the provisions of Stipulation 7.B. In the event that a previously unidentified historic property has traditional cultural or religious significance to a Tribe or Tribes, FTA shall undertake consultation with the appropriate THPO(s). Unless otherwise agreed upon by the signatories, work shall cease on portions of the Undertaking that affect the property or properties until such time as the amendment goes into effect.

G. Execution

Execution of this MOA by FTA, CTDOT, and CTSHPO and implementation of its terms are evidence that FTA has taken into account the effects of the Undertaking on the Historic Properties.

H. Counterparts

This MOA may be signed in counterpart copies, all of which, taken together, shall constitute but one and the same document.

SIGNATORY PAGE

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
THE CONNECTICUT DEPARTMENT OF TRANSPORTATION,
AND
THE CONNECTICUT STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Federal Transit Administration

By: ______________________________________ Date: _________________
Mary Beth Mello, Regional Administrator, Region 1

Concur:______________________________________ Date: ________________
Wendy A. Lee, Regional Counsel

SIGNATORY PAGE

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WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Connecticut Department Of Transportation

By: ______________________________________ Date: _________________
Thomas J. Maziarz, Bureau Chief, Bureau of Policy and Planning

SIGNATORY PAGE

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WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Connecticut State Historic Preservation Officer

By: _____________________________________ Date: _________________
Catherine Labadia, Deputy State Historic Preservation Officer

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
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THE CONNECTICUT STATE HISTORIC PRESERVATION OFFICER
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WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Tribal Historic Preservation Officer, Mashantucket Pequot Tribal Nation

By: ______________________________ Date: ________________
Marissa Turnbull, Tribal Historic Preservation Officer

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
THE CONNECTICUT DEPARTMENT OF TRANSPORTATION,
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REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Tribal Historic Preservation Officer, Mohegan Tribe of Indians of Connecticut

By: ______________________________ Date: ________________
James Quinn, Tribal Historic Preservation Officer

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
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REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Norwalk Historical Commission

By: ______________________________________ Date: ___________________
David Westmoreland, Vice Chairman

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
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THE CONNECTICUT DEPARTMENT OF TRANSPORTATION,
AND
THE CONNECTICUT STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Norwalk Historical Society

By: ______________________________________ Date: ___________________
Diane Jellerette, Executive Director

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
THE CONNECTICUT DEPARTMENT OF TRANSPORTATION,
AND
THE CONNECTICUT STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

Norwalk Preservation Trust

By: ______________________________________ Date: __________________
Tod Bryant, President

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
THE FEDERAL TRANSIT ADMINISTRATION,
THE CONNECTICUT DEPARTMENT OF TRANSPORTATION,
AND
THE CONNECTICUT STATE HISTORIC PRESERVATION OFFICER
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

SONO Switch Tower Museum

By: ______________________________________ Date: __________________

Buck Neulinger, President

MEMORANDUM OF AGREEMENT
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

APPENDIX A:
ARCHAEOLOGICAL TREATMENT PLAN

I. INTRODUCTION

The Connecticut Department of Transportation (CTDOT) proposes the replacement of the Norwalk River Railroad Bridge (State Bridge 04288R), also known as the Walk Bridge, across the Norwalk River in Norwalk, Connecticut (the Undertaking). The plans for the Undertaking involve numerous actions that may affect buried archaeological sites which may be eligible for listing in the National Register of Historic Places (NRHP). The actions include the acquisition of at least twenty (20) parcels for use as construction easements, access and staging areas, as well as shoreline, intertidal and underwater actions related to the erection of new bridge footings, submarine electric cables, and construction-related structures.

An archaeological sensitivity assessment (Phase IA) was undertaken of the terrestrial, intertidal and underwater areas that will be affected by the Undertaking. The assessment included review of historic maps, archaeological site files, local histories, census records, environmental data and bathymetric data, as well as a walkover survey. Twenty (20) terrestrial parcels were assessed as having the potential for containing intact buried archaeological remains. Most of the terrestrial parcels are sensitive for historic-period resources based on the land-use history and 19th century development on both sides of the Norwalk River. However, the survival of pre-colonial Native American site remains cannot be ruled out, because substantial portions of the project area were formerly marshlands, inclusive of a mapped "ancient Indian fort" within a current marina formed by filling in the marsh around the fort site. Intertidal and underwater portions of the Area of Potential Effect (APE), outside of the deep regularly-dredged channel, were also assessed as having archaeological sensitivity for pre-colonial Native American sites.

A combination of geoprobe investigation, machine-assisted and manual testing, and archaeological monitoring is recommended for terrestrial parcels to determine whether potentially significant archaeological resources have survived. A combination of vibracores and hand cores is recommended to determine whether potentially significant submerged archaeological resources have survived in intertidal and underwater portions of the APE.

Additional evaluation of areas of archaeological sensitivity will occur as outlined below.

II. EVALUATION OF AREAS OF ARCHAEOLOGICAL POTENTIAL

A. Further Analysis of Archaeological Sensitivity

Additional geotechnical information may become available that indicates that areas designated as archaeologically sensitive in the project-wide archaeological sensitivity report have little or no potential for containing intact archaeological resources. CTDOT shall notify the U.S. Department of

Transportation, Federal Transit Administration (FTA) and the Connecticut State Historic Preservation Office (CTSHPO) of these findings. No further archaeological investigations will be undertaken for these areas.

B. Standards for Archaeological Documentation

All archaeological survey, assessment, documentation and mitigation will be conducted according to the CTSHPO's *Environmental Review Primer for Connecticut's Archaeological Resources* and the United States Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation*.

C. Assessment of Additional Sensitive Areas

Additional areas of archaeological sensitivity may also be identified as part of ongoing actions associated with the Undertaking. Specific areas of the Undertaking impact identified after completion of the Undertaking-wide archaeological sensitivity assessment survey will be evaluated for their potential to contain NRHP-eligible subsurface terrestrial, intertidal and underwater resources. The assessment survey for additional areas will include documentary research, walkover survey, and evaluation of historical, environmental and bathymetric data. Sensitive areas will undergo testing as per Section II.D. below.

D. Field Testing to Determine Presence or Absence of Archaeological Resources

In areas determined to have terrestrial, intertidal and underwater sensitivity, CTDOT, in consultation with CTSHPO and FTA, shall undertake field testing to identify the presence or absence of archaeological resources (Phase Phase IB) as follows:

1. Phase IB testing will begin with geoprobe, vibracore and hand-testing in terrestrial and intertidal areas already identified as sensitive in the Phase IA survey. This testing will rule out certain areas as too disturbed to contain intact archaeological deposits and will help guide development of a focused, more intensive Phase IB testing plan that will conclusively determine the presence or absence of archaeological resources. These determinations will be included in the Phase IB testing plan identified in section D.2.

2. Prior to intensive Phase IB field testing, CTDOT will submit a plan outlining the proposed methodology for CTSHPO's concurrence. The plan will likely include machine-stripping followed by manual shovel testing, expanded shovel testing in non-paved areas, and underwater archaeological investigation.

3. Subsequent to field testing in sensitive areas, CTDOT shall provide a technical memorandum to FTA, CTSHPO, and local stakeholders in which one of the following conclusions is reached:

    a) The APE does not appear to contain potentially significant NRHP-eligible archaeological resources; or

    b) The APE does contain potentially significant NRHP-eligible archaeological resources.

E. Field Testing to Determine Significance and Extent of Archaeological Resources

If Phase IB testing determines that potentially significant archaeological resources exist in areas that will be impacted by the Undertaking, Phase II field investigations shall be undertaken immediately in order to identify the physical extent of such resources and to determine their significance.

Subsequent to Phase II field testing in sensitive areas, CTDOT shall provide a combined Phase I/II survey technical report to FTA and CTSHPO in which one of the following conclusions is reached:

1. The APE contains significant NRHP-eligible archaeological resources; or
2. The APE does not contain significant NRHP-eligible archaeological resources.

F. Mitigation Data Recovery and Curation

If Phase II field testing determines that significant archaeological resources exist in areas that will be impacted by the Undertaking and that such impacts cannot be avoided, CTDOT, in consultation with FTA and CTSHPO, shall develop and implement appropriate measures to minimize and/or mitigate adverse effects on archaeological resources in the APE. These measures will be implemented prior to any construction or demolition of the area of significant archaeological resources.

1. CTDOT and FTA, in consultation with CTSHPO, shall consider measures, such as design modification, for avoidance of significant archaeological resources.

2. Should mitigation of an unavoidable archaeological site be required, stipulations may be amended to the MOA to address the mitigation, if deemed necessary by CTDOT and FTA in consultation with CTSHPO.

3. In advance of any mitigation or data recovery efforts undertaken for significant archaeological sites in the APE, CTDOT, in consultation with CTSHPO and in coordination with local stakeholders, will develop, in accordance with 36 CFR Part 79, an Analysis and Curation of Material and Records Plan for any archaeological excavations. CTDOT shall be responsible for the implementation of such plan.

MEMORANDUM OF AGREEMENT
REGARDING THE
WALK BRIDGE REPLACEMENT PROJECT
NORWALK, CONNECTICUT
STATE PROJECT 301-176

APPENDIX B

INSTITUTIONS THAT MAY BE INTERESTED IN OBTAINING SALVAGED MATERIALS FROM THE WALK BRIDGE REPLACEMENT PROJECT

Vernon Depot Park
Vernon Parks and Recreation Department
14 Park Place
Vernon, CT 06066

The Shoreline Trolley Museum
17 River Street
East Haven, CT 06512

Connecticut Trolley Museum
P.O. Box 360
East Windsor, CT 06088

The Valley Railroad Company
One Railroad Avenue
P.O. Box 452
Essex, CT 06426

Railroad Museum of New England
P.O. Box400
Thomaston, CT 06787-0400

Connecticut Eastern Railway Museum
Eastern CT Chapter, National Railway Historical Society
P.O. Box 665
Willimantic, CT 06226-0665

Danbury Railway Museum
120 White Street
Danbury, CT 06810

SONO Switch Tower Museum
77 Washington Street
Norwalk, CT 06854

Norwalk Historical Society
Mill Hill Historic Park
2 East Wall Street, P. O. Box 1640
Norwalk, CT 06851

City of Norwalk
Norwalk City Hall
125 East Avenue
Norwalk, CT 06851-5125

Lockwood-Mathews Mansion Museum
295 West Avenue
Norwalk, CT 06851