3

Affected Environment and Environmental Consequences

This chapter describes the existing conditions that may be affected by the Project, and analyzes the environmental consequences of the Project, including a comparison of the probable consequences of the five reasonable alternatives and the No-Action Alternative.

Existing conditions are the current natural, cultural, and social conditions of an area that are subject to change, both directly and indirectly, because of a proposed Federal action. The resources and issues analyzed for the Project include:

- Wetlands and Surface Waters
- Water Quality and Pollutant Loading
- Floodplain and Hydrodynamics
- Wildlife and Fisheries
- Threatened and Endangered Species
- Farmlands
- Air Quality
- Noise
- Parks, Recreation and Conservation Lands
- Cultural Resources
- Contamination and Hazardous Materials
- Visual Resources
- Construction Impacts
- Social and Economic Resources
- Navigation
- Relationship of Local Short-term Uses vs. Long-term Productivity
- Irreversible and Irretrievable Commitment of Resources
- Cumulative Impacts

Evaluating and documenting existing conditions is a multi-step process that involves regulatory and data review to describe the existing conditions within the Study Area. Generally, the review of the existing conditions considers the Study Area as defined in **Chapter 1**, *Introduction*, and as depicted in **Figures 1.1-1** and **1.1-2**. However, the analyses of Air Quality, Cultural Resources, Visual and Aesthetic Resources, Environmental Justice, Socio-Economic Conditions, and Cumulative Impacts consider areas outside of the main project Study Area. Each resource-specific Study Area is clearly defined in the sections of this chapter.

Impacts, also known as "*effects,*" may be direct, indirect, temporary, and/or permanent.[20] Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action, are later in time or farther removed in distance, but are still reasonably foreseeable. Temporary impacts are short-term impacts that occur during the construction period. Conversely, permanent impacts are those which permanently change the existing environment.

Impacts may also be beneficial or adverse. Where applicable, each resource section considers the potential need for mitigation measures when adverse impacts are unavoidable. Potential permitting and compliance requirements are described in **Chapter 5**, *Project Commitments* and in **Chapter 6**, *Federal and State Actions Required*.

3.1 Wetlands and Surface Waters

Wetland and surface water resources within the Study Area include Little Bay and several small wetlands. Wetlands are a landform containing features such as surface water or saturation, characteristic wetland plants, and hydric soils which provide evidence for saturated conditions for an extended period of time. The major waterbody within the Study Area is Little Bay at the entrance to the Great Bay Estuary adjacent to the Piscataqua River. No freshwater streams or rivers exist within the Study Area.

Federal protection of wetlands is regulated under Section 404 of the Clean Water Act and Section 10 of the Federal Rivers and Harbors Act. The ACOE is charged with the duty of overseeing and regulating activities in wetlands at the federal level. Under Section 404, the US Environmental Protection Agency and the US Fish and Wildlife Service (USFWS) also review permit applications for wetland impacts.

The State of New Hampshire regulates activities in wetlands under NH Revised Statutes Annotated (RSA) 482-A, which grants regulatory authority to the NH Department of Environmental Services (NHDES) Wetlands Bureau. Under this statute, all proposals to dredge or fill wetlands must be permitted by the NHDES Wetlands Bureau. In accordance with NH RSA 482-A:3(IV)(b), modification of "*man-made non-tidal drainage ditches, roadside and railroad ditches, detention basins, ponds and wetlands that have been legally constructed to collect, convey, treat, or control stormwater and spring run-off*" does not require permitting under most circumstances. The NHDES Wetlands Permit application must also consider impacts below the

[20] Council on Environmental Quality. 1981. *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*. 46 Federal Register 18026. Accessed from https://www.energy.gov/sites/prod/files/G-CEQ-40Questions.pdf. Accessed on October 10, 2018.

highest observable tide line (HOTL) and within the tidal buffer zone (TBZ). The HOTL is defined in Env-Wt 602.23 as "*a line defining the farthest landward limit of tidal flow, not including storm events, that can be recognized by indicators such as the presence of a strand line of flotsam and debris, the landward margin of salt tolerant vegetation, or a physical barrier that blocks inland flow of the tide.*" The TBZ is defined in Env-Wt 602.52 as "*the area identified in RSA 482-A:4, I as bordering on tidal waters within 100 feet of the highest observable tide line, which can contain banks, upland areas, bogs, salt marsh, swamps, meadows, flats, or other lowlands subject to tidal action.*"

The NHDES Shoreland Program regulates construction, excavation, or filling activities within 250 feet of waterbodies protected under the Shoreland Water Quality Protection Act (RSA 483-B). Protected waterbodies include public waters defined under RSA 483-B:4(XVI) including all water subject to the ebb and flow of the tide, which is applicable to Little Bay. Any disturbance proposed within 250 feet from the reference line of protected waterbodies requires permitting through the NHDES Shoreland Program. Communities also have the ability to enact their own ordinances to regulate activities in and surrounding wetlands and surface waters. However, since the Project would be state-funded, local zoning ordinances do not apply.

3.1.1 Affected Environment

A brief description of the wetlands and surface waters documented within the Study Area is provided below. The locations of wetlands and surface waters for the greater Spaulding Turnpike Improvements Project were originally determined using the information contained on NWI and USGS maps. These resources were then delineated by environmental scientists in 2003, with portions of this delineation reviewed in April 2009. Additionally, all wetlands within the Study Area were field verified again on January 20, 2020. The location of existing wetlands and surface waters are identified on **Figure 3.1-1**, *Wetland and Surface Water Resources*. Note that new wetlands delineations as well as function and value assessments will be conducted during final design of the Project in accordance with the NHDES Wetlands Bureau rules in effect at the time of the permit application.

Wetlands

Within Newington, wetlands in the Study Area include a small wetland located immediately south of the pedestrian approach ramp to the GSB and just south of the water crossing which drain via a deeply cut channel to the Little Bay shoreline. This wetland is composed of a series of interconnected palustrine emergent ditches. Principal functions and values of this wetland include floodflow alteration by providing a water conveyance for surface water runoff to enter Little Bay. Additionally, there is a wetland located east of Shattuck Way and north of the Spaulding Turnpike that collects and conveys sheet flow from these roadways. While this wetland intersects the Study Area, it is outside of the location of the Action Alternatives. A non-jurisdictional detention basin has been constructed in Newington between the existing pedestrian approach ramp to the GSB and the Spaulding Turnpike as part of the larger Newington-Dover, Spaulding Turnpike Improvements Project.

A non-jurisdictional drainage area is located within Hilton Park in Dover, southwest of the Spaulding Turnpike. This is a short drainage swale that collects runoff from the pedestrian approach ramp to the GSB and drains to an existing culvert with a stone headwall. The culvert exists under dense invasive vegetation (multi-flora rose and oriental bittersweet).

Surface Waters

The major waterbodies within and adjacent to the Study Area include Little Bay, the Great Bay Estuary, and the Piscataqua River. The Great Bay Estuary is a large tidal embayment covering approximately 17 square miles and contains 144 miles of shoreline. The tidal exchange between the Great Bay and Piscataqua River involves enormous volumes of water and is known to have unusually strong tidal currents.

The Piscataqua River is a major tidally-influenced river system that forms part of the border between Maine and New Hampshire and drains approximately 1,400 square miles of watershed. The Piscataqua River is formed by the confluence of the Cocheco and Salmon Falls Rivers, approximately 12 miles north of the Study Area. Near the Study Area, the Piscataqua River is typically 2,000 to 3,500 feet wide and has a substrate composition of sand and mud.

The Little Bay represents the lower part of the Great Bay Estuary and includes the narrow section between Dover and Newington where it joins the Piscataqua River to the east. The Little Bay receives flow from the Bellamy River to the north, the Oyster River to the west, and Great Bay to the southwest. The watershed of Little Bay is approximately 112 square miles. The substrate of Little Bay is composed of sand and mud. The top-of-bank and ordinary high water of Little Bay within the vicinity of the GSB was delineated as part of the field verification and delineation work conducted in 2003. The functions and values of Little Bay in the Study Area include floodflow alteration, fish and shellfish habitat, sediment/toxicant/ pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization, wildlife habitat, recreation, educational/scientific value, uniqueness/heritage, visual quality/aesthetics, and threatened/endangered species habitat.

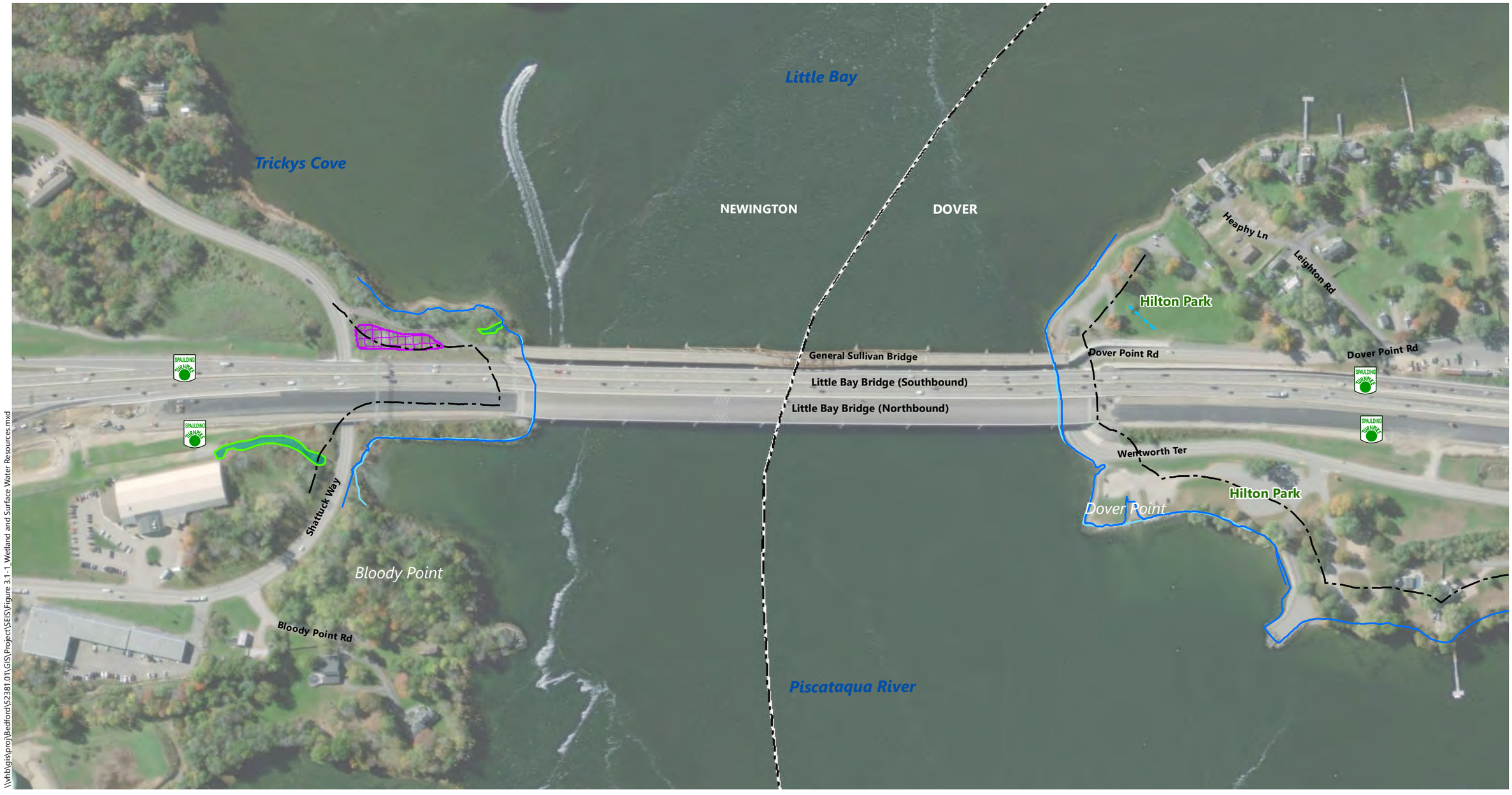
Tidal Habitats

Additional features of the Little Bay include the top-of-bank and ordinary high water of Little Bay, as well as the HOTL and TBZ. The HOTL defines the farthest landward limit of tidal flow, not including storm events. The TBZ is located within 100 feet of the HOTL. Additionally, the Protected Shoreland of Little Bay includes a 50-foot Waterfront Buffer, a 150-foot Natural Woodland Buffer, and a 250-foot Protected Shoreland Buffer.

The Study Area contains a wide diversity of bottom types and habitat types, according to a study of marine intertidal and subtidal habitats and bottom types, as well as areas of submerged aquatic vegetation completed by the University of New Hampshire (UNH).[21] Nine different bottom types were mapped: intertidal hard bottom with rockweed; intertidal mudflat, intertidal rock/algal/abundant mussel; intertidal rock/algal/soft sparse mussel; intertidal salt marsh;

[21] Grizzle, R. and M. Brodeur. 2003. Spaulding Turnpike Environmental Impact Study: Technical Report for Phase 1 – Data Collection and Coordination (Assessment of Existing Conditions in Little Bay). Progress Report on Jackson Estuarine Laboratory Work Tasks 1-4. Jackson Estuarine Laboratory, University of New Hampshire, Durham, NH.

Figure 3.1-1



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.1-1_Wetland and Surface Water Resources.mxd

0 125 250 500 Feet

Legend

- Town Boundaries
- Wetland Edge
- Top of Bank
- Tidal Buffer Zone
- Non Jursdictional Drainage
- Highest Observable Tide Line
- Wetland Resource Area
- Non Jurisdictional Detention Basin

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Wetland and Surface Water Resources

U.S. Department of Transportation Federal Highway Administration

New Hampshire DOT Department of Transportation

Source: VHB, NH GRANIT

intertidal scattered rock/algal/soft sediment; subtidal kelp bed; subtidal macroalgal (non-kelp) bed; and subtidal mussel reef. See **Figure 3.1-2** for the location of these habitat types.

Intertidal Habitats

Intertidal areas near the bridges consist of peaty deposits in several areas, expansive unvegetated mudflats, and rocky bottoms with scattered patches of soft sediments. Intertidal habitats near the bridges were grouped and mapped by six major types: hard bottom with rockweed; mudflat; rock/algal/abundant mussel; rock/algal/soft sparse mussel; salt marsh; and scattered rock/algal/soft sediment. Salt marsh is restricted to the intertidal zone, forming a narrow fringe along Trickys Cove. Field inspection of the areas under and on both sides of the existing bridges indicates that there is some narrow fringe salt marsh in some places, although only a few feet wide in the immediate vicinity of the bridges.

Salt marsh habitat is dominated by cord grass (*Spartina* spp.). Intertidal mudflats are relatively narrow and only occur in two areas east of the bridges on the Dover Point (north) side. In contrast, there are expansive mudflats on both sides of the bridges on the Newington (south) side. All intertidal mudflat habitat is at least potential clam habitat. Except for a few scattered patches of soft-sediment deposits, the remaining intertidal habitats near the bridges are all on rocky bottoms and vary mainly by the presence or absence of rockweeds and mussels. These habitats grade into similar habitat types sub-tidally.

Subtidal Habitats

Subtidal areas consist mainly of rocky bottom types ranging from small gravel to large boulders interspersed with widely scattered patches of soft sediments. This area is a tidal rapid which regularly experiences tidal currents up to approximately 9 to 10 feet per second on spring tides. Therefore, organisms must be adapted for high-flow conditions or live in micro-environments (*e.g.,* patches of soft sediment) protected from the currents. All four mapped habitat types are ecologically diverse and apparently (based on the numbers of epibenthic organisms observed) very productive. Of note are the kelp (dominated by *Laminaria* spp.) and mussel beds.

3.1.2 Environmental Consequences

Impacts to wetlands and surface waters within the Study Area were initially identified and permitted under the larger Newington-Dover, Spaulding Turnpike Improvements Project. The NHDES issued Wetlands Permit 2006-02007 in June 2009 for the Spaulding Turnpike Improvements Project, which permitted up to approximately 20.4 acres of impact to palustrine, riverine, and estuarine wetlands. Upon completion of the final plans for the proposed GSB Project, a new Wetlands Permit application would be developed for the Project.

Updated impacts to wetland and surface water resources were calculated for each Action Alternative. Further information regarding the anticipated direct and indirect impacts to wetland and surface water resources is provided below. A summary of the proposed permanent and temporary impacts within areas of wetlands jurisdiction is provided in **Table 3.1-2**.

Table 3.1-2 Permanent and Temporary Wetland Impacts

Alternative	Wetland (acres)		Bed/Bank of Little Bay (acres)		Tidal Buffer Zone (acres)	
	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary
No-Action	0	0	0	0	0	0
Alternative 1	0	0.1	0	0.8	0	0.9
Alternative 3	0	0.1	0	0.8	0	0.9
Alternative 6	0	0.1	0.1	0.8	0	0.9
Alternative 7	0	0.1	0.1	0.8	0	0.9
Alternative 9	0	0.1	0	0.8	0	0.9

3.1.2.1 Direct Impacts

No-Action Alternative

Under the No-Action Alternative, no direct permanent impacts to wetlands, the bed/bank of Little Bay, or the Protected Shoreland of Little Bay are anticipated to occur under the No-Action Alternative since there would be no changes to the existing GSB infrastructure or surrounding area. However, it is important to note that the NHDOT would be required to remove the GSB if it no longer serves a transportation purpose under the terms of USCG permits issued for the LBB construction and expansion. Removal of the GSB would require temporary impacts associated with construction access.

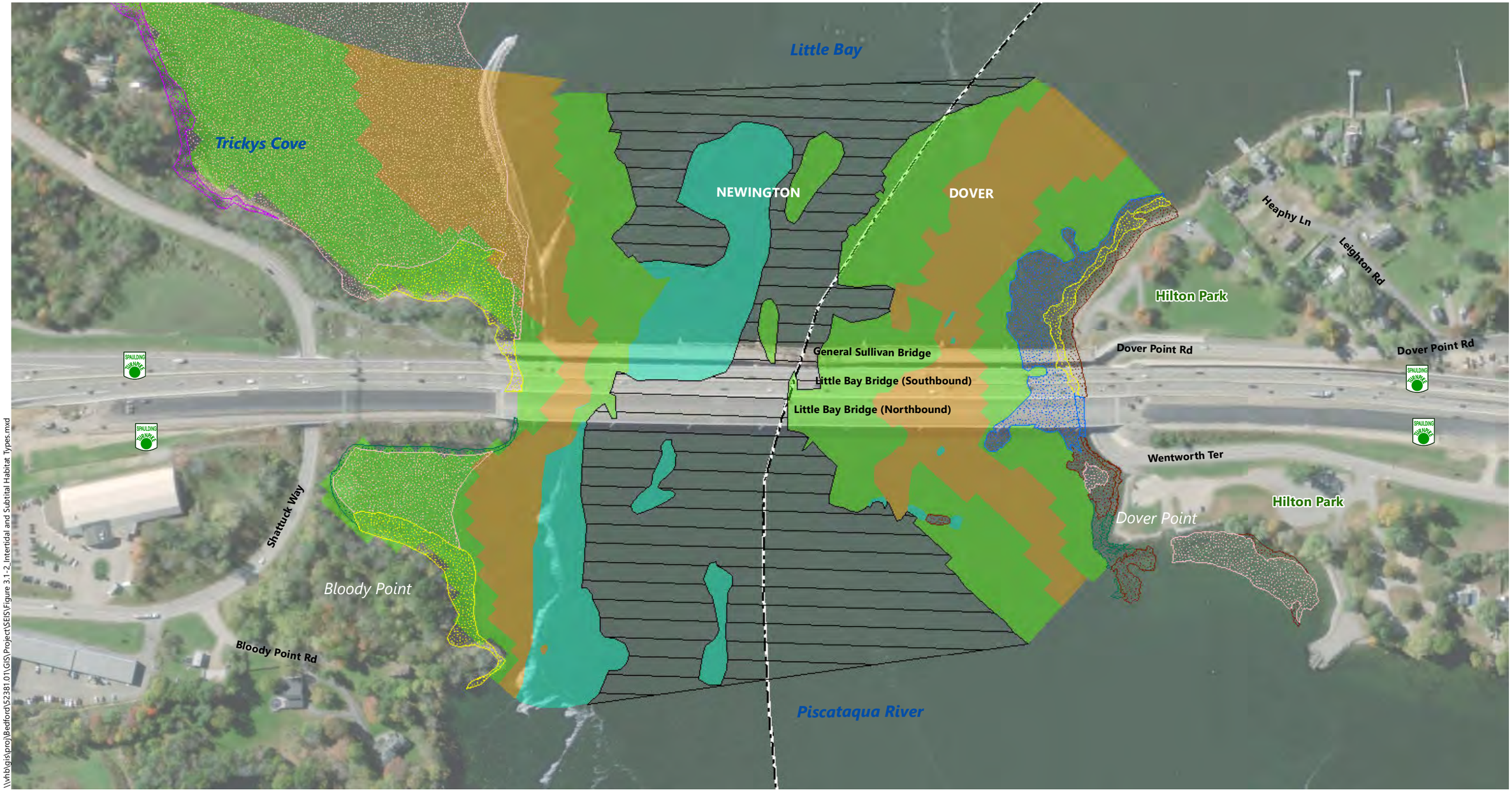
Alternative 1

Alternative 1 would not result in any direct permanent impacts. However, direct temporary impacts to jurisdictional wetlands would result from the placement of construction access causeways and trestle structures within Little Bay (approximately 260 feet long on the Newington side and approximately 130 feet long on the Dover side). Use of the causeway and trestle structures would temporarily impact approximately 0.8 acre within the bed and bank of Little Bay. The trestles would be installed using pile bents and would be approximately 450 to 460 feet long from the Newington side and 470 to 480 feet long on the Dover side.

Installation of the causeways and trestles would affect several functions and values of the Little Bay including fish and shellfish habitat, wildlife habitat, recreation, and visual quality; however, these impacts would be temporary in nature and of a relatively short duration.

Alternative 1 would also temporarily impact the non-jurisdictional drainage area located in Hilton Park south of the Spaulding Turnpike for the full length of the drainage swale during construction. This feature would be restored upon completion of the work. Impacts to this feature would result from construction access and equipment staging. Temporary geotextile fabric and crushed stone would be placed over this swale. If deemed necessary, a temporary culvert would be placed to allow the swale to convey drainage until the work is complete.

Figure 3.1-2



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.1-2_Intertidal and Subtital Habitat Types.mxd

0 125 250 500 Feet

Legend

Town Boundaries

Intertidal Habitats

- Hard Bottom with Rockweed
- Mudflat
- Rock/Algal Abundant Mussel
- Rock/Algal Sparse Mussel
- Salt Marsh
- Scattered Rock/Algal Soft Sediment

Subtidal Habitats

- Kelp Bed
- Macroalgal (Non-Kelp) Bed
- Mussel Reef
- Other

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Intertidal and Subtidal Habitat Types

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT

Similarly, the wetland located immediately south of the GSB pedestrian approach ramp in Newington would be temporarily impacted from the placement of geotextile fabric and crushed stone or other means of stabilizing the ground surface.[22] These measures would be removed upon completion of the work and the wetland would be restored to pre-construction conditions. This wetland would still be able to convey stormwater runoff from upland areas into Little Bay throughout the duration of construction since measures would be taken during construction to allow water to continue to flow into the bay.

Temporary impacts within the TBZ of Little Bay would also result from proposed construction access and staging areas in the Study Area of both Newington and Dover. As shown on the Preliminary Construction Impact Plans (**Appendix D**), construction access would generally follow existing paved and previously-developed areas in Newington and Dover.

Direct permanent impacts within the 250-foot Protected Shoreland buffer of Little Bay are not anticipated to occur under Alternative 1 since the existing footprint of the GSB would be retained. Impacts to the Protected Shoreland of Little Bay would be limited to the temporary use of construction access and staging areas. As previously mentioned, the proposed construction access would generally follow existing paved areas adjacent to the GSB.

The temporary causeways and trestles would have direct temporary impact intertidal and subtidal habitats located within Little Bay according to the study conducted by UNH. The study identified rock/algal abundant mussel and rock/algal sparse mussel habitat near the shoreline of Little Bay along the Newington and Dover coastlines, which would be temporarily impacted by the proposed causeways and trestles. Additionally, approximately 30 percent of area proposed to be temporarily filled by the placement of the causeways is mapped as kelp/microalgal beds. The pile bents proposed to support the temporary trestles would result in additional temporary impacts to kelp/macroalgal beds. Impacts to intertidal and subtidal habitats are anticipated to rebound upon removal of the temporary causeways and trestles once construction is complete. The installation of these causeways and trestles would also impact approximately 0.2 acre of blue mussel shellfish bed located under the GSB. Further information regarding impacts to blue mussel shellfish beds are provided in **Section 3.4**, *Wildlife and Fisheries*.

Alternative 3

Impacts to wetlands, surface waters, and tidal habitats under Alternative 3 would be the same as the impacts proposed under Alternative 1.

Alternative 6

Under Alternative 6, direct permanent impacts within the bed/bank of Little Bay would occur due to the removal of GSB Pier 1 and installation of a new pier (likely a drilled shaft pier) within Little Bay to support a new bridge span. This new pier would permanently impact rock/algal habitat located in the area where the GSB Pier 1 is proposed to be removed and replaced. These impacts would be localized to the pier location and are not anticipated to negatively impact the rock/algal habitat type as a whole.

Like Alternative 1, direct temporary impacts within the bed and banks of Little Bay would result from the temporary placement of causeways and trestles used during construction to remove the GSB and construct the new Alternative 6 bridge structure.

Direct permanent impacts within the TBZ and 250-foot Protected Shoreland of Little Bay are similar to Alternative 1. However Alternative 6 would result in additional permanent impacts to the Protected Shoreland because the curved approach span on the Dover end of the bridge would need to be replaced, along with construction of a new pier in within Hilton Park.

Alternative 7

Impacts to wetlands, surface waters, and tidal habitats under Alternative 7 would be the same as the impacts described under Alternative 6.

Alternative 9 (Preferred Alternative)

Impacts to wetlands, surface waters, and tidal habitats under Alternative 9 would be the same as the impacts proposed under Alternative 1. However, note that the temporary effects associated with construction access for Alternative 9 would be shorter in duration than for Alternative 1, since the expected construction duration would be 1.5 years (versus 3 years for Alternative 1).

3.1.2.2 Indirect Impacts

No-Action Alternative

Under the No-Action Alternative, no indirect impacts to wetlands or the bed and bank of Little Bay are anticipated. As noted above, the USCG has required that the GSB be removed if it no longer serves a transportation purpose. If the GSB is removed, including its pier foundations, then potential hydrodynamic effects may occur. This effect has not been fully analyzed. However, based on hydrodynamic modeling previously conducted for other alternatives, this effect is not expected to be adverse.

Action Alternatives

While Alternatives 6 and 7 involve direct wetland impacts from the replacement of GSB Pier 1 and the construction of a new pier within Little Bay near the Dover shoreline, no indirect impacts are anticipated from the pier replacement or construction of a new pier. The replacement pier would be smaller than the existing GSB Pier 1 and would not substantially impair the flow of water within the Little Bay or impact tidal currents or wave energy. The new pier proposed to be installed along the Dover shoreline under Alternatives 6 and 7 would only have a minor impact to the flow of water, tidal currents, or wave energy. The use of BMPs during construction would minimize any indirect impacts to the Little Bay or other jurisdictional wetlands located near the proposed work that could occur (erosion and sedimentation) during construction activities.

[22] Geotextile and crushed stone are proposed to be used within the unpaved staging areas for a safe and reliable construction access and equipment staging while protecting the wetland from rutting and erosion.

3.1.3 Mitigation

Since the Action Alternatives would involve temporary ground disturbance within and directly adjacent to wetlands and the Little Bay, wetland impacts would be avoided or minimized through the implementation of the following environmental commitments:

- NHDOT will submit a permit application to the NHDES Wetlands Bureau for the wetland impacts resulting from the Preferred Alternative. NHDOT will coordinate with state and federal resource agencies, and the communities of Newington and Dover to identify whether project-specific mitigation is required for the GSB Project.
- Applicable erosion and sediment control BMPs would be used throughout construction to protect wetlands and surface waters from sediment, erosion, pollution, and contaminants.
- Unpaved staging areas are to be protected with temporary geotextile fabric under crushed stone.
- Disturbed areas will be restored to as near pre-existing conditions as practicable once construction is complete. All disturbed and graded areas would be seeded and mulched as needed. Disturbed areas that have been seeded and mulched would be considered stable once 85-percent vegetative growth has been achieved.
- Appropriate pollution preventative measures and BMPs as outlined within the *New Hampshire Stormwater Manual Vol. 3 – Erosion Control and Sediment Controls During Construction* (December 2008), available online at NHDES's website, shall be employed to assure that any detrimental impacts are minimized to the extent practicable.

3.2 Water Quality and Pollutant Loading

The 2007 FEIS and final design efforts for the LBBs and overall Spaulding Turnpike improvements included an initial qualitative water quality assessment that was based on a relative comparison of the amount of new impervious area that would be created by each build alternative. New impervious area represents an indicator of the amount of potentially added stormwater volume and associated pollutant load that may be discharged to area water bodies.

Subsequent to the 2007 FEIS and in response to the 401 Water Quality Certificate issued for the LBBs and Spaulding Turnpike Improvements, more detailed pollutant loading analyses were completed to assess whether the Spaulding Turnpike Improvements would meet the anti-degradation provisions of the New Hampshire surface water quality standards (Env-Wq 1708). Specifically, the pollutant loading analyses were used to assess whether any increased discharge of stormwater would result in an increase in pollutant loads, specifically total suspended solids, total phosphorus and total nitrogen that would result in a substantial lowering of the water quality conditions in the receiving water consisting of the Little Bay, Piscataqua River and other tributaries.

These pollutant loading analyses focused primarily on the proposed roadway mainline and LBB expansion and accounted for pre and post-development conditions including existing and proposed impervious areas and the anticipated treatment effects of planned stormwater BMPs included in the 2007 Preferred Alternative design.

The previous pollutant loading analyses indicated that the average annual pollutant loads of total suspended solids, total phosphorus and total nitrogen discharged to the Little Bay and Piscataqua River from the project area would be reduced by approximately 5,580, 6.2 and 44.5 pounds, respectively, under post-development conditions compared to the estimated pre-development loads due to the proposed stormwater BMP treatment included in the roadway improvement design.[23] In other words, there would be a net water quality benefit with respect to future stormwater volumes discharged from the project area. In fact, based on the NHDES pollutant loading methodology, these pollutant load reductions are essentially equivalent to eliminating approximately two acres of existing impervious area within the project area even with the added lanes and roadway width resulting from the project.[24]

Even though the planned GSB improvements were not included in the pollutant loading analyses discussed above, no substantial increases in impervious area or stormwater volumes are anticipated with the proposed GSB design alternatives, discussed herein. In fact, a narrower bridge deck is anticipated compared to the existing GSB since the project seeks to accommodate only pedestrian and non-motor vehicle uses. A narrower bridge deck would result in less impervious area compared to the existing GSB, which would only add to the water quality benefits that are already anticipated with the stormwater treatment BMPs included in the mainline roadway and LBB improvements.

Given the results of the previous pollutant loading analyses, additional stormwater treatment would only be considered necessary if the proposed GSB design alternatives would potentially increase the amount of impervious area and related stormwater volumes relative to existing conditions. Stormwater generated from the proposed GSB design alternatives would be discharged through bridge scuppers to the Little Bay similar to the existing GSB.

A qualitative water quality assessment was conducted for the various GSB design alternatives to compare differences in the planned bridge deck widths and associated impervious area for each of the proposed design alternatives relative to the existing GSB deck area. This analysis was used to assess whether the proposed GSB design alternatives would potentially increase or decrease the future impervious and stormwater volumes relative to existing conditions and to identify which of the alternatives would have the least or greatest amount of impervious area associated with the planned bridge deck. Since the proposed replacement alternatives are essentially

[23] CHA. 2013. Spaulding Turnpike Contract #M, Stormwater Management Report, Volume 1, Slope and Drain, Newington prepared by VHB and Contract #L Stormwater Management Report, Slope and Drain. Technical Report prepared by CHA, dated February 11, 2013.

[24] The NHDES Simple Method Pollutant Loading Model used in the previous analyses indicates that 1.0 acre of roadway area would generate approximately 20.4 lbs. of nitrogen per year if left untreated and discharged directly to the water body. Thus, 2.0 acres of additional, untreated impervious area would generate approximately 40.8 lbs. of nitrogen per year, which is nearly equivalent to the estimated net reduction resulting from the stormwater treatment proposed for the portion of the project draining to the Little Bay.

located along the same alignment as the existing GSB, the proposed GSB bridge length is assumed to essentially be the same as the existing GSB.

3.2.1 Affected Environment

The primary water body directly beneath the GSB is considered to be the lower Little Bay or the mouth of the Little Bay, which connects to the Piscataqua River to a large tidal estuary known as the Great Bay Estuary. Due to the large tidal volume exchange between the Great Bay and the Piscataqua River, the tidal currents at this Little Bay location are considered to be some of the strongest tidal currents in the world. The Little Bay and associated Great Bay support a diverse and rich ecosystem of various plant and aquatic species that are essential to the marine environment as well as the fishing, shell fishing and tourism industry.

New Hampshire's 2016 303 (d) list of water quality impairments for the Little Bay (Assessment Unit # NHEST600030904-06-15), beneath the GSB and part of the lower Little Bay, indicates the water body is impaired due to previously observed elevated levels of Polychlorinated biphenyls (PCBs) and Dioxin that presumably are legacy pollutants from past industrial activities in marine and waterfront areas. Other listed water quality impairments include elevated light attenuation coefficient readings and poor estuarine bioassessment results. Diminished light penetration in the water column can impede eelgrass growth and is usually caused by phytoplankton blooms, suspended non-algal material or colored dissolved organic matter. These potential causes are generally influenced by multiple sources and activities that occur on a more continuous basis in the bay and greater watershed area.

3.2.2 Environmental Consequences

None of the Action Alternatives are anticipated to contribute to the known primary water quality impairments associated with elevated PCBs or Dioxin as neither of these pollutants are typically found in stormwater runoff from road surfaces. The proposed GSB design alternatives could have the potential to adversely affect the existing poor light attenuation impairment, if the Project were to result in an increase in stormwater volumes or impervious area and more specifically in nitrogen loads associated with stormwater.

Each of the alternatives were evaluated to assess how impervious area would change relative to the No-Action Alternative (*i.e.,* existing conditions). This comparison provides a means to assess whether future stormwater volumes or nutrient loads are likely to increase with any of the proposed GSB alternatives in comparison to current conditions.

3.2.2.1 Direct Impacts

The potential for permanent, direct water quality impacts primarily relates to whether any of the alternatives would substantially increase the amount of impervious area and related stormwater volumes discharged to the Little Bay compared to existing conditions.

Additionally, temporary water quality impacts could result from excavation or construction within water or below the tide line. Only two proposed design alternatives (Alternatives 6 and 7) would involve construction of a new bridge pier in the Little Bay. Due to a slight shift in the proposed bridge alignment bringing the proposed GSB closer to the LBB, these alternatives would require a new bridge pier to replace the first bridge pier from the Dover side. A temporary fill causeway would also likely be required to provide access and a working platform for construction equipment during the pier construction. Each of the proposed alternatives, except the No-Action Alternative, also have some level of demolition and construction work to rehabilitate and/or replace various bridge components. Potential temporary impacts related to construction activities are included in **Section 3.13**, *Construction Impacts*.

No-Action Alternative

Under the No-Action Alternative, the GSB would continue to discharge stormwater to the Little Bay through existing bridge scuppers. The bridge deck is approximately 1,530 feet long and 24 feet wide along the entire bridge length and, thus, comprises approximately 36,720 square feet of impervious area. This does not include the surface area associated with metal support beams extending above or adjacent to the bridge deck.

Alternative 1

Alternative 1 would involve rehabilitation of the GSB, including replacement of the bridge deck. The new bridge deck would provide a multiuse path approximately 16 feet wide. This deck would be approximately 33 percent narrower than the existing 24 feet width associated with the existing GSB. The narrower bridge deck would result in a corresponding reduction in future stormwater volumes discharged from the GSB bridge deck compared to existing conditions. No meaningful changes in impervious area would result from modifications of either supporting bridge piers or abutments.

Alternative 3

Alternative 3 would also create a 16-foot-wide multiuse path; this narrower bridge deck would result in an estimated 33 percent reduction of future stormwater volumes compared to existing conditions. No meaningful changes in impervious area would result from modifications of either supporting bridge piers or abutments.

***Alternative* 6**

Alternative 6 involves removal of the GSB and construction of a new bridge closer to the LBB using pier extensions that extend from the existing GSB piers foundations to the existing LBB piers. Due to the minor shift in the bridge alignment, the bridge length would be extended by approximately 50 feet to accommodate new abutment on the Newington side. The curb to curb bridge deck width would be 16 feet. The estimated bridge deck area would be approximately 28,280 square feet or slightly more than Alternatives 1, 3 and 9 due to the added bridge length, but still approximately 23 percent less than the existing bridge. The existing Pier 1 within Little Bay closest to the Dover side would also have to be replaced with a new pier that would result in direct impacts to the marine aquatic habitat. The GSB superstructure would be demolished but seven of the eight GSB piers would remain in place to support the pier extensions. No major changes to the other bridge piers or abutments are proposed.

Alternative 7

Under Alternative 7, the potential for water quality impacts would be the same as Alternative 6.

Alternative 9 (Preferred Alternative)

Under Alternative 9, the potential for water quality impacts would be the same as Alternative 1, with an anticipated 33 percent reduction in impervious area compared to existing conditions.

3.2.2.2 Indirect Impacts

No-Action Alternative

No indirect water quality impacts are expected to result from the No-Action Alternative.

Action Alternatives

No indirect water quality impacts are expected to result from any of the Action Alternatives. Indirect impacts typically relate to other ancillary activities or physical changes that may occur as a result of a project that may affect water quality. If anything, the increased capacity to accommodate alternatives modes of travel via bicycling or walking as result of the Project may reduce the number of vehicle miles traveled for local commuters and, thus, reduce the related vehicle exhaust emissions that have been shown to contribute to the pollutant levels contained in rainwater.

3.2.3 Mitigation

The GSB Project is located within an Urbanized Area that is subject to the 2017 EPA MS4 Permit; however, since the Action Alternatives would reduce impervious area relative to what currently exists today, less stormwater would be generated and discharged to the Little Bay. In fact, the pollutant load calculations associated with the stormwater treatment measures (*e.g.*, gravel wetlands and extended wet detention ponds) included in the larger Newington-Dover, Spaulding Turnpike Improvements Project indicate that the overall project is expected to result in a pollutant load reduction, which exceeds the requirements of the antidegradation provisions of the state surface water quality regulations and the MS4 Permit. No additional mitigation measures are considered necessary with respect to post-construction stormwater discharges under future conditions.

During the construction period, the project will need to address the provisions of EPA's Construction General Permit (CGP) as more than 1 acre of disturbance is expected, including the anticipated construction laydown areas. NHDOT will require contractors to submit a Notice of Intent (NOI) and develop a Stormwater Pollution Prevention Plan (SWPPP) outlining the various protective and containment measures that will be deployed to limit any land-based erosion or discharge of stormwater and minimize potential temporary water quality impacts associated with the construction activities. NHDOT will also require contractors to describe the construction methods that will be used to minimize the disturbance of marine sediments during construction of the temporary causeways or, if necessary, installation of temporary coffer dams, including any potential dewatering activity. NHDOT will require contractors to have a qualified environmental and erosion control monitor onsite to inspect, document and report on daily activities within the proposed project limits and construction staging areas.

Where dewatering activity may be needed, NHDOT will require contractors to provide a dewatering and erosion control plan that is consistent with NPDES Remedial Permit for Dewatering Activity in New Hampshire including contingency measures for extreme wet weather events.

3.3 Floodplain and Hydrodynamics

Floodplains are a vital part of riverine and coastal systems by providing areas for flood storage during storms including tidal events. Floodplains are defined as, "the lowland and relatively flat areas adjoining inland and coastal waters, including, at a minimum that area subject to a one percent or greater chance of flooding in any given year" (44 CFR 9).

All federally funded projects are required to evaluate the potential impact on floodplains, per Executive Order (EO) 11988, *Floodplain Management* (May 24,1977). The regulation that sets forth the policy and procedures of this order is titled *Floodplain Management and Protection of Wetlands* (44 CFR 9) which is administered by the Federal Emergency Management Agency (FEMA). The New Hampshire Office of Strategic Initiatives (OSI) has developed three state model floodplain ordinances which require communities to (at a minimum) adopt the National Flood Insurance Program outlined in 44 CFR.

The City of Dover Code for Floodplain Development (Chapter 113-3) recognizes floodplain elevations as those delineated in the FEMA "Flood Insurance Study (FIS) for the County of Strafford, NH," dated May 17, 2005, with the accompanying series of Flood Insurance Rate Maps (FIRMs). The City of Dover Code prohibits building, encroachment, or other development within the floodplain along watercourses that have been designated as Regulatory Floodways. For watercourses not designated as Regulatory Floodways, the City of Dover permits development if it is demonstrated that such development will not increase the base flood elevation more than one foot at any point within the community.

Since the publication of the 2007 FEIS, the Town of Newington has published information on floodplains, Article 17: Floodplain Management in April 2016. The Town of Newington adopted the requirements in the National Flood Insurance Program (44 CFR 59). The Newington zoning ordinance recognizes the lands designated as flood hazard areas defined in the FEMA FIS for the County of Rockingham, NH (dated May 17, 2005).

3.3.1 Affected Environment

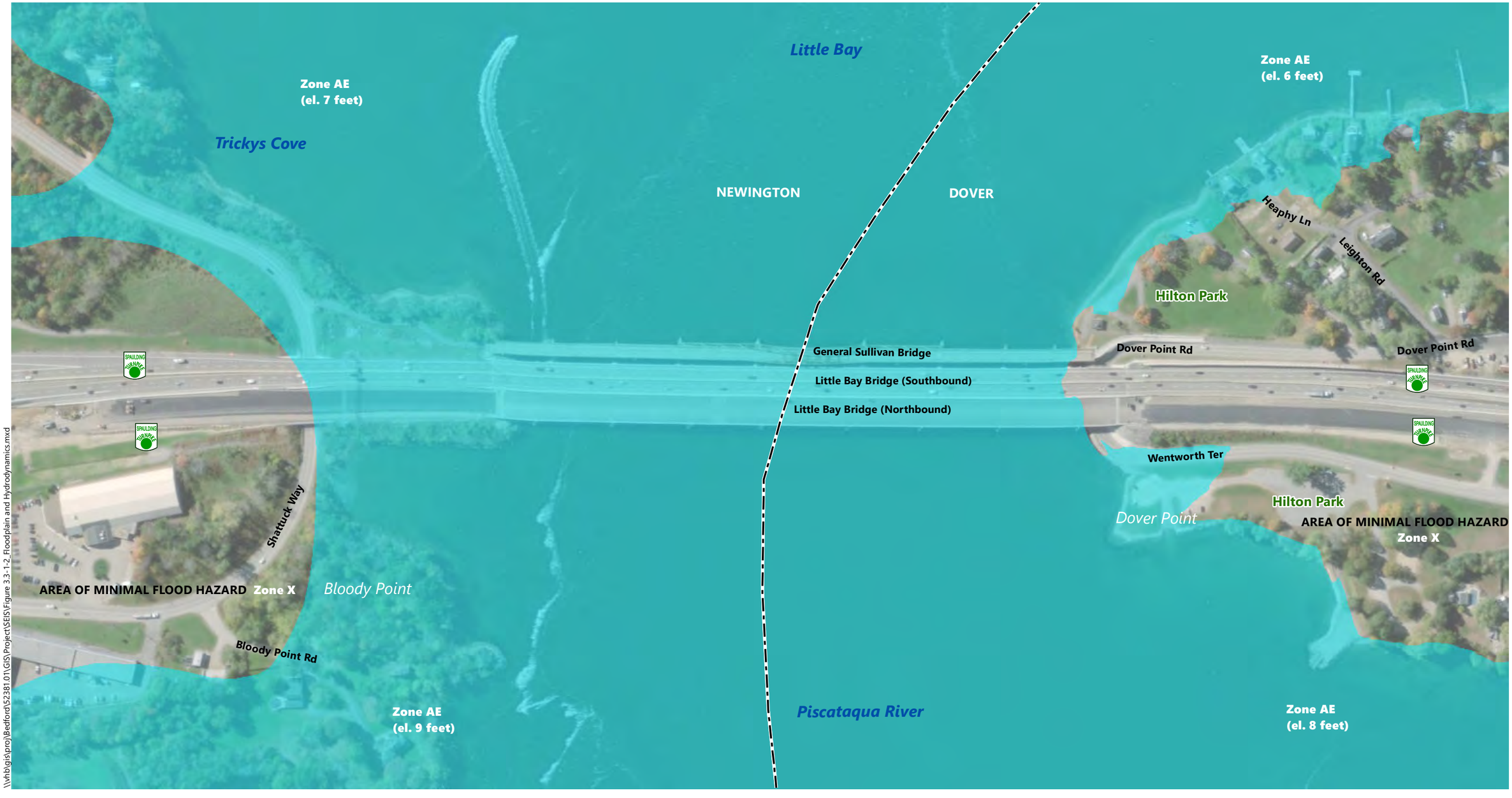
3.3.1.1 Floodplains

Floodplain elevation data was examined for Dover and Newington, the two municipalities within the Study Area. Floodplain boundaries were determined using the FEMA FIRM for Dover and Newington which are derived from the FIS used in the 2007 FEIS. These maps show areas of potential risk from a 1-percent-annual-chance flood event, or also referred to as Zone AE (see **Figure 3.3-1**).

Newington

Based on the FEMA FIRM maps for Rockingham County updated in 2005, there are two AE flood zones within the Study Area in Newington. 100-year flood elevations were determined in the FIS

Figure 3.3-1



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.3-1-2_Floodplain and Hydrodynamics.mxd

0 125 250 500 Feet

Legend

Town Boundaries

1% Annual Chance Flood Hazard (FEMA)

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Floodplain and Hydrodynamics

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT

and confirmed in the 2007 FEIS. The Piscataqua River 100-year flood zone along the entire Newington shoreline has an elevation of 9 feet (NGVD29). This flood zone extends from the City of Portsmouth boundary north around Bloody Point and ending just east of the northbound LBB. The remaining portion of the flood zone along Newington's shoreline extends west from the northbound LBB to Trickys Cove and eventually into Great Bay; this area has a 100-year flood elevation of 7 feet (NGVD29).

Dover

Based on the FEMA FIRM maps for Strafford County updated in 2005, there are two AE flood zones within the Study Area in Dover. The two zones in Dover include the area running south along the Piscataqua River and the shoreline along the Little Bay. The flood zone along the Piscataqua River begins at the southern portion of Pomeroy Cove and runs south around Hilton Park ending east of the LBB, this zone has an elevation of 8 feet (NGVD29). The other flood zone in Dover begins just east of the LBB and extends west along the Dover coastline eventually turning north and ending on the opposite shoreline to Pomeroy Cove, this area has an elevation of 6 feet (NGVD29).

3.3.1.2 Hydrodynamics

The UNH developed a hydrodynamic model of the Great Bay - Piscataqua River Estuarine System which was presented in the 2007 FEIS. This hydrodynamic model predicted currents and tidal elevations in the Great Bay and Little Bay, including the areas around the LBB and GSB.[25] The model was used to predict the effects of changes to the bridge pier system on tidal dynamics in the area. In 2010, this model was revised to assess the proposed final design of the piers for the southbound LBB, which involved installation of drilled shaft piers rather than the connected pier foundations presented in the FEIS.[26] The 2010 modeling effort verified that the drilled shaft pier configuration was consistent with hydrodynamic effects presented in the 2007 FEIS.

The hydrodynamic models predicted that the construction of new piers for the LBB would result in a negligible increase in tidal maxima of 0.00 feet (0.1 inches) to 0.02 feet (0.24 inches) across the entirety of the Little Bay/Great Bay Estuary system. The completed conditions of the Spaulding Turnpike Improvements Project equaled a slight increase in current velocity within the 200-foot-wide navigation channel (between Piers 4 and 5) by a maximum of 5 percent. Data published in both analyses show the currents in the area of the LBBs are in the range of 10 to 12 feet per second at maximum values during both the ebb and flood tides, with the ebb values slightly greater than the flood values.

3.3.2 Environmental Consequences

For the GSB Project, impacts to floodplains and hydrodynamics were evaluated using data published by the UNH, State of New Hampshire, and FEMA. Potential impacts to floodplains and hydrodynamics would relate to the possible installation of new structures (*e.g.*, new piers) within Little Bay that would impact floodwater storage potential, tidal maxima, currents, and wave patterns.

3.3.2.1 Direct Impacts

Permanent direct impacts to floodplains and hydrodynamics would occur where new substructures are proposed in the tidal zone (*i.e.*, Alternatives 6 and 7). The removal and replacement of GSB Pier 1 would permanently alter conditions within Little Bay and placement of this structure would result in changes to the hydrodynamic conditions. Alternatives 1, 3, and 9 do not propose permanent changes to structures below the highest observable tide line; therefore, these three Action Alternatives would not permanently impact hydrodynamics within the Study Area.

Under all Action Alternatives, temporary direct impacts would occur due to the installation of structures needed to support access the GSB during construction (**Appendix D**). In Newington, the temporary causeway would extend approximately 260 feet north into Little Bay, adjacent to GSB piers and covering a total area of approximately 22,000 square feet. In Dover, the temporary causeway would extend south about 130 feet into Little Bay, also adjacent to GSB piers. The total area of this second causeway would be approximately 9,000 square feet. Trestles beyond the causeways would extend approximately 450 to 460 feet on the Newington side and 470 to 480 feet on the Dover side and would be held in place by piers.

The placement of causeways and trestles would temporarily alter floodplains and hydrodynamics on a localized scale in the Study Area, both at and directly adjacent to the temporary structures (*i.e.*, there would be no widespread impacts across Little Bay or Great Bay Estuary).[27] For the larger Spaulding Turnpike Improvements Project, the hydrodynamic models predicted a minor increase in tidal maxima of 0.00 feet (0.02 inches) to 0.03 feet (0.35 inches) across the entirety of Little Bay and Great Bay Estuary from the placement of temporary structures. The temporary structures would increase the current velocity (in feet per second) at a maximum of 10 percent through the main navigational channel (between GSB Piers 4 and 5).

During construction of any of the Action Alternatives, the causeways and trestles would divert floodwaters, tidal maxima, currents and wave patterns to other areas of the Little Bay/Great Bay Estuary. However, these temporary direct impacts would be minor due to the extensive area of the Little Bay and Great Bay Estuary, which has the ability to disperse the minor amount of displaced waters or waves over an expansive system of salt marsh, mud flat, and riverine habitat. The Great Bay National Estuarine Research Reserve (part of the Great Bay Estuary) encompasses 10,235 total acres, approximately 7,300 acres of open water and wetlands, the approximate areas occupied by the temporary causeways and trestles would equal 0.72 acre, or 0.007 percent of the total area of Great Bay National Estuarine Research Reserve. Post construction, coastal and

[25] Celikkol, B., T. Shevenell, Z. Aydinoglu, and J. Scott. 2006. *Hydrodynamic Computer Model Study of the Great Bay Estuarine System, New Hampshire, In Support of the Little Bay Bridge Project*. Computer Modeling Group, Ocean Engineering, University of New Hampshire, Durham, NH.

[26] AECOM. 2010. Hydraulic Modeling Analysis – Spaulding Turnpike Improvements, Little Bay Bridges Newington to Dover, New Hampshire. Prepared for VHB.

[27] It is important to note that the causeway and trestle structures are conceptual and will be finalized as the Project progresses to final design. As stated on the Preliminary Construction Impact Plans (**Appendix D**), temporary structures will be based on contractor means and methods for access.

marine habitats would be restored to pre-construction sloping and grading; conditions are anticipated to rebound to existing conditions.

No-Action Alternative

Under the No-Action Alternative, the existing conditions of floodplains and hydrodynamics in the Great Bay Estuary system would be unaltered. No permanent impacts would result from pier configuration changes, and there would be no temporary direct impacts from the causeway and trestle structures necessary for construction.[28]

Alternative 1

Permanent direct impacts to floodplains and hydrodynamics would not occur as part of Alternative 1 due to the lack of new or replacement infrastructure in the floodplain and tidal zone. Alternative 1 does not require the removal or replacement of pier structures in Little Bay.

Construction of Alternative 1 is expected to take approximately 3 years, the longest construction timeframe of the Action Alternatives. Minor temporary impacts to floodplains and hydrodynamics would occur from the installation of causeways and trestles which would remain in place through the duration of construction. The placement of causeways and trestles would result in minor changes in local tidal conditions during construction.

Alternative 3

Permanent direct impacts under Alternative 3 are the same as described in Alternative 1. Alternative 3 does not require the removal and replacement of pier structures in Little Bay; therefore, Alternative 3 would not result in any permanent impacts to floodplains or hydrodynamics.

Temporary impacts to floodplains and hydrodynamics would be similar to the impacts described in Alternative 1 (*i.e.*, shifts in flood storage potential and temporary changes to tidal maxima, currents and wave patterns at or directly adjacent to the temporary structures). However, the estimated timeframe to complete construction of Alternative 3 is less than the timeframe estimated to complete Alternative 1; Alternative 3 is estimated to take 2 years to construct.

Alternative 6

Alternative 6 would result in permanent direct impacts to floodplains and hydrodynamics in Little Bay and Great Bay Estuary system. Impacts to these resources would result from the removal of GSB Pier 1 and installation of a new pier to support the reconfigured approach span. GSB Piers 2 through 8 would be reused.

Temporary impacts to floodplains and hydrodynamics would be similar to the impacts described in Alternative 1 (*i.e.*, shifts in flood storage potential and temporary changes to tidal maxima, currents and wave patterns at- or directly adjacent to the temporary structures). However, the estimated timeframe to complete construction of Alternative 6 is 1.5 years - less than the timeframes estimated to complete Alternatives 1 and 3.

Alternative 7

Permanent direct impacts resulting from Alternative 7 on floodplains and hydrodynamics are the same as described in Alternative 6, from the removal of GSB Pier 1 and installation of a new pier. Temporary direct impacts on floodplains and hydrodynamics from Alternative 7 are also the same as described in Alternative 6. The estimated construction timeframe of Alternative 7 is 1.5 years.

Alternative 9 (Preferred Alternative)

Permanent direct impacts from Alternative 9 are the same as described in Alternative 1. Alternative 9 does not require the removal or replacement of pier structures in Little Bay.

Temporary direct impacts to floodplains and hydrodynamics are identical to the impacts described in Alternative 1 (*i.e.,* shifts in flood storage potential and temporary changes to tidal maxima, currents and wave patterns at or directly adjacent to the temporary structures). However, the estimated timeframe to complete construction of Alternative 9 is less than the timeframes estimated to complete Alternatives 1 and 3. The estimated construction timeframe is 1.5 years – equivalent to the estimated construction timeframes of Alternatives 6 and 7.

3.3.2.2 Indirect Impacts

Indirect impacts on floodplains and hydrodynamics are not anticipated as part of the Project. It is assumed that impacts occurring from any unforeseen future development within the Study Area would not impact floodplains or hydrodynamics because of federal and state regulations, and local policies and ordinances. Both the City of Dover and Town of Newington have adopted local policies aligned with FEMA policies.

3.3.3 Mitigation

The potential impacts to floodplains and hydrodynamics are considered minor in the context of the extensive volume of Little Bay, Piscataqua River and Great Bay. Direct impacts to the 100-year floodplain have been minimized in the conceptual designs developed to date and would continue to be considered as the Project progresses to final design.

Under all Action Alternatives, temporary direct impacts would result from the placement of the temporary stone causeways and trestles in Little Bay during construction. As the Project progresses into final design, the details on installation of the temporary structures would be determined and efforts would be made to further minimize the minor temporary impacts, where applicable.

[28] Note, however, that the USCG would require removal of the GSB if it is no longer used for transportation purposes. Removal of the bridge would require at least temporary impacts.

3.4 Wildlife and Fisheries

Wildlife habitat in New Hampshire is highly valuable to sustaining native large and small mammals, as well as invertebrate, avian, and aquatic species. Each wildlife species requires a unique habitat type or set of habitat types to be sustained, reproduce, and survive. Additionally, habitat size requirements are different for each species, since some species require large tracts of undisturbed land to thrive, while others can survive in more built, urbanized environments.

The NH Fish & Game Department (NHF&GD) is responsible for managing and protecting native wildlife species within New Hampshire, as authorized by RSA 212-A, including threatened and endangered species. This statute also authorizes the NHF&GD to gather information about wildlife species in general and determine types of conservation needs each species has to be sustained. To help accomplish this mission, the NHF&GD developed the New Hampshire Wildlife Action Plan to assist with conserving and protecting wildlife species and habitat types throughout the state.

On a national scale, the USFWS is responsible for the protection and management of migratory species in the United States. Except for threatened and endangered species and their associated "critical habitats," federal protection of wildlife on private property is confined to regulations regarding the exploitation of species and is not extended to wildlife habitat, except for the designation of critical habitat under the Endangered Species Act (ESA) of 1973. Both wildlife species and wildlife habitats are generally protected on Federal lands, including National Wildlife Refuges, National Parks and Monuments, and National Forests.

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) established a requirement to describe and identify Essential Fish Habitat (EFH) in each federal fishery management plan. The Magnuson-Stevens Act defines EFH as "*those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity*" (50 CFR 600.920). Under these regulations, FHWA is required to coordinate with the National Oceanic and Atmospheric Administration (NOAA) regarding the potential effect of the Project on EFH.

3.4.1 Affected Environment

The Project is at the entrance of the Great Bay, located in the lower part of Great Bay called Little Bay, which includes the narrow section between Dover and Newington where it joins the Piscataqua River. The Great Bay estuary provides unique habitat opportunities in coastal New Hampshire since the bay is a large tidal embayment that covers over 17 square miles and contains 144 miles of shoreline. Strong tidal currents exist in Little Bay near the Piscataqua River.

The following sections summarize known wildlife and fish habitats within the Study Area, as well as coordination conducted with the NHF&GD and NOAA. There are no Federal lands, including National Wildlife Refuges, National Parks and Monuments, or National Forests, within the Study Area.

3.4.1.1 Wildlife and Habitat

The Wildlife Action Plan emphasizes the conservation of Species of Greatest Conservation Need and the habitats these species use. The condition of wildlife habitat resources within the Study Area was evaluated based on maps created from the 2015 Wildlife Action Plan habitat type locations and habitat tier information.

Wildlife Habitat Types

Because the Study Area is largely developed as residential, commercial, and park land uses, the Wildlife Action Plan does not identify any habitat type for much of the upland areas around the GSB. Small areas of salt marsh habitat are identified along the shoreline of Great Bay within the Study Area. As shown in **Figure 3.4-1** south of the GSB in Newington are sparse areas of salt marsh, wet meadow/shrub wetland, and hemlock-hardwood-pine to the east, with larger areas of Appalachian oak-pine to the west.

The following dominant habitat types are found within the Study Area:

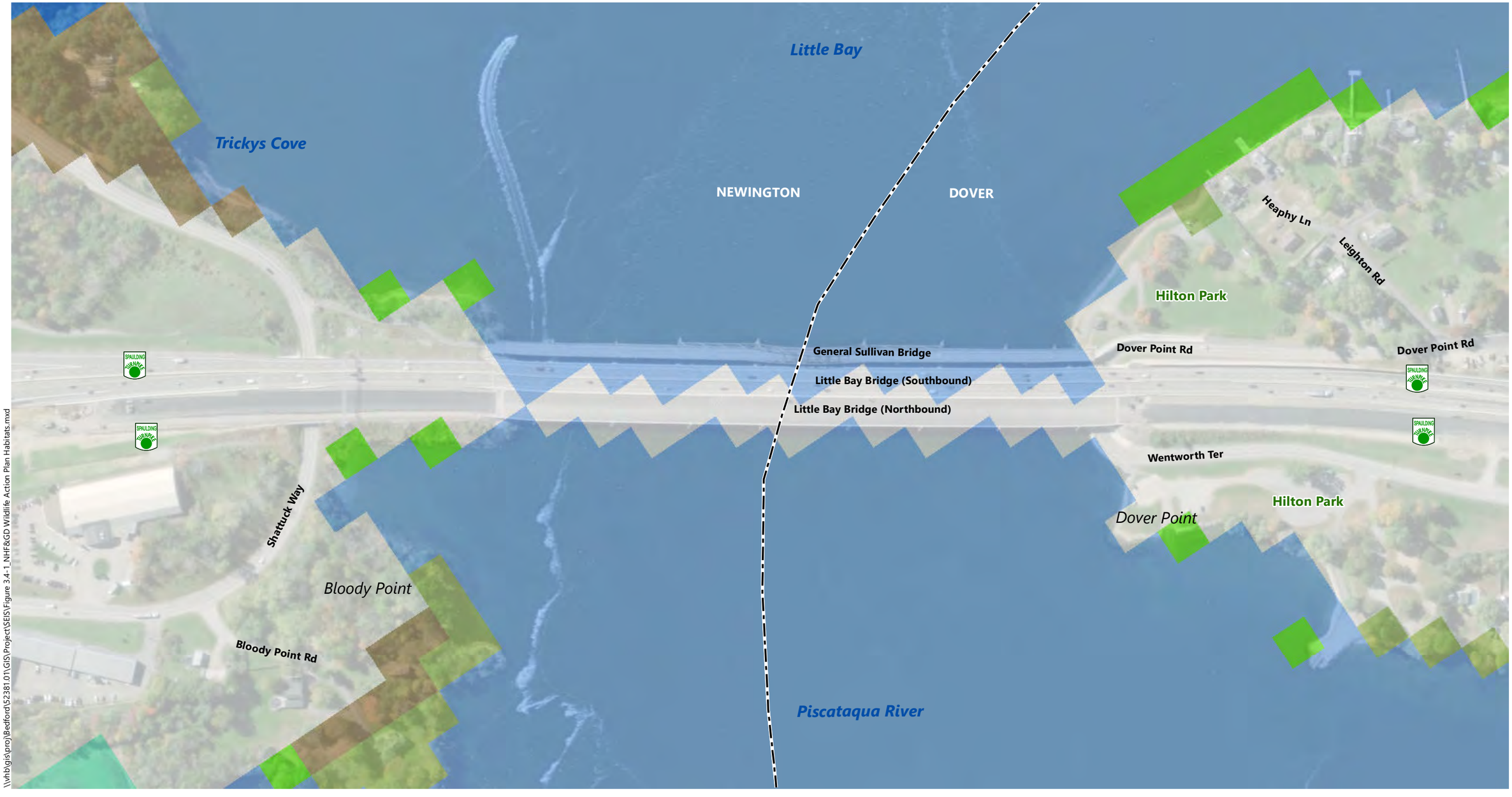
- **Salt Marsh**. Salt marshes are present between ocean and upland and are highly productive habitats, containing plant species that are tolerant of salt and frequently changing water levels.
- **Hemlock-Hardwood-Pine**. This is a transitional forest community between hardwood conifer forests in higher elevations and oak-pine forests in lower elevations. This habitat type has dry, sandy soils with dominant tree species of red oak and white pine, often transitioning to a dominance of hemlock and beech.
- **Appalachian Oak-Pine**. Forests designated as Appalachian Oak-Pine forests contain plant species characteristic of the central Appalachian states.
- **Wet Meadow/Shrub Wetland**. These wetlands are emergent marshes, wet meadows, or scrub-shrub wetlands and are mostly controlled by groundwater. These habitats have poorly-drained muck and mineral soils that are often saturated, but rarely permanently flooded.

Wildlife Habitat Tiers

The NHF&GD identifies ranked habitat tiers via a ranking system which identifies terrestrial and wetland habitats that are in the best condition to meet the needs of wildlife. These ranked habitats are especially considered important for species of greatest conservation need. Habitat tiers are separated into three tier rankings, which are 1) Top Ranked Habitat in the State, 2) Top Ranked Habitat in Biological Region, and 3) Supporting Landscape. The first tier, Top Ranked Habitat in the State, includes the top 15 percent habitat areas, which are known critical habitats of state-listed species and all known alpine, dune, saltmarsh, and rocky shore habitats. The State was then divided into regions to designate the top 30 percent of each habitat type within each region, thus creating the second tier, Top Ranked Habitat in Biological Region. The remaining top 50 percent habitat areas are designated to the Supporting Landscape tier, as well as large continuous tracts of forestland.

The Great Bay is identified as a Tier 1, *Top Ranked Habitat* starting at the GSB and extending west. This Tier 1 habitat includes a small portion of shoreline along the Great Bay in the Study Area. There are additional select areas of Tier 1 habitat along the shoreline of the Piscataqua River in the southeast corner of the Study Area. The Great Bay is ranked as a Tier 1 habitat since the bay is a unique coastal habitat in the State. No Tier 2, *Top Ranked Habitat in Biological*

Figure 3.4-1



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.4-1_NHF&GD Wildlife Action Plan Habitats.mxd

0 125 250 500 Feet

Legend

Town Boundaries

NHF&GD Wildlife Action Plan Habitats

- Appalachian oak-pine
- Hemlock-hardwood-pine
- NLCD Developed or Barren
- Open water
- Salt marsh
- Temperate swamp
- Wet meadow/shrub wetland

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

NHF&GD Wildlife Action Plan Habitats

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT Department of Transportation

Source: NHGRANIT, NHF&GD WAP

Region, or Tier 3, *Supporting Landscape* habitat rankings are located in the Study Area. Refer to **Figure 3.4-2** for more information.

Land uses within the Study Area include residential, with small areas of commercial. The Dover shoreline in the Study Area is largely disturbed. Hilton Park is located on both the east and west sides of the Spaulding Turnpike, with Dover Point Road and Wentworth Terrace running in a "U" shape underneath the Spaulding Turnpike near the Great Bay. This area lacks dense vegetation near the shoreline. The southern portion of the Study Area in Newington is more vegetated than disturbed; however, similar to Dover Point Road and Wentworth Terrace, Shattuck Way runs in a "U" shape under the Turnpike along the point within close proximity to Great Bay, fragmenting this otherwise vegetated coastal habitat.

3.4.1.1 Essential Fish Habitat and Designated Critical Habitat

The ESA Section 7 Mapper was used to determine the presence of ESA-listed species, EFH, and critical habitat for NOAA-managed fish species in the Study Area. Little Bay is designated as EFH for several fish species: Atlantic sturgeon (*Acipenser oxyrhynchus ocyrhynchus*) and shortnose sturgeon (*Acipenser brevirostrum*). Atlantic sturgeon travel into Great Bay and points beyond from the Piscataqua River through Little Bay. Because the Project involves in-water work within Little Bay, an EFH Assessment Worksheet and an Appendix A Verification Form were completed and submitted to NOAA for review. The assessments evaluated the impacts associated with Alternative 9 (Preferred Alternative) as the proposed temporary impacts would be similar under all alternatives. The minor permanent impact differences are noted below in **Section 3.4.2**. A summary of these two assessments is provided below.

Essential Fish Habitat Assessment Worksheet

The 2006 EFH Assessment prepared for the Newington-Dover, Spaulding Turnpike Improvements Project was updated in January 2019 (**Appendix E**). The 2019 EFH Assessment evaluated habitat characteristics of Little Bay and described the anticipated impacts to sediment composition, water salinity, depth, and temperature, as well as aquatic vegetation. The 2019 EFH Assessment also evaluated impacts on the different life stages of species known to occur within the Study Area and depicts the existing types of intertidal and subtidal habitats. The portion of Little Bay in the Study Area is designated EFH habitat for eggs, larvae, juveniles, and spawning adults for several species.[29]

The 2019 EFH Assessment also evaluated the presence of shellfish habitat. The NH Coastal Viewer identified a ±2.8-acre blue mussel shellfish bed in Little Bay along the Dover coastline underneath the GSB in the northern portion of the Study Area. This bed was identified by the NHDES Shellfish Program in 2013.[30]

Atlantic Sturgeon and Shortnose Sturgeon Consultation

The Little Bay is designated critical habitat for Atlantic sturgeon (*Acipenser oxyrhynchus ocyrhynchus*) and shortnose sturgeon (*Acipenser brevirostrum*). The Project was determined to be eligible under the Programmatic ESA Section 7 Consultation since the Project involves work to the bridge structure and meets the applicable project design criteria included in the FHWA Greater Atlantic Regional Fisheries Office 2018 *Not Likely to Adversely Affect Program Appendix A Verification Form* (see **Appendix E**). Atlantic sturgeon is an ESA-listed species, and Little Bay is within a distinct population segment for Atlantic sturgeon. On June 18, 2019 NOAA concurred that the project "*may affect but is not likely to adversely affect*" Atlantic/shortnose sturgeon critical habitat.

3.4.2 Environmental Consequences

This section discusses the anticipated direct and indirect impacts to wildlife habitat types and tiers as identified by the 2015 Wildlife Action Plan, as well as anticipated direct and indirect impacts to EFH and critical habitat for Atlantic sturgeon and shortnose sturgeon. The Project would not impact the Great Bay National Wildlife Refuge nor the Great Bay National Estuarine Research Reserve because of their distance from the Study Area.

3.4.2.1 Direct Impacts

No-Action Alternative

No direct or indirect impacts to wildlife or fishery habitat, EFH, or designated critical habitat would occur under the No-Action Alternative.

Alternative 1

Wildlife Habitat Types and Tiers

Under Alternative 1, direct, temporary impacts would result from the installation of temporary construction access within and adjacent to Little Bay. A minor amount of shoreland habitat would be impacted; generally, this shoreland habitat impact would be limited to previously disturbed areas. Some of this habitat is identified as Tier 1 wildlife habitat, which is part of the greater habitat area of Great Bay, beginning at the GSB and continuing west. Specifically, Alternative 1 would involve minor tree and shrub clearing along the shoreline within the Study Area along the Newington side. Disturbed areas along the shoreline would be restored and plantings would be added upon completion of construction; therefore, these impacts are not anticipated to result in permanent, direct impacts to the habitat of Great Bay or adjacent shoreline.

Essential Fish Habitat

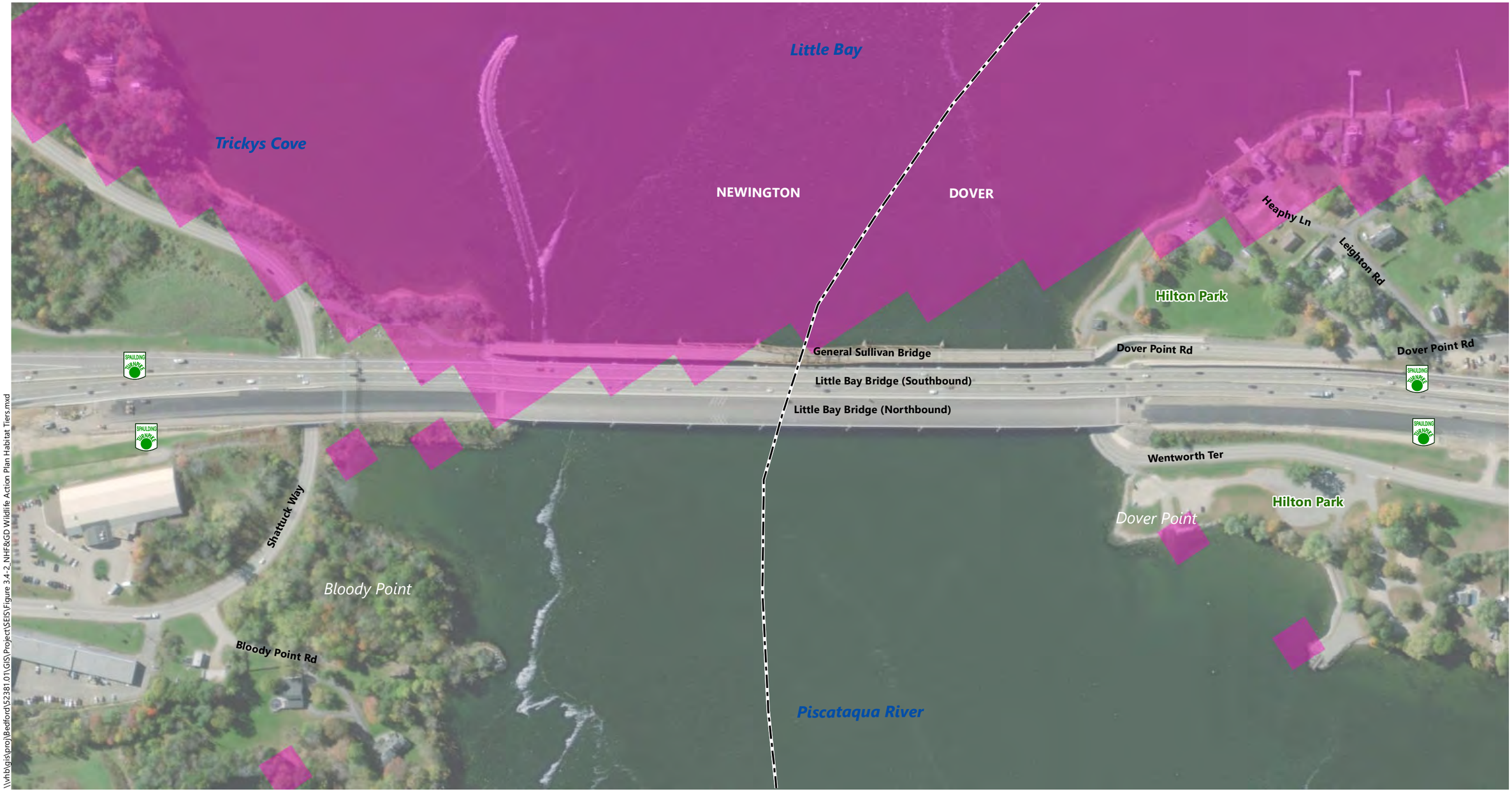
Like the evaluation of Alternative 9 (Preferred Alternative) described below, Alternative 1 would not have a substantial effect on EFH. No permanent impacts to EFH are anticipated under Alternative 1. Direct temporary impacts under Alternative 1 would result from the placement of causeways and trestles which would have localized impacts to the bed, current flows, and

---

[29] A breakdown of species located in the Great Bay at a particular life stage is provided in **Appendix E**, Table 1.

[30] Morrissey, E., and C. Nash. 2013. *Identifying Blue Mussel* (Mytilus edulis) *Resource in Coastal New Hampshire*. NH Department of Environmental Services' Shellfish Program. Accessed from https://www.des.nh.gov/organization/divisions/water/wmb/shellfish/ redtide/aquaculture.htm. Accessed on January 14, 2019.

Figure 3.4-2



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.4-2_NHF&GD Wildlife Action Plan Habitat Tiers.mxd

0 125 250 500 Feet

Legend

Town Boundaries

NHF&GD Wildlife Action Plan Habitat Tiers

Highest Ranked Habitat in New Hampshire

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

NHF&GD Wildlife Action Plan Habitat Tiers

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: NHGRANIT, NHF&GD WAP

acoustic effects within Little Bay. These temporary impacts would be similar under all alternatives.

Temporary impacts under Alternative 1 would occur due to in-water disturbance from the causeways and trestles. The installation and removal of these structures over a one- to two-month period could cause sedimentation, acoustic effects, and habitat disturbance. Direct temporary impacts to EFH would occur under Alternative 1 from the placement of the causeways and trestles involve temporary alterations to the currents of Little Bay at a localized scale and would cause minor changes in tidal velocities. Current flows in the Study Area are complex and have a wide range of directional components and speeds during the tidal cycle. These tidal flow characteristics were studied during the preparation of the 2007 FEIS. Tidal flows, currents, and wave patterns are not expected to be permanently altered as a result of the temporary impacts associated with construction access. Any changes to tidal flow, currents, and wave patterns due to the placement of the causeways and trestles would be temporary and minor.

ESA Designated Critical Habitat

Like the evaluation of Alternative 9 (Preferred Alternative), Alternative 1 is anticipated to have minor impacts to designated critical habitat for Atlantic sturgeon and shortnose sturgeon that may occur within Little Bay. Resources that contribute to known designated critical habitat within the project area include the following: hard bottom substrate; water temperature, flow, salinity, and dissolved oxygen; submerged aquatic vegetation and oyster reefs; noise environment; and aquatic species movement.

Temporary impacts to designated critical habitat under Alternative 1 would include temporary disturbance to the bed of Little Bay from the use of cofferdams and turbidity curtains, and temporary placement of fill from the causeways within the Little Bay. Additionally, temporary noise impacts within this designated critical habitat would occur under Alternative 1 due to pile driving from the temporary causeways and the installation of the temporary trestle. An *Hydroacoustic Impact Assessment* evaluated the potential for noise impacts on Atlantic sturgeon and shortnose sturgeon due to pile driving to install the temporary trestles. The findings of the *Hydroacoustic Impact Assessment* determined that there would be no injury to Atlantic sturgeon or shortnose sturgeon as a result of the installation of the temporary causeways and trestles. These impacts would be similar under all Action Alternatives. No permanent impacts to designated critical habitat would occur under Alternative 1.

Shellfish Habitat

Alternative 1 would result in temporary, direct impacts to about 0.2 acre of the blue mussel shellfish bed due to the installation of causeways and trestles. These temporary structures would be in place throughout the duration of construction. Standard marine construction BMPs would be implemented wherever feasible to mitigate the potential for suspension of sediments and consequent siltation.

Alternative 3

Impacts to wildlife, EFH, designated critical habitat, and shellfish habitat under Alternative 3 would be similar to the impacts described under Alternative 1.

Alternative 6

Wildlife Habitat Types and Tiers

Temporary direct impacts to wildlife habitats and wildlife tiers under Alternative 6 would be similar to those described under Alternative 1. However, Alternative 6 would result in minor additional direct permanent impact to open water habitat due to the removal of the existing GSB Pier 1 and the construction of a new approach span pier in Little Bay near the Dover shoreline. The approach span pier would permanently impact approximately 50 square feet of blue mussel shellfish bed.

Essential Fish Habitat

Temporary impacts to EFH habitat under Alternative 6 would be similar to those described under Alternative 1.

Alternative 6 would result in direct permanent impacts to EFH within Little Bay from the removal and construction of GSB Pier 1. Permanent impacts from the pier removal and construction of a new approach span pier would have a negative effect on EFH habitat because of the addition of a permanent structure, which would result in permanent impacts to the bed and localized currents of Little Bay. Additionally, the new pier would be located within the blue mussel shellfish bed, therefore resulting in approximately 50 square feet of permanent impacts to shellfish habitat (see below).

ESA Designated Critical Habitat

Impacts to designated critical habitat for Atlantic and shortnose sturgeon would be similar as those described in Alternative 1 with the exception of the additional direct permanent impacts proposed within Little Bay from the removal of the existing GSB Pier 1 and construction of a new approach span pier. It is anticipated that the removal and construction of this pier would result in additional noise impacts that would not occur under Alternative 9.

Shellfish Habitat

Like Alternative 1, Alternative 6 would result in temporary, direct impacts to about 0.2 acre of the blue mussel shellfish bed due to the installation of causeways and trestles. Alternative 6 would also result in permanent, direct impact to the blue mussel shellfish bed from the removal of the existing GSB Pier 1 and construction of a new approach span pier.

Alternative 7

Impacts to wildlife, EFH, designated critical habitat, and shellfish habitat under Alternative 7 would be similar to the impacts described under Alternative 6.

Alternative 9 (Preferred Alternative)

Impacts to wildlife and shellfish habitat under Alternative 9 would be similar to the impacts described under Alternative 1.

Essential Fish Habitat

An analysis of impacts to EFH was completed for Alternative 9 (**Appendix E**). The Worksheet concluded that Alternative 9 would not have a substantial effect on EFH. NOAA reviewed this assessment on May 17, 2019 and indicated that the impacts are temporary and minor in nature; NOAA did not have any EFH conservation recommendations (**Appendix E**). Temporary impacts under Alternative 9 would occur due to in-water disturbance from the causeways and trestles. The installation and removal of these structures over a one- to two-month period could cause sedimentation, acoustic effects, and habitat disturbance.

Direct temporary impacts to EFH under Alternative 9 would result from the placement of the causeways and trestles involve temporary alterations to the currents of Little Bay at a localized scale and would cause minor changes in tidal velocities. Current flows in the Study Area are complex and have a wide range of directional components and speeds during the tidal cycle. These tidal flow characteristics were studied during the preparation of the 2007 FEIS. Tidal flows, currents, and wave patterns are not expected to be permanently altered as a result of the temporary impacts associated with construction access. Any changes to tidal flow, currents, and wave patterns due to the placement of the causeways and trestles would be temporary and minor.

ESA Designated Critical Habitat

The Appendix A Verification Form was used to evaluate proposed impacts to ESA-listed species and critical habitat within the Study Area under Alternative 9. Resources evaluated for impacts in the Appendix A Verification Form included: hard bottom substrate; changes in water temperature, flow, salinity, and dissolved oxygen; and submerged aquatic vegetation and oyster reefs. Additionally, under the Appendix A Verification Form the Project was evaluated for noise impacts, impacts from marine vessels, aquatic species movement, use of cofferdams and turbidity curtains, and temporary placement of fill from the causeways within the Little Bay. Further information regarding the impact evaluation can be found in **Appendix E**.

A *Hydroacoustic Impact Assessment* (**Appendix E**) evaluated the potential for noise impacts on Atlantic sturgeon and shortnose sturgeon due to pile driving to install the temporary trestle. The hydroacoustic assessment determined that a sturgeon would need to be within approximately 190 feet (58 meters) of a pile for a prolonged period of time to be exposed to potentially injurious sound levels. If any sturgeon are within 190 feet of a pile at the time pile driving commences, it is expected that sturgeon would leave the area in a matter of seconds. The utilization of a soft start technique would also give any sturgeon in the area time to move out of the range of potential injury causing noise; therefore, no injury to Atlantic sturgeon or shortnose sturgeon is anticipated.

Additionally, underwater sound levels would be below 150 dBRMS[31] at distances beyond approximately 256 feet (78 meters) from the pile being installed. If sturgeon were to go into the area where sound levels exceed 150 dBRMS, it is reasonable to assume that a sturgeon would redirect its course of movement away from the area where pile driving is occurring. Given the small distance a sturgeon would need to move to avoid disturbances, these temporary noise impacts would not result in substantial, adverse impacts to sturgeon.

Upon completion of the Appendix A Verification Form, NHDOT and FHWA determined that Alternative 1 "*may affect but not likely to adversely affect*" Atlantic sturgeon and shortnose sturgeon, or their critical habitat.[32] Applicable minimization and mitigation measures would be followed during construction to ensure impacts to these species would be minimized to the greatest extent practicable. Additionally, the Project would comply with the *NMFS/FHWA Best Management Practices Manual for Transportation Activities in the Greater Atlantic Region* (April 2018).

3.4.2.2 Indirect Impacts

No-Action Alternative

No indirect impacts to wildlife habitat, EFH, designated critical habitat, or shellfish habitat are anticipated to occur under the No-Action Alternative, since there would not be any changes to the existing GSB infrastructure or surrounding area.

Action Alternatives

Potential indirect impacts of the Action Alternatives to wildlife habitat, EFH, designated critical habitat, and shellfish habitats are described below.

Wildlife Habitat Types and Tiers

None of the Action Alternatives would cause temporary or permanent indirect impacts to wildlife habitat types or tiers within the Study Area.

Essential Fish Habitat

The in-water work of all Action Alternatives has the potential to cause temporary, indirect impacts to prey species of federally managed fish species. No measurable indirect impacts to these species' populations are anticipated; prey species are expected to return to existing conditions once in-water work is complete and all disturbed areas have been restored.

ESA Designated Critical Habitat

Under all Action Alternatives, indirect impacts to Atlantic sturgeon and shortnose sturgeon are similar to potential indirect impacts to EFH, including temporary alterations to the currents of Little Bay at a localized scale and minor changes in tidal velocities. Since these changes to tidal flow, currents, and wave patterns are expected to be temporary and minor in nature, any indirect impacts are not anticipated to adversely affect Atlantic sturgeon or shortnose sturgeon.

Shellfish

All Action Alternatives would result in minor, temporary, indirect impact to shellfish habitat from the proposed in-water work. Impacts under Alternatives 6 and 7 would result in the greatest indirect impacts to shellfish habitat due to the additional work of removing and reconstructing

[31] "RMS" sound level (dBRMS) represents the root-mean squared sound pressure over a duration (typically 50 to 100 milliseconds).

[32] Johnson, Mike. US Department of Commerce, NOAA Fisheries, Greater Atlantic Regional Fisheries Office, Habitat Conservation Division. Personal communication, May 17, 2019. (Refer to **Appendix E**).

GSB Pier 1, since there would be a greater disturbance within the bed of Little Bay. Upon completion of construction, areas indirectly disturbed would become re-established over time.

3.4.3 Mitigation

Because wildlife impacts are considered minor, no specific mitigation is proposed. However, the following list of environmental commitments would minimize potential impacts to wildlife:

- Erosion and sediment control BMPs composed of wildlife friendly materials such as woven organic material would be used during the construction period, as recommended by the NHF&GD.
- Tree and shrub clearing and ground disturbing impacts would be reduced to the extent practicable during design and construction to limit unnecessary impacts on wildlife habitat.
- Areas of disturbance along the shoreline of Little Bay would be stabilized and plantings installed as appropriate as part of site restoration.

No compensatory mitigation for the proposed permanent and temporary impacts within EFH habitat is required. All impacts to EFH and designated critical habitat would be temporary (except for the minor permanent impact associated with the replacement pier required by Alternatives 6 and 7) and standard BMPs for marine construction would be used for the Project, wherever feasible. BMPs would be implemented to mitigate the potential for suspension of sediments and consequent siltation during in-water construction.

Based on correspondence with NOAA's Greater Atlantic Regional Fisheries Office, the following list of environmental commitments would be implemented to protect the water quality and aquatic habitat of Great Bay, and reduce risk of impact to aquatic species:

- A drainage and erosion control plan for all shoreside construction would be implemented, including BMPs to control and capture silt-laden stormwater runoff.
- Standard marine construction BMPs would be implemented wherever feasible to mitigate the potential for suspension of sediments and consequent siltation.
- The contractor would be directed to divert runoff to temporary erosion check dams or to capture runoff using silt fences, hay bales, silt socks, mulch filter berms, or temporary detention basins.
- Areas of soil disturbance would be seeded and mulched as quickly as possible after initial grading.
- The contractor would be required to inspect all construction BMPs on a daily basis to ensure that they are properly installed and maintained.
- Standard BMPs will be used for in-water and shoreside construction to address potential fuel or oil spills from the construction equipment, and to mitigate the potential for suspension of sediments and consequent siltation.
- An emergency response plan for all spills would be in place prior to construction.
- The Project would comply with the *NMFS/FHWA Best Management Practices Manual for Transportation Activities in the Greater Atlantic Region* (April 2018).
- Care will be taken to minimize impacts to shellfish beds, particularly those adjacent to Dover Point. If needed and determined practical, shellfish may be relocated outside of the temporary impact area associated with the temporary construction causeway.

3.5 Threatened and Endangered Species

Threatened, endangered, and special concern species and exemplary natural communities are natural resources that are historically known to occur within New Hampshire but are protected and given special consideration due to their declining presence in the State. The NH Endangered Species Conservation Act (RSA 212-A) delegates authority and responsibility for the listing and protection of threatened and endangered wildlife species in New Hampshire to the NHF&GD. The NHF&GD developed the *Nongame and Endangered Wildlife Program* in 1988 to manage and steward these species. The NHF&GD manages threatened and endangered species cooperatively with the New Hampshire Natural Heritage Bureau (NHNHB). The *New Hampshire Plant Protection Act of 1987* (RSA 217-A), enacted by the New Hampshire Legislature in 1987, established the authority for the State to develop a list of rare plant species. The NHNHB was designated this authority and developed the list in NH Administrative Rules Res 1100, *et seq*.

The federal ESA (P.L. 93-205), as amended in 1978, 1982, and 1988, recognizes the need and provides the means to protect rare plants and invertebrate and vertebrate species of fish and wildlife, and provides for the protection and/or acquisition of critical habitats and the management of endangered species. Section 7(a)(2) of the ESA dictates that all Federal agencies must consult the US Department of the Interior to ensure that actions taken under federal funding, federal assistance, or federal permits (*e.g.*, Section 404 Wetland Fill Permits) do not jeopardize the existence of threatened or endangered species. Jurisdiction is given to US Department of the Interior to recommend changes to the Project to avoid such jeopardy (including impacts to the habitat as well as to the plants or animals themselves).

3.5.1 Affected Environment

Determining the presence of State rare, threatened, and endangered plant, animal, and natural communities within or near the Study Area was determined by consultation through letters and email with Amy Lamb (NHNHB), Carol Henderson (NHF&GD), and Cheri Patterson (NHF&GD).

The presence of federally listed or proposed, threatened, or endangered species, designated critical habitat, or other natural resources of concern within or near the Study Area was determined using the USFWS Information Planning and Conservation (IPaC) System. The IPaC tool streamlines the USFWS coordination process regarding potential impacts to federally threatened or endangered species by producing a report of the known occurrences of federally threatened or endangered species that may be present within one mile of the Project Footprint, and then providing opportunities for online consultation for certain species rather than contacting the local USFWS office. In New Hampshire, state agencies may conduct consultation with the USFWS through the IPaC tool regarding potential impacts to certain species such as the Northern Long-eared bat (NLEB).

In addition to the species managed under the NHNHB, NHF&GD, and USFWS, ESA-listed species managed under NOAA were identified using the ESA Section 7 Mapper. The Mapper identified

Great Bay as a distinct population segment (DPS) for Atlantic sturgeon, an ESA-listed species. Information about this species and impacts anticipated as a result of the Project were previously discussed in **Section 3.4**, *Wildlife and Fisheries*.

Below is a discussion of the rare, threatened, or endangered species identified by the NHNHB and USFWS that are known to occur within or near the Study Area.

3.5.1.1 State-Listed Species Occurrences

A search for the occurrence of state-listed rare, threatened, or endangered plant or animal species or natural communities within the vicinity of the Study area was completed using the NHNHB online DataCheck tool. A report dated February 8, 2021 indicated the presence of prolific yellow-flowered knotweed (*Polygonum ramosissimum spp. prolificum*), smooth black sedge (*Carex nigra*), eelgrass beds (*Zostera marina*), Atlantic sturgeon (*Acipenser oxyrinchus*), shortnose sturgeon (*Acipenser brevirostrum*), and cliff swallow (*Petrochelidon pyrrhonota*) within the Study Area, as well as a sparsely vegetated intertidal system and subtidal system (see **Appendix F**).

The NHNHB report indicates prolific yellow-flowered knotweed under the GSB and LBBs in Hilton Park, as well as smooth black sedge south of the GSB in Newington. Coordination with the NHNHB initially occurred in 2012, at which time NHNHB conducted surveys within wetland areas along the Spaulding Turnpike south of the GSB. During the 2012 surveys, smooth black sedge was found within five wetlands along the Turnpike. An additional survey conducted by NHNHB in October 3, 2019 did not identify prolific yellow-flowered knotweed or smooth black sedge in areas where is has historically been known to occur.

The NHNHB report identified three locations where eelgrass beds have been documented in the general vicinity of the GSB. The eelgrass beds are located downstream (easterly) in the Piscataqua River and upstream (westerly) in Little Bay. The nearest westerly population is approximately 2,800 feet away from the GSB, and the nearest easterly population is approximately 1,700 feet away from the GSB.

The report also indicated the presence of cliff swallow near the Study Area; upon consultation with Pamela Hunt at NH Audubon (refer to **Appendix G**), cliff swallows are not currently known to be nesting on the GSB, having abandoned the site around 2012 or 2013. In addition to these species, the NHNHB report indicated that the project spans a sparsely vegetated intertidal system and subtidal system.

3.5.1.2 Federally-Listed Species Occurrences

The USFWS IPaC tool was used to confirm the presence of any federally listed or proposed, threatened, or endangered species, designated critical habitat, or other natural resources of concern within the Study Area. The IPaC results letter dated July 12, 2019 indicated that NLEB (*Myotis septentrionalis*) may occur within the Study Area (refer to the IPaC report in **Appendix H**). The IPaC official species list was updated on January 19, 2021 and confirmed that the only federally listed species potentially within the project area is the NLEB. No known hibernacula exist within 0.5 miles of the Study Area, and no known roost trees exist within 0.25 miles of the Study Area. One roost location is present in Newington; however, this roost site is greater than 0.25 miles from the Study Area. Although no known hibernacula or roost trees exist in the vicinity of the Study Area, there are small areas of habitat that would support NLEB species.

The NHNHB report identified Atlantic sturgeon and shortnose sturgeon within the vicinity of the Project, which is consistent with the mapping of designated critical habitat for these species according to the ESA Section 7 Mapper.[33]

3.5.2 Environmental Consequences

Below is a discussion of the anticipated impacts the Project would have on the rare, threatened, or endangered species identified within the Study Area.

3.5.2.1 Direct Impacts

No-Action Alternative

No direct impacts to threatened or endangered species are anticipated as a result of the No-Action Alternative since there would not be any changes to the existing GSB infrastructure or surrounding area.

Alternative 1

State-Listed Species

The NHNHB report dated February 8, 2021 indicated the presence of prolific yellow-flowered knotweed and smooth black sedge in the vicinity of the Study Area (see **Appendix F**). Specifically, the NHNHB report indicates prolific yellow-flowered knotweed under the GSB and LBBs in Hilton Park, and smooth black sedge south of the GSB in Newington. The NHDOT has consulted with the NHNHB since 2012 regarding these species. The NHNHB conducted surveys for these plants in 2012, during which smooth black sedge was found within five wetlands along the Turnpike. When an additional survey was conducted by NHNHB in October 3, 2019, no prolific yellow-flowered knotweed or smooth black sedge were identified in areas where they were historically known to occur. Therefore, the NHNHB does not anticipate any negative impacts to these species as a result of the proposed project. **Appendix F** provides the email correspondence and associated photographs from NHNHB relaying this information.

The NHNHB report identified eelgrass beds in the Piscataqua River and Little Bay. The potential impacts of the Project primarily relate to possible sedimentation at these eelgrass beds. All of the Action Alternatives (Alternatives 1, 3, 6, 7, and 9) will cause temporary, in-water disturbance from installation and removal of the proposed causeways and trestles for construction access. The installation and removal of these structures over a one- to two-month period may cause limited

[33] National Oceanic and Atmospheric Administration Fisheries. 2018. *Section 7 Mapper*. Greater Atlantic Region. Accessed from https://noaa.maps.arcgis.com/apps/webappviewer/ index.html?id=1bc332edc5204e03b250ac11f9914a27. Accessed on January 11, 2019. See **Section 3.4** for further discussion.

sedimentation. Any impacts are likely to be limited to a temporary increase in turbidity and suspended solids. Because of substantial tidal exchange and normal river flows, water quality at the project site is expected to return quickly to its pre-disturbance condition. BMPs would be implemented to mitigate the potential for suspension of sediments and consequent siltation during in-water construction.

Based on the distance to the nearest eelgrass bed (approximately 1,700 feet to the east and 2,800 feet to the west) and the limited impacts and duration of the in-stream work, NHDOT has concluded that the potential impacts to eelgrass beds is unlikely. As documented in an email dated March 31, 2021, the NHNHB also does not expect impacts to eelgrass beds as a result of the Project. **Appendix F** provides the correspondence between NHDOT and NHNHB.

The NHNHB report identified Atlantic sturgeon and shortnose sturgeon within the vicinity of the Project, which is consistent with the mapping of designated critical habitat for these species according to the ESA Section 7 Mapper.[34] Based on the work that would be anticipated to be completed to rehabilitate or replace the bridge for Alternative 9 (Preferred Alternative), NOAA concurred that the project "*may affect but is not likely to adversely affect*" Atlantic/shortnose sturgeon critical habitat per correspondence with William Barnhill, NOAA, June 18, 2019 (refer to **Section 3.4**, *Wildlife and Fisheries*, as well as **Appendix E**). The proposed temporary impacts would be similar under Alternative 1.

As previously mentioned, cliff swallows have historically used the GSB for nesting; however, cliff swallows have not been documented using the bridge since 2012 or 2013. The NHF&GD and NH Audubon coordinated with the NHDOT regarding possible mitigation opportunities that could be incorporated with the new bridge. The NHF&GD recommended installing clay nests along the bridge to attract cliff swallows due to their historic use of the bridge, however NHDOT is opposed to using clay nests because of anticipated compromising bridge maintenance efforts. Communications with the NHF&GD and NH Audubon is provided in **Appendix G**.

The NHNHB report indicated that the project spans a sparsely vegetated intertidal system and subtidal system. The proposed in-water work would impact both of these systems. The NHDOT has coordinated with NOAA regarding the proposed impacts to fish and marine habitat. Additionally, coordination with the NHF&GD Marine Program is ongoing. As previously described in **Section 3.1**, *Wetlands and Surface Waters*, the temporary causeways and trestles would have a direct temporary impact on intertidal and subtidal habitats within Little Bay, including impacts to a blue mussel shellfish bed located under the GSB and along the shoreline extending to the west. Impacts to intertidal and subtidal habitats are anticipated to rebound upon removal of the temporary causeways and trestles once construction is complete.

Federally-Listed Species

Construction impacts for Alternative 1 would involve minor tree and shrub clearing to make room for the temporary construction access and causeways. All tree clearing would occur within 300 feet of existing roadways. Additionally, a survey for the presence of NLEB on the GSB structure was completed on September 26 and 27, 2018. During the survey no signs of NLEB roosting locations were detected on or under the bridge structure. Since there is the potential for NLEB species to be present within the vicinity of the Project and the Project would impact the bridge structure and trees in the Project's limit of disturbance, coordination with the USFWS was required to assess potential impacts to the NLEB.

Based on this information, a determination key was completed for the Project through the USFWS IPaC system. In response to the determination key, the USFWS provided a concurrence verification letter (Consultation Code 05E1NE00-2019-F-2285), stating that the Project adheres to the criteria of the *Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat* (revised February 5, 2018), and therefore satisfies the requirements under Section 7(a)(2) of the ESA of 1973 (refer to **Appendix H**). The official effect determination of "*may affect - likely to adversely affect*" is valid as long as applicable Avoidance and Minimization Measures (AMMs, provided in **Appendix H** and **Section 3.5.3**) are adopted into the final plans and are implemented during construction. Additionally, a survey for the presence of NLEB on the GSB structure will need to be done prior to construction in accordance with the Programmatic Biological Opinion. While the Project may affect the NLEB, the resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

Alternative 3

Impacts to threatened and endangered species under Alternative 3 would be the same as the impacts described under Alternative 1.

Alternative 6

Under Alternative 6, impacts to threatened or endangered species would be similar to that described under Alternative 1 with the exception of the additional direct, permanent impacts to subtidal and intertidal systems from the removal of the existing GSB Pier 1 and construction of a new pier within Little Bay to support a new bridge span, as described in **Section 3.1**, *Wetlands and Surface Waters*. The replacement pier would have slightly greater temporary impacts on Atlantic and shortnose sturgeon, as described in **Section 3.4**, *Wildlife and Fisheries*. Under Alternative 6, the potential for suspension of sediments and consequent siltation during in-water construction is greater than Alternatives 1, 3, and 9 due to the construction of a new pier within Little Bay.

Alternative 7

Impacts to threatened or endangered species under Alternative 7 would be the same as the impacts described under Alternative 6.

Alternative 9 (Preferred Alternative)

Impacts to threatened or endangered species under Alternative 9 would be the same as the impacts described under Alternative 1.

[34] National Oceanic and Atmospheric Administration Fisheries. 2018. *Section 7 Mapper*. Greater Atlantic Region. Accessed from https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=1bc332edc5204e03b250ac11f9914a27. Accessed on January 11, 2019.

3.5.2.2 Indirect Impacts

No-Action Alternative

No indirect impacts to threatened or endangered species are anticipated as a result of the No-Action Alternative since there would not be any changes to the existing GSB infrastructure or surrounding area.

Action Alternatives

While Alternatives 6 and 7 involve direct permanent impact to intertidal and subtidal systems and a greater degree of temporary impact to Atlantic and shortnose sturgeon, no indirect impacts to threatened or endangered species are anticipated to occur as a result of any of the Action Alternatives.

3.5.3 Mitigation

In addition to the environmental commitments in **Section 3.4.3**, *Wildlife and Fisheries*, the following mitigation measures would be implemented during construction to reduce or eliminate potential impacts to threatened and endangered species and natural communities.

- If a threatened, endangered, or rare plant species is encountered during construction that was not documented prior to construction, construction activities in that area would temporarily cease until the plant has been relocated.
- The existing bridge structure will be re-surveyed to identify any use by NLEB following the procedures in Appendix D of the *Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat* (revised February 5, 2018).
- The following AMMs shall be followed to comply with the NLEB effect determination (refer to the USFWS concurrence letter in **Appendix H**).
  - Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.
  - Direct temporary lighting away from suitable habitat during the active season.
  - When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting).
  - Modify all phase/aspects of the project (*e.g.*, temporary work areas) to minimize tree removal.
  - Ensure tree removal is minimized to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field.
- Wildlife friendly erosion control methods shall be implemented during construction such as woven organic material for erosion control blankets. Welded plastic, biodegradable plastic, or threaded erosion control materials shall not be used as part of construction.
- Since soil disturbance is anticipated to occur as part of the Project, the contractor(s) shall be required to develop and implement an appropriate Invasive Species Control and Management Plan which adheres to NHDOT's publication *Best Management Practices for the Control of Invasive and Noxious Plant Species* (2018) during construction to minimize the spread of invasive plant species within the area of ground disturbance. Only clean equipment that is free of plant material and debris shall be delivered to the Project site and utilized during construction. All machinery entering and leaving any area containing invasive plants will be inspected for foreign plant matter (stems, flowers roots, etc.) and embedded soil. If foreign plant matter/soil is present, the operator shall remove the plant material and soil from the machine using acceptable methods.

3.6 Farmlands

The identification and protection of farmlands is important to the national, regional and local economies; therefore, consideration of potential impacts from federal activities on- or adjacent to prime or unique farmlands is necessary. The Farmland Protection Policy Act (FPPA) of 1984 (7 USC 4201) provides guidelines to Federal agencies involved in projects that may convert existing or potential farmland areas to non-agricultural uses. The FPPA directs Federal agencies to *"…(a) identify and take into account the adverse effects of their programs on the preservation of farmland, (b) to consider alternative actions, as appropriate, that could lessen adverse effects, and (c) to ensure that their programs, to the extent practicable, are compatible with State and units of local government and private programs and policies to protect farmland…"* (7 CFR 658.1). FHWA's Technical Advisory T6640.8A (October 30, 1987) further directs that impacts on farmlands be assessed as part of the environmental assessment for all transportation projects.

The FPPA outlines several exemptions which apply to projects that occur within urbanized areas as identified by the US Census Bureau or areas already in development. Farmlands are defined as *already in* areas of development in the FPPA as, *Farmland "already in" urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as "urbanized area" (UA) on the Census Bureau Map* (7 CFR 658.2).

3.6.1 Affected Environment

Urbanized areas maps are available by the US Census Bureau from the 2010 Census.[35] Review of urban area reference maps determined that the Study Area occurs entirely within the following two UAs: Dover – Rochester, NH – ME 24607 on the Dover side of the Study Area and Portsmouth, NH – ME 71506 on the Newington side of the Study Area.

[35] US Census Bureau. *2010 Census Urban Area Reference Maps*. Revised October 16, 2019. Accessed from https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-urban-areas.html. Accessed on June 25, 2019.

3.6.2 Environmental Consequences

Impacts to farmlands result from the conversion or loss of undeveloped properties and prime or unique farmlands (as defined by the FPPA or the US Department of Agriculture) to paved or disturbed surfaces. Due to the Project occurring entirely with areas exempt from the FPPA, prime farmlands were not evaluated.

3.6.2.1 Direct Impacts

Due to the location of the Project within UAs it is exempt from the FPPA. Additionally, the Study Area lies entirely within State of New Hampshire parcels and bridge piers or abutments. Parcels where construction access and laydown would occur are parklands (on the Dover side of the Study Area) and State Highway right-of-way (on the Newington side of the Study Area). During construction, activities would occur in the areas leading up to the bridge abutments in Newington and Dover, as illustrated in the Preliminary Construction Impact Plans (**Appendix D**). Disturbed areas would be restored to existing conditions after construction. It is anticipated that any disturbed areas would rebound after construction.

3.6.2.2 Indirect Impacts

The Project would not result in indirect impacts on farmlands as the induced growth impacts from land conversion were evaluated in the 2007 FEIS.

3.6.3 Mitigation

No mitigation is required because the Project would have no impacts to farmlands.

3.7 Air Quality

The Clean Air Act, as amended, protects the quality of the nation's air resources at both the federal and state level. It established the National Ambient Air Quality Standards (NAAQS) for various criteria pollutants in order to protect the health and welfare of the general public. From a transportation perspective, the primary pollutants of concern are carbon monoxide, volatile organic compounds, and oxides of nitrogen, which are emitted from gasoline and diesel engines. Highway agencies are required to consider the impacts of their projects on a local and a regional level.

3.7.1 Affected Environment

The Project is located in both the Town of Newington and City of Dover, in Rockingham and Strafford County, respectively. The Clean Air Act, as amended divided the State into attainment and non-attainment areas with classifications based upon the severity of the air quality problems. A nonattainment area is an area that has had measured pollutant levels that exceed the NAAQS and that has not been designated to attainment. The Clean Air Act, as amended, established emission reduction requirements that vary depending on an area's classification.

Based on the US Environmental Protection Agency's (EPA) Green Book[36], both Rockingham and Strafford Counties were designated as nonattainment areas for 1-hour (1979-Revoked) and 8-hour (1997-Revoked) Ozone standards. Rockingham County is also designated as nonattainment for Sulfur Dioxide, but Sulfur Dioxide is not a pollutant of transportation concern due to the restriction of sulfur content in on-road diesel fuels. These counties are in attainment for all other criteria pollutants.

3.7.2 Environmental Consequences

The Project is not expected to result in substantial direct or indirect, permanent or temporary, impacts on air quality. The 2007 FEIS evaluated air quality associated with the GSB and LBBs. The analyses in the 2007 FEIS considered both regional and local air quality associated with motor vehicle traffic traveling over the LBBs. The larger Newington-Dover, Spaulding Turnpike Improvements Project was incorporated into the State Transportation Improvement Plan and associated Conformity analysis and no regional impacts were found. The 2007 FEIS also evaluated local air quality by conducting microscale "hotspot" modeling that determined that all pollutant concentrations would be below the NAAQS, meaning no local air quality impact was anticipated.

During operations, the GSB would not be a substantial source of pollutant emissions since it would carry pedestrian and bicycle traffic and would not affect motor vehicle traffic on the LBB. Since the Project would not change the design of the roadway or result in changes to traffic volumes, it is assumed that there would be no long-term change in air quality impacts relative to the impacts discussed in the 2007 FEIS. The following sections consider both the direct and indirect impacts associated with the construction and operations of the Project.

3.7.2.1 Direct Impacts

Direct impacts are evaluated for both the operational period (*i.e.,* open for public use) and construction period of the Project. This section is organized by alternative, discussing direct impacts resulting from each alternative individually. However, none of the Action Alternatives (Alternatives 1, 3, 6, 7, and 9) would cause a substantial source of pollutant emissions since the bridge would carry pedestrians and bicyclists and would not affect motor vehicle traffic on the LBBs.

Construction of the Project would temporarily result in increased pollutant emissions associated with construction equipment. The intensity and duration of construction are considered for each of the alternatives. General construction air quality mitigation measures are described in **Section 3.7.3**.

---

[36] US Environmental Protection Agency. *Green Book Website*. Accessed from https://www.epa.gov/green-book. Accessed on July 15, 2019.

No-Action Alternative

Under the No-Action Alternative, non-motorized transportation across the Little Bay would be permanently eliminated and no construction would occur. As the lack of a viable non-motorized connection across Little Bay could be expected to increase vehicular traffic using the LBB, which could result in a minor increase in vehicle emissions.

Alternative 1

As Alternative 1 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs, it would not be a substantial source of pollutant emissions during operations. As such, no permanent direct impacts are anticipated for Alternative 1.

Alternative 1 would result in a temporary increase of emissions during construction. Emissions from the operation of construction equipment would include nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter. These emissions would be temporary and the locations at which they occur would change over time. The construction of Alternative 1 is anticipated to last 3 years, the longest of all the Action Alternatives. The construction would involve the reuse of all existing piers and general rehabilitation of the existing steel truss. Although the duration is longer, the rehabilitation work would likely be less pollutant intensive than the complete replacement of spans and piers occurring in other Action Alternatives.

Alternative 3

As Alternative 3 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs, it would not be a substantial source of pollutant emissions during operations. As such, no permanent direct impacts are anticipated for Alternative 3.

Alternative 3 would result in a temporary increase of emissions during construction. Temporary air quality impacts associated with Alternative 3 are expected to be similar to Alternative 1. The construction of Alternative 3 is anticipated to last 2 years. The construction would involve the reuse of all existing piers and rehabilitation of the thru-truss main spans 4, 5 and 6 and the replacement of the approach spans 1, 2, 3, 7, 8 and 9. Although the duration is shorter than Alternative 1, pollutant emissions associated with the replacement of the approach spans may be more intensive, although temporary in nature.

Alternative 6

Alternative 6 would construct the non-motorized, recreational path adjacent to traffic on the southbound LBB. As the alternative would preserve the existing roadway geometries, no permanent direct impacts are anticipated for Alternative 6.

Alternative 6 would result in a temporary increase of emissions during construction. The construction of Alternative 6 is anticipated to last 1.5 years and would involve the replacement of GSB Pier 1, and reuse of all other existing piers. Under Alternative 6, the deck of the southbound LBB would be widened approximately 17.5 feet to the west to accommodate a new multi-use path on the LBB. To accomplish this widening, the GSB superstructure would be removed, since the GSB is approximately 15 feet from the LBB. Although the construction duration is shorter than Alternatives 1 and 3, temporary pollutant emissions associated with constructing the new superstructure and pier would be more intensive, due to the required removal of the existing GSB. This alternative would also temporarily impact motor vehicle traffic on the southbound LBB, increasing delays and pollutant emissions during lane closures and times of reduced capacity.

Alternative 7

As Alternative 7 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs, it would not be a substantial source of pollutant emissions during operations. As such, no permanent direct impacts are anticipated for Alternative 7.

Alternative 7 would result in a temporary increase of emissions during construction. Temporary air quality impacts associated with Alternative 7 are expected to be largely similar to those described under Alternative 6, as the alternatives are similar. The construction of Alternative 7 is anticipated to last 1.5 years and would involve the replacement of GSB Pier 1, and reuse of all other existing piers. Alternative 7 varies from Alternative 6 in that Alternative 7 involves an independent deck versus the widened LBB deck. Alternative 7 would also temporarily impact motor vehicle traffic on the southbound LBB, increasing delays and pollutant emissions during roadway closures and times of reduced capacity.

Alternative 9 (Preferred Alternative)

As Alternative 9 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs, it would not be a substantial source of pollutant emissions during operations. As such, no permanent direct impacts are anticipated for Alternative 9.

Alternative 9 would result in a temporary increase of emissions during construction. The construction of Alternative 9 is anticipated to last 1.5 years. The construction would involve the reuse of all existing piers and complete replacement of the existing steel truss with a new steel girder superstructure. Although the construction duration is shorter than Alternatives 1 and 3, pollutant emissions associated with the new superstructure would be more intensive although still temporary in nature, due to the required removal of the existing GSB superstructure.

3.7.2.2 Indirect Impacts

The secondary air quality impacts associated with secondary growth were not evaluated in the 2007 FEIS and cannot be reasonably estimated in this DSEIS. These types of impacts are typically included in future emission estimates of Conformity Analyses for the New Hampshire State Implementation Plan.

Under the No-Action Alternative, non-motorized transportation across the Little Bay would be permanently eliminated and no construction would occur. As such, no indirect impacts are anticipated for the No-Action Alternative.

All Action Alternatives would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs. None of the Action Alternatives would be a substantial source of pollutant emissions. As such, no indirect impacts are anticipated for any of the Action Alternatives.

3.7.3 Mitigation

No substantial air quality impacts are anticipated during the operation of the Project; therefore, no mitigation measures are proposed. Construction activity associated with all Action Alternatives would not cause a substantial adverse air quality impact but would result in a temporary increase in pollutant emissions. The NHDOT will require the contractors involved with construction to include air pollution control devices on heavy diesel construction equipment, in accordance with applicable state and federal laws at the time of construction. The merits and practicality of more stringent or voluntary specification measures will be considered through the final design process with input from the contracting community at large. Mitigating fugitive dust emissions involves minimizing or eliminating its generation. Mitigation measures that will be used for construction include wetting and stabilization to suppress dust generation, cleaning paved roadways, and scheduling construction to minimize the amount and duration of exposed earth.

3.8 Noise

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. Highway noise has the potential to affect people living and working near highways by causing annoyance or interfering with speech.

3.8.1 Affected Environment

The NHDOT[37] and FHWA[38] noise impact assessment procedures for Type I projects include identifying receptor locations, predicting existing and future highway noise levels, determining project noise impacts, and evaluating noise abatement measures. A Type I project is a highway project that results in the construction of a new highway or the physical alteration of an existing highway that substantially changes either the horizontal or vertical alignment or increases the number of through travel lanes.

In the 2007 FEIS, noise measurements and modeling using FHWA's Traffic Noise Model were used to evaluate existing noise conditions at noise receptors. Most noise receptor locations in the study area are residential (Activity Category B). Existing (2007) sound levels at all the receptors analyzed in the 2007 FEIS ranged from 39 to 71 dBA[39] depending on proximity to the Spaulding Turnpike. Current (2019) sound levels in the GSB Project Study Area would vary marginally from these values due only to changes in traffic volumes since 2007 and the construction of the southbound LBB.

3.8.2 Environmental Consequences

The 2007 FEIS noise analysis results indicated that receptors on Fox Run Road and Shattuck Way in Newington, as well as receptor locations on Dover Point Road, Hilton Park, Wentworth Terrace, Cote Drive, Spur Road, and Homestead Lane in Dover would approach or exceed the noise abatement criteria. The 2007 FEIS determined that sound barriers would be feasible and reasonable on both the east and west sides of the Turnpike between the LBB and Exit 6 and on both the east and west sides of the Spaulding Turnpike north of Exit 6.

3.8.2.1 Direct Impacts

Direct impacts have been evaluated for both the operations and construction of the GSB. During operations, the GSB would not be a substantial source of noise since it would carry pedestrians and bicyclists and would not affect motor vehicle traffic on the LBBs.

The Action Alternatives would result in a temporary increase in noise associated with construction equipment, and no permanent changes in noise level. The types of construction activities that would generate noise include pile driving and other construction activities. The intensity and duration of construction have been considered for each of the Action Alternatives. Potential hydroacoustic effects on fish due to underwater pile driving is discussed in **Section 3.4**, *Wildlife and Fisheries*.

No-Action Alternative

Under the No-Action Alternative, non-motorized transportation across the Little Bay would be permanently eliminated and no construction would occur. As such, there would be no construction noise and no direct noise impact (either temporary or permanent) would occur.

Alternative 1

Alternative 1 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs. Therefore, it would not be a substantial source of noise during operations and there would be no permanent direct noise impacts.

Alternative 1 would result in a temporary increase in noise during construction. The construction of Alternative 1 is anticipated to last 3 years, the longest of all Action Alternatives. Thus, construction noise exposure in Alternative 1 would last the longest. The construction would involve the reuse of all existing piers and general rehabilitation of the existing steel truss. Although the duration is longer, the rehabilitation work would likely be less noise intensive than the complete replacement of spans and piers occurring in other Action Alternatives as the partial or complete removal of the bridge superstructure, or drilling for pier foundations, would not be required.

Alternative 3

Alternative 3 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs. Therefore, it would not be a substantial source of noise during operations and there would be no direct noise impacts.

[37] NH Department of Transportation. 2016. Policy and Procedural Guidelines for the Assessment and Abatement of Highway Traffic Noise for Type I & Type II Highway Projects.

[38] Procedures for Abatement of Highway Traffic Noise and Construction Noise, Federal Highway Administration, 23 CFR 772.

[39] Sound levels measured using this weighting system are called "A-weighted" sound levels and are expressed in decibel notation as "dBA." The A-weighted sound level is widely accepted by acousticians as a proper unit for describing environmental noise.

Alternative 3 would result in a temporary increase of noise during construction. The construction of Alternative 3 is anticipated to last 2 years. The construction would involve the reuse of all existing piers and rehabilitation of the thru-truss main spans 4, 5 and 6 and the replacement of the approach spans 1, 2, 3, 7, 8 and 9. Although the construction duration is shorter than Alternative 1, noise associated with the replacement of the approach spans may be more noise intensive compared to the rehabilitation activity occurring in Alternative 1.

Alternative 6

Alternative 6 would construct the non-motorized, recreational path adjacent to traffic on the southbound LBB. As this alternative would preserve the existing roadway geometries, there would be no change in traffic noise and no permanent direct noise impacts.

Alternative 6 would result in a temporary increase of noise during construction. The construction of Alternative 6 is anticipated to last 1.5 years and would involve the replacement of GSB Pier 1, and reuse of all other existing piers. Under Alternative 6, the deck of the southbound LBB would be widened approximately 17.5 feet to the west to accommodate a new multi-use path on the LBB. To accomplish this widening, the GSB superstructure would be removed, since the GSB is approximately 15 feet from the LBB. Although the construction duration is shorter than Alternatives 1 and 3, noise associated with the constructing the new superstructure and pier would be more intensive, due to the required removal of the existing GSB superstructure. Such removal would require the use of heavy construction equipment, increasing noise. The replacement of GSB Pier 1 would require foundation work, often requiring activities such as drilling or pile driving resulting in impact noise.

Alternative 7

Alternative 7 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs. Therefore, it would not be a substantial source of noise during operations and there would be no permanent direct noise impacts.

Alternative 7 would result in a temporary increase of noise during construction. Temporary noise impacts associated with Alternative 7 are expected to be largely similar to those described under Alternative 6, as the alternatives are similar. Alternative 7 varies from Alternative 6 in that Alternative 7 involves an independent deck versus the widened LBB deck. Although the construction duration is shorter than Alternatives 1 and 3, noise associated with constructing the new superstructure and pier would be more intensive, due to the required removal of the existing GSB superstructure. Such removal would require the use of heavy construction equipment, increasing noise. The replacement of GSB Pier 1 would require foundation work, often requiring activities such as drilling or pile driving resulting in impact noise.

Alternative 9 (Preferred Alternative)

Alternative 9 would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs. Therefore, it would not be a substantial source of noise during operations and there would be no permanent direct noise impacts.

Alternative 9 would result in a temporary increase of noise during construction. The construction of Alternative 9 is anticipated to last 1.5 years. The construction would involve the reuse of all existing piers and complete replacement of the existing steel truss with a new steel girder superstructure. Although the duration is shorter than Alternatives 1 and 3, noise associated with constructing the new superstructure and pier would be more intensive, due to the required removal of the existing GSB superstructure. Such removal would require the use of heavy construction equipment, increasing noise. However, the Alternative 9 would reuse the existing piers, reducing the need for foundation work associated with impact noise activities such as pile driving.

3.8.2.2 Indirect Impacts

Under the No-Action Alternative, non-motorized transportation across the Little Bay would be permanently eliminated and no construction would occur. Eliminating of non-motorized transportation could increase vehicular traffic in the area, which could have an indirect effect on noise conditions.

All Action Alternatives would carry bicyclists and pedestrians and would not affect motor vehicle traffic on the LBBs. None of the Action Alternatives would be a substantial source of noise during operations. As such, no indirect impacts are anticipated for any of the Action Alternatives.

3.8.3 Mitigation

Since the Project would not affect operational noise impact, there would be no change in noise mitigation from that determined in the 2007 FEIS. There are no statewide noise regulations that relate to construction activities in New Hampshire and NHDOT is not subject to local restrictions related to construction noise.

3.9 Parks, Recreation, and Conservation Lands

This section identifies parks, recreational facilities, and conservation lands within the Study Area. FHWA evaluates potential impacts on parks and recreational facilities under NEPA and under Section 4(f) of the US Department of Transportation (USDOT) Act of 1966, 49 USC 303. Section 4(f) provides consideration of publicly-owned parks, recreation areas, wildlife or waterfowl refuges, or publicly- and privately-owned historic sites of national, state, or local significance, during the planning and design of transportation projects.[40]

Certain parks and recreation areas are also protected by Section 6(f) of the Land and Water Conservation Fund Act, 16 USC 4601-8(f). Section 6(f) applies if the property was acquired or

[40] **Chapter 4**, *Programmatic Section 4(f) Evaluation for the Use of Historic Bridges*, presents an analysis of the properties afforded protection under Section 4(f), addresses potential impacts of the Project on these properties, and describes plans to minimize harm.

developed with financial assistance under the Land and Water Conservation Fund (LWCF) State Assistance Program. In general, Section 6(f) requires that when LWCF-funded properties are converted to non-park purposes, the converted property must be replaced with recreational property of at least equal fair market value and of reasonably equivalent usefulness and location. The US Department of the Interior, National Park Service administers the LWCF program at the federal level, with funding distribution and oversight occurring at the state level. In New Hampshire, the program is managed by the NH Department of Natural and Cultural Resources, Division of Parks and Recreation, Office of Community Recreation.

3.9.1 Affected Environment

Parks, recreational facilities, and conservation lands were identified based on field reviews, aerial imagery, location photographs, and review of existing federal and GRANIT GIS data. There are no parks, recreational facilities, or conservation lands within the Study Area on the Newington side of the GSB. Recreational resources located within and adjacent to the Study Area are depicted in **Figure 3.9-1**.

Hilton Park

Hilton Park, a publicly owned park located on Dover Point, offers picnic areas, a boat launch, fishing dock, a play area, benches, and open green space. Hilton Park was created in 1938 following the GSB construction and contains a historic monument commemorating the site of the first settlement in Dover in 1623. Park visitors have relatively unobstructed views of the Piscataqua River, Little Bay, and the LBB. Hilton Park is open from 6:00 AM – 8:00 PM; overnight use is prohibited. NHDOT, Bureau of Turnpikes, owns and manages the 16-acre park.

Marine Traffic

Recreational boating is prevalent in this coastal area of New Hampshire. Because the GSB crosses the Piscataqua River, a navigable water, recreational boaters and other marine traffic pass under the GSB. Within the Study Area, there is one public boat ramp on the eastern side of Hilton Park.

To access the Piscataqua River, boaters launching from nearby docks would need to pass underneath the GSB; therefore, this analysis identifies public boat ramps within a 2-mile radius of the GSB. In addition to the public boat ramp in Hilton Park, three public boat ramps are within 2 miles of the GSB. One public water access site in Newington is Fox Point Dock, about 1.7 miles west of the GSB. Patterson Lane Ramp in Newington is about 1.3 miles east of the GSB at the end of Patterson Lane. Eliot Boat Basin, in Eliot, Maine, is approximately 1.5 miles southeast of the GSB.

Bicycle and Pedestrian Facilities

The GSB provides a connection for bicyclists and pedestrians, including both recreational and commuting uses. In 2010, the Dover and Newington approaches to the GSB were reconstructed to enhance the pedestrian and bicycle access to the bridge. Following regular bridge inspections, the superstructure was determined to be in critical condition due to the deterioration of the truss and floor system. The degree of deterioration required the NHDOT to install fencing in 2015 along the bridge deck to restrict full access to the middle of the bridge. However, the bridge continued to support pedestrian and bicycle activity.

To measure the extent of pedestrian and bicycle activity on the bridge following the installation of the fencing, the NHDOT Bureau of Turnpikes installed temporary, passive pedestrian counting equipment at the Dover and Newington approaches to the bridge. This equipment provided NHDOT with daily counts of the pedestrians and bicyclists that crossed the counter thresholds in both directions at the two ends of the bridge (it is noted that the counting equipment did not differentiate between a bicyclist and a pedestrian). The counting equipment was in place from mid-July through the end of September of 2016. **Table 3.9-1** provides a summary of the weekly, average weekday, and average weekend pedestrian activity observed during these counting periods. These counts represent the combined totals of pedestrians and bicyclists passing the counter during the given time period.

Table 3.9-1 Bridge Pedestrian and Bicycle Count Data (Summer 2016)

	Newington Approach			Dover Approach		
Time Period (Week Ending Date)	Total Weekly Count	Average Weekday	Average Weekend	Total Weekly Count	Average Weekday	Average Weekend
July 23, 2016	527	76	74	944	133	139
July 30, 2016	477	61	86	*	95**	136**
August 6, 2016	438	76	29	*	*	*
August 13, 2016	595	61	146	817	103	152
August 20, 2016	503	64	92	854	118	132
August 27, 2016	610	86	91	969	120	184
September 3, 2016	*	*	*	874	111	159
September 10, 2016	*	59	*	668	77	142
September 17, 2016**	*	86**	72**	732	104	107
September 24, 2016**	*	61**	98**	602	85	90
October 1, 2016**	*	62**	78**	*	67**	134**
July/August Averages	**525**	**71**	**86**	**896**	**114**	**149**

Notes:
* Data unavailable
** Data from sampling only, no weekly totals available

The count data is not directional, so it is not possible to determine the origins and destinations of pedestrian and bicycle activity on the bridge. For example, the data cannot differentiate whether a pedestrian started on the Dover side, passed the Dover counter heading south onto the bridge, turned around near the middle of the bridge, and passed the Dover counter again, heading north off of the bridge; versus a pedestrian who started on the Dover side, crossed the Dover counter heading south and then crossed the Newington counter, continuing to the south. However, it may be inferred by the substantial difference between the total counts at the Newington approach and the total counts at the Dover approach that there were several pedestrians and bicyclists whose destination (and turnaround location) was the bridge itself. It can also be inferred that the total pedestrian and bicycle activity is equal to the total count at both count stations, divided by two (any pedestrian that passes one counter must necessarily

Figure 3.9-1

\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.9-1_Parks, Recreation and Conservation Lands.mxd

0 750 1500 3000 Feet

Legend

- Town Boundaries
- Public Boat Ramp
- Hilton Park

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Parks, Recreation and Conservation Lands

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: NHGRANIT, VHB

pass the same counter or the opposite counter; therefore, each individual pedestrian or bicyclist is counted twice). As shown in **Table 3.9-1**, the bridge experienced an average of 525 counts per week at the Newington counter and 896 counts per week at the Dover counter. This is equivalent to approximately 710 pedestrians and bicyclists per week that used the bridge during the summer of 2016, or just over 100 pedestrians and bicyclists per day. The Dover approach showed more pedestrian and bicycle activity then the Newington approach. This is likely due to the relative proximity of Hilton Park and several residential properties on the Dover side, as opposed to the more commercialized properties on the Newington side.

As inferred from this data, the GSB has historically been used by pedestrians and bicyclists for both recreation and transportation purposes. As previously mentioned in **Chapter 1**, the GSB was forced to close to pedestrians and bicyclists in September 2018 due to safety concerns, and a temporary detour was established in August 2019 along northbound LBB to maintain the connection between Newington and Dover for transportation purposes.

3.9.2 Environmental Consequences

Potential impacts to parks, recreational facilities, and conservation lands were evaluated based on the potential for the Project to directly take land, impede access, or whether the proposal is compatible with local open space or park plans.

3.9.2.1 Direct Impacts

Temporary direct impacts to Hilton Park and marine traffic are described in this section. No permanent, direct impacts to Hilton Park or marine traffic are proposed under any of the Action Alternatives.

No-Action Alternative

The No-Action Alternative would not result in any direct permanent or temporary impacts to Hilton Park or marine traffic; however, the No-Action Alternative would not meet the Purpose and Need of providing non-motorized access between Newington and Dover.

Since the current temporary pedestrian and bicycle route along the northbound LBB impacts future vehicular traffic, this is a short-term solution that was implemented to maintain pedestrian and bicycle traffic over Little Bay until the permanent non-motorized crossing of the Little Bay is completed. Therefore, under the No-Action Alternative, this current accommodation would not be available. As such, non-motorized crossings of the Little Bay would not be possible as the existing GSB has been closed to all traffic due to its deteriorated condition. Therefore, non-motorized access from Newington to Dover would have a choice of an approximately 27-mile detour to the north, or an approximately 23.8-mile detour by following around Great Bay to the south.

Alternative 1

Hilton Park

Temporary, direct impacts due to occupancy of a portion of the western side of Hilton Park are anticipated during the construction period under Alternative 1. Approximately 48,000 square feet of Hilton Park would be temporarily occupied and fenced off for construction access, laydown, and staging (**Appendix D**). This temporary staging area represents approximately 12 percent of the total Hilton Park property in recreational use, or about 29 percent of the approximately 3.8-acre western portion of the park. For all alternatives, the construction access, laydown, and staging would only occur within the portion of the west side of Hilton Park; no access, laydown, or staging is proposed within the eastern side of Hilton Park. Under Alternative 1, the duration of these temporary impacts would be approximately three years. The sidewalk along Wentworth Terrace, which passes underneath the Spaulding Turnpike and runs along Dover Point Road, connects the east and west sides of Hilton Park. This sidewalk would remain open for continued public use under Alternative 1, which would retain the existing connectivity of the east and west sides of Hilton Park, although the temporary staging area would require pedestrians to make a slight detour relative to the existing condition.

In addition to temporary occupancy during construction, Alternative 1 would involve relocation of the pavilion that is currently located on the west side of Hilton Park (refer to Site Photo 12 in **Appendix A**) to allow safe contractor access to the GSB. NHDOT would determine relocation details for the pavilion, such as the structure's final location and whether the structure would be relocated or replaced.

The Hilton Park driveway off of Dover Point Road would be used for construction access under Alternative 1 but would not be fenced off, allowing for continued public use and access to the west side of Hilton Park. More than 14.9 acres of Hilton Park would remain open and accessible to the public during the temporary occupancy for construction. Public access to the recreational opportunities provided by Hilton Park would be maintained. During construction, Hilton Park visitors would still be able to use the existing picnic areas, boat launch, fishing dock, play area, benches, and open green space.

Marine Traffic

During most of the construction proposed under Alternative 1, the main navigational channel (a 200-foot zone of passage under the center span of the GSB) would remain open. For public safety reasons, removal of the center spans and other construction activities may require brief, temporary closure of the navigational channel; closure would be planned in close coordination with the US Coast Guard (USCG), the NH Port Authority, and the NH Marine Patrol. The timeframe of the periodic, temporary closures of the main navigational channel would likely correspond with construction activities and construction timeframes, which under Alternative 1 is proposed to be approximately three years. Alternative 1 would involve a longer time frame of temporary occupancy of Hilton Park but potentially fewer instances of closing the main navigational channel than Alternatives 6, 7 and 9 due to their required construction activities (*i.e.,* removal of the existing GSB superstructure and construction of a new superstructure).

Temporary, direct impacts to marine traffic is anticipated to occur under Alternative 1; final construction plans and coordination with the USCG would ultimately determine when, and how often, the 200-foot navigational channel would need to be closed.

Bicycle and Pedestrian Connection

As previously described, the GSB is relied on by pedestrians and bicyclists to provide recreation and transportation opportunities in the seacoast area of New Hampshire. Alternative 1 would re-establish this connection across the GSB for pedestrians and bicyclists.

Alternative 3

Impacts to parks, recreational facilities, and conservation lands under Alternative 3 would be similar to the impacts described under Alternative 1. The duration of the proposed temporary impacts under Alternative 3 would be two years, whereas the duration of temporary impacts under Alternative 1 would be three years. Like Alternative 1, Alternative 3 would involve a longer time frame of temporary occupancy of a portion of the west side of Hilton Park but potentially fewer instances of closing the main navigational channel than Alternatives 6, 7 and 9 due to their required construction activities that would include removing the existing GSB superstructure and construction of a new superstructure. Alternative 3 would re-establish connection across the GSB over Little Bay for pedestrians and bicyclists.

Alternative 6

Impacts to Hilton Park and marine traffic under Alternative 6 would be similar to the impacts proposed under Alternative 1. The duration of temporary construction impacts under Alternative 6 would be 1.5 years. This shorter construction period would result in less temporary, direct impacts to Hilton Park than Alternatives 1 and 3. However, in contrast to Alternatives 1, 3, and 9, Alternative 6 would involve partial closure of the sidewalk along Dover Point Road, which passes underneath the Spaulding Turnpike and runs along Wentworth Terrace (**Appendix D**). This portion of sidewalk connects the east and west sides of Hilton Park. This sidewalk would remain closed during construction for public safety reasons, resulting in a temporary loss of connectivity between the east and west sides of Hilton Park.

Alternative 6 involves removal of the GSB superstructure as well as construction of an entirely new superstructure, which would likely result in more instances of closing the main navigational channel than Alternatives 1 and 3. Alternative 6 would re-establish pedestrian and bicycle connection over Little Bay.

Alternative 7

Impacts to parks, recreational facilities, and conservation lands under Alternative 7 would be the same as the impacts described under Alternative 6. The duration of temporary impacts under Alternative 6 and 7 are the same, approximately 1.5 years. This shorter construction period would result in less temporary, direct impacts to Hilton Park than Alternatives 1 and 3. However, like Alternative 6, Alternative 7 would involve partial closure of the sidewalk along Dover Point Road, which passes underneath the Spaulding Turnpike and runs along Wentworth Terrace. This portion of sidewalk connects the east and west sides of Hilton Park. This sidewalk would remain closed during construction for public safety reasons, resulting in a temporary loss of connectivity between the east and west sides of Hilton Park.

Like Alternative 6, Alternative 7 involves removal of the GSB superstructure as well as construction of an entirely new superstructure, which would likely result in more instances of closing the main navigational channel. Alternative 7 would re-establish pedestrian and bicycle connection over Little Bay.

Alternative 9 (Preferred Alternative)

Impacts to parks, recreational facilities, and conservation lands under Alternative 9 would be similar to the impacts described under Alternative 1. The duration of temporary impacts under Alternative 9 would be 1.5 years, whereas the duration of temporary impacts under Alternative 1 would be three years. Like Alternatives 6 and 7, this shorter construction period would result in less temporary, direct impacts to Hilton Park than Alternatives 1 and 3. As with Alternatives 1 and 3, the sidewalk along Dover Point Road, which passes underneath the Spaulding Turnpike and runs along Wentworth Terrace, would remain open for continued public use, although the temporary staging area would require pedestrians to make a slight detour relative to the existing condition. Alternative 9 would retain the existing connectivity of the east and west sides of Hilton Park during construction, in contrast to Alternatives 6 and 7.

Like Alternatives 6 and 7, Alternative 9 involves removal of the GSB superstructure as well as construction of an entirely new superstructure, which would likely result in more instances of closing the main navigational channel. Alternative 9 would also re-establish pedestrian and bicycle connection over Little Bay.

3.9.2.2 Indirect Impacts

None of the alternatives (No-Action Alternative or Action Alternatives) would cause indirect impacts to Hilton Park or park visitors. Indirect impacts occur at some future time other than a direct impact. Impacts to Hilton Park would be temporary and directly related to construction. Furthermore, the east side of Hilton Park would remain unimpacted during construction; the fenced off staging area would be within a portion of the west side of Hilton Park, immediately adjacent to the GSB Dover abutment. Once construction is complete, the public would regain full access to the western part of Hilton Park.

Overall, the Project would benefit the Newington-Dover area through improved recreational opportunities for the public by providing a long-term transportation and recreation route for pedestrians and bicyclists over Little Bay. As previously mentioned, the current temporary bicycle and pedestrian route over Little Bay along the northbound LBB is not a feasible long-term solution since the segment of the bridge used for the bicycle and pedestrian route is meant for vehicular traffic. Providing a permanent, long-term bicycle and pedestrian route would improve connectivity and non-motorized transportation modes, which could lead to improved recreational opportunities and access to alternative modes of transportation.

3.9.3 Mitigation

Public access to Hilton Park, outside of the staging and construction work zone, shall be maintained. However, temporary restrictions on public access may be necessary during delivery of materials to the staging areas. The replacement or relocation of the Hilton Park pavilion will be evaluated in coordination with the NHDOT Bureau of Turnpike. To minimize land disturbance, unpaved areas within the fenced-off staging area of Hilton Park are to be protected with temporary geotextile fabric under crushed stone. Disturbed areas shall be restored to pre-

existing conditions once construction is complete. Additionally, coordination between NHDOT and NH Fish and Game regarding recreation opportunities at Hilton Park will be ongoing. As discussed further in **Section 3.15**, *Navigation*, potential periodic closures of the navigational channel during work on the GSB's center spans will be closely coordinated with the USCG, the NH Port Authority, and the NH Marine Patrol to minimize impacts to marine traffic.

3.10 Cultural Resources

3.10.1 Introduction

The NHPA of 1966, as amended, defines historic properties as "any prehistoric or historic district, site, building, structure, or object included on or eligible for listing on the National Register [of Historic Places (National Register)] including artifacts, records, and material remains related to the district, site, building, structure, or object" (54 USC 300308). Historic properties[41] are found both above and below ground. Archaeological sites or archaeological resources represent the locations of prehistoric and historic activities, while above-ground historic properties may include buildings, structures, objects, and sites that are usually at least 50 years old. Historic properties may occur as a grouping: historic/cultural landscapes consist of lands that have been culturally modified; historic districts consist of buildings and other elements that retain identity and integrity as a group; and linear historic districts can include canals, roads, railroads or other manmade linear features. Sacred sites, cemeteries, and burial places are also considered historic properties, although they are generally not considered eligible for the National Register unless they meet special requirements.

The NHPA establishes specific criteria for National Register eligibility:

"The quality of significance in American history, architecture, archeology, 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 prehistory or history." (36 CFR 60.4)

3.10.1.1 Federal Requirements

Historic properties are afforded protection by compliance with Section 106 of the NHPA (Section 106) and its implementing regulations (36 CFR 800); Section 4(f) of the USDOT Act of 1966 (49 USC 303); and the NEPA of 1969 (42 USC 4321 *et seq.*) and the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR 1500-1508).

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA (Section 106) stipulates that "the head of any federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking." (54 USC 306108). The implementing regulations (36 CFR 800) lay out the Section 106 consultation process.

Section 4(f) of the US Department of Transportation Act

Section 4(f) of the USDOT Act of 1966 [Section 4(f)] (49 USC 303) states that "…special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites." The regulations governing Section 4(f) implementation (23 CFR 774) specify that the FHWA may not approve the use of a Section 4(f) property unless it determines: 1) that there is no prudent and feasible avoidance alternative, and 2) that the action includes all possible planning to minimize harm to the property from such use. **Chapter 4** of this DSEIS provides a Section 4(f) evaluation.

NEPA

Through this DSEIS, the Project is also complying with the NEPA of 1969 (42 USC 4321 *et seq.*) and CEQ NEPA regulations (40 CFR 1500-1508), which require that an undertaking consider the impacts of the actions on natural and cultural resources. According to the NEPA regulations, in considering whether an action may "significantly affect the quality of the human environment," an agency must consider, among other things, the "unique characteristics of the geographic area such as proximity to historic or cultural resources [40 CFR 1508.27(b)(3)]," and "the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places" [40 CFR 1508.27(b)(8)].

3.10.1.2 State Requirements

In New Hampshire, historic resources are afforded protection under RSA 227-C:9, Directive for Cooperation in the Protection of Historic Resources, which directs New Hampshire's state agencies, departments, commissions, and institutions to fully cooperate with the NHDHR while administrating all state licensed, assisted, or contracted projects, activities, or programs to protect historical resources under their administration that may be adversely affected by a state

[41] NEPA generally categorizes above-ground and archaeological historic resources as "cultural resources," while Section 106 utilizes the term "historic properties" to refer to those properties listed in, or determined eligible for listing in, the National Register of Historic Places. While the title of this section is "Cultural Resources" to maintain consistency with NEPA language, the discussion itself uses "historic properties," as the latter is more commonly used by agencies such as the ACHP, National Park Service, and NHDHR.

undertaking. The purposes of this process are to locate and identify historical, architectural, archaeological, and historical archaeological resources within a project's impact area; apply the criteria for evaluation of significance to a resource to determine possible eligibility to the National Register, if not previously determined eligible or listed; assess the probable effects of a project on resources listed on or eligible for, the National Register; and avoid historic properties and/or develop appropriate mitigation or minimization methods to lessen a project's impact on affected historic properties. These directives are subject to the agency's budgetary limitations.

3.10.2 Methodology for the Identification of Historic Properties

All historic property investigations and consultations were conducted in accordance with Section 106 and its implementing regulations, NEPA, and RSA 227-C:9. Work associated with the above-ground historic properties survey was completed in accordance with NHDHR's Area Form Manual (updated 2015), NHDHR's Architectural Survey Policy (updated 2016), and appropriate guidelines set forth in National Register Bulletin No. 24, *Guidelines for Local Surveys: A Basis For Preservation Planning* (updated 1985).

3.10.2.1 Area of Potential Effects (APE)

The Area of Potential Effect (APE) is defined as "…the geographic area within which the undertaking may cause changes in the character of or use of historic properties if any such properties exist" (36 CFR 800.16(d)). The establishment of a Project's APE is based on the potential for effects, both physical and indirect, that may impact the character-defining features that qualify a historic property for the National Register.

Several factors were considered in determining the APE, including the evaluation of alternatives for the GSB Project. Work components across all alternatives were combined to develop an APE that considered the widest range of potential effects.

Potential impacts that informed the APE boundaries were varied. The GSB footprint, as well as a portion of the approach paths and areas leading to the bridge, were susceptible to potential physical changes resulting from the Project. Additionally, a temporary detour for bicycles and pedestrians, to maintain connectivity during construction was considered. Potential non-physical effects included the visual impacts of potentially replacing all or portions of the GSB superstructure.

The resulting APE is an irregularly-shaped footprint, beginning approximately 600 feet north of the bridge crossing on Dover Point, and extending up to 1,500 feet west, 700 feet east, and 1,200 feet south of the crossing (**Figure 3.10-1**).

3.10.2.2 Methodology for the Identification of Above-Ground Historic Properties

Project Area Form: Background Research and Reconnaissance Survey

An updated Project Area Form (PAF) was submitted to NHDHR in September 2018, providing information updating the original Spaulding Turnpike PAF that was finalized in November 2005 (Spaulding Turnpike: Newington-Dover Project Area, NWN-DOV). The goal of the PAF was to provide a high-level overview of the resources and historic contexts in the APE.

A site file search at NHDHR was completed in November 2018 to determine whether updates had been filed for inventory forms completed in 2005 as part of the larger Newington-Dover, Spaulding Turnpike Improvements Project, and whether additional properties within the current APE had been recorded. Much of the historical narrative and context discussion contained in the 2005 PAF still stands; therefore, current research focused on updating or enhancing these discussions, as appropriate, to bring them up to the present day. Attention was especially given to describing how the recent changes to transportation routes resulting from the Spaulding Turnpike Improvements Project have affected the land use, roadway layout, and integrity of the APE and individual properties discussed in the 2005 PAF. In addition, some historical development patterns described in 2005 have continued to play out in the intervening years, and relevant recent information was provided. Due to the specific nature of the updated information provided in the 2018 PAF update, research sources consisted primarily of map and historic aerial analysis to understand recent development, supplemented by consulting deeds, directory records, building permit records, and land plans, especially for properties not discussed in the 2005 PAF. Information provided by a property owner on Heaphy Lane clarified the recent evolution of this small collection of properties near the Dover Point waterfront.

A reconnaissance survey was conducted to photograph buildings and structures within the APE, as well as streetscapes. This included previously-recorded properties, as well as properties newly-included in the 2018 PAF update, to understand and document noted changes in integrity since the preparation of previous inventory forms.

The 2018 PAF update identified 14 resources within the APE that were over 50 years old; 13 additional resources were less than 50 years old but helped inform discussions regarding recent development patterns. Properties that were surveyed and discussed in the 2018 PAF update are summarized in **Table 3.10-1**.[42]

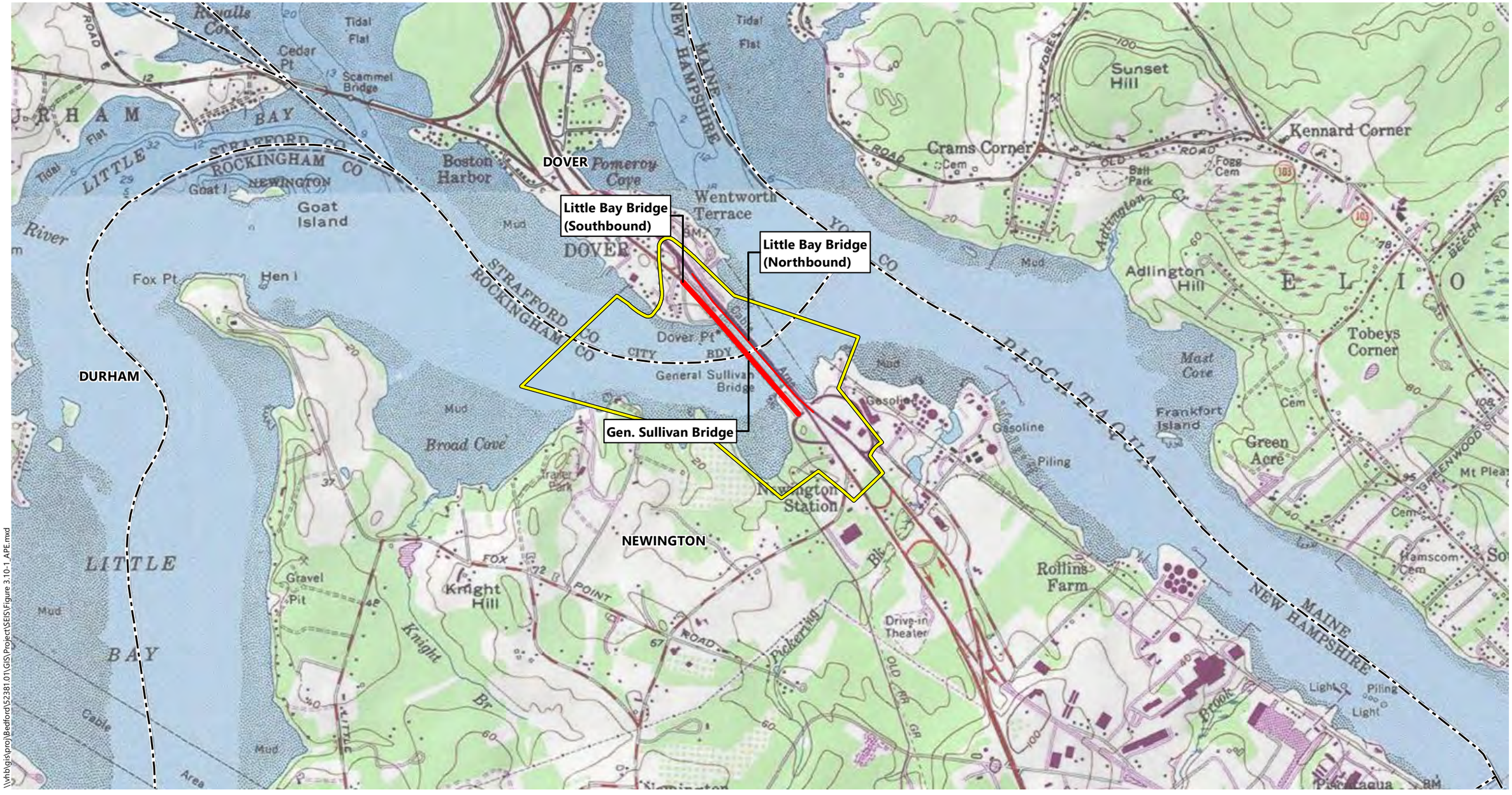
Intensive Survey and Eligibility Evaluations

Multiple alternatives and elements of the Project were evaluated and narrowed down by the spring of 2019. Based on the recommendations of the 2018 PAF update, intensive-level survey via the preparation of NHDHR Individual Inventory Forms was completed for the following properties within the APE. One additional NHDHR Area Form, for the Bloody Point Area in Newington, was not discussed in the original or updated PAF, but was completed following the suggestion by a Consulting Party.

- Hilton Park (DOV0150) - determined not eligible (inventory form update)
- General Sullivan Bridge (DOV0158) - determined eligible (inventory form update)
- 137 Beane Lane (NWN0246) – determined not eligible (new inventory form)
- Bloody Point Area (NWN-BLPT) - determined not eligible (new inventory form)

[42] One additional potentially historic area was subsequently evaluated through the preparation of an NHDHR Area Form, which was not discussed in the 2018 PAF update. See discussion below.

Figure 3.10-1



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.10-1_APE.mxd

0 750 1500 3000 Feet

Approximate Work Limits

Area of Potential Effect (APE)

Town Boundaries

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Area of Potential Effect

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT, USGS 7.5-minute Topographic Quadrangles Dover East and Portsmouth, dated 1983

Table 3.10-1 2018 PAF Update: Surveyed Properties

City	Street #	Street Name	Property Name	Year Built	NHDHR #	Desig./ Previous DOE[1]
Dover	430	Dover Point Rd	Ira F. Pinkham House/Wentworth Summer Residence	1853	DOV0093/ NH doc. #626	Eligible (A&C)
Dover	435	Dover Point Rd	Belanger House	1945	DOV0092	Not Eligible
Dover	439	Dover Point Rd	John E. Pinkham House	1865	DOV0091	Not Eligible
Dover	441	Dover Point Rd	Ida M. Dame House/ Linwood Lodge	1900	DOV0090	Not Eligible
Dover	8	Heaphy Ln		2014		
Dover	9	Heaphy Ln		c. 1970		
Dover	12	Heaphy Ln		1999		
Dover	8	Leighton Rd		1983		
Dover	12	Leighton Rd		2014		
Dover	14	Leighton Rd		c. 1950		
Dover	16	Leighton Rd		2003		
Dover	19	Leighton Rd		2011		
Dover	20	Leighton Rd		1953, 2014		
Dover	N/A	N/A	Hilton Park Roadside Safety Rest Area	1938	DOV0150	
Dover/ Newington	N/A	N/A	General Sullivan Bridge	1934	DOV0158/ NH doc. #703	Eligible (A&C)
Dover/ Newington	N/A	N/A	Little Bay Bridges	1983 and 2011		
Newington	61	Beane Ln	Great Bay Marine Inc.	c. 1956	N/A	N/A
Newington	137	Beane Ln	N/A	c. 1930	N/A	N/A
Newington	22	Bloody Point Rd	Axel Johnson Conference Center (Sprague Energy)	c. 1930	NWN-SP	N/A
Newington	24	Bloody Point Rd	Newington Railroad Depot and Toll House	1873	NWN0168/NR #10000187	Listed 4/19/2010 (A&C)
Newington	N/A	N/A	Spaulding Turnpike Bridge over Shattuck Way (Newington 103/124)	1983, 2011	N/A	N/A
Newington	19	Nimble Hill Rd	Portsmouth Sign Company	2010	N/A	N/A
Newington	437	Shattuck Way	Rockingham Electrical Supply	1978	N/A	N/A
Newington	516	Shattuck Way	N/A	c. 1930	NWN0162	Not Eligible
Newington	518	Shattuck Way	N/A	c. 1956	NWN0163	Not Eligible
Newington	521	Shattuck Way	Atco LanAir Inc.	c. 1985	N/A	N/A
Newington	1149	Spaulding Tnpk	Mitchell's Gulf	1996	N/A	N/A

Note: 1 – Determination of Eligibility (DOE)

It is noted that the following properties within the APE were inventoried and evaluated during the initial Section 106 consultation process, which concluded in 2008:

- Ida M. Dame House/Linwood Lodge (DOV0090) - determined not eligible
- John E. Pinkham House (DOV0091) - determined not eligible
- 435 Dover Point Road (DOV0092) - determined not eligible
- Hilton Park (DOV0150) - determined not eligible
- Ira F. Pinkham House/Wentworth Summer Residence (DOV0093) - determined eligible
- General Sullivan Bridge (DOV0158) - determined eligible
- 516 Shattuck Way (NWN0162) - determined not eligible
- 518 Shattuck Way (NWN0163) - determined not eligible
- Newington Railroad Depot and Toll House (NWN0168/ NR #10000187) - eligible
- Axel Johnson Conference Center, Sprague Energy Area Form (NWN-SP) - more information needed
- NWN0159 and NWN016 - determined not eligible (both are since demolished)

The Newington Railroad Depot and Toll House was listed in the National Register in 2010. In 2012, the Ira F. Pinkham House/Wentworth Summer Residence was recorded in a state-level Historic American Building Survey report, prepared by VHB (NH State No. 626).

Inventory forms and Determinations of Eligibility are on file at the NHDHR offices in Concord, NH. Determinations of Eligibility for inventory forms completed for this Project are included in **Appendix I**.

3.10.2.3 Methodology for the Identification of Archaeological Resources

Archaeologists conducted a Phase IA archaeological sensitivity assessment (Bunker, *et al.* 2003) and a Phase IB intensive archaeological investigation/Phase II Determination of Eligibility (Tumelaire, *et al.* 2011; Tumelaire, *et al.* 2012) as part of the larger Newington-Dover, Spaulding Turnpike Improvements Project. Background research and documentary review were major components of the Phase IA study, to identify previously recorded archaeological resources and to complete a chronology of part human activity in the Spaulding Turnpike Improvements Project Area. Data accumulated from archival resources were used to identify particular sites, features, or past land use patterns and to construct contexts to develop expectations for resource presence.

Archival research was completed using a variety of primary and secondary sources at a number of institutions, including Strawbery Banke Museum, the Portsmouth and Newington libraries, the New Hampshire Historical Society, the NHDHR, the NHDOT, and UNH. Documents reviewed included: state-wide inventory files maintained at the NHDHR; published and unpublished archaeological site reports; local and regional histories; historic topographic maps; and historic photographs and aerial photographs. Research was augmented with interviews with property owners, NHDOT personnel, NHDHR personnel, Strawbery Banke Museum historians, archaeologists, and marine specialist.

Phase IA background research was followed by a field inspection for both terrestrial and underwater resources. For terrestrial resources, all roadways within the project area were driven and a selected number of areas were walked; field survey was conducted along cove margins at low tide. Where sites were identified, these were recorded with preliminary field sketches and photographs. For maritime and underwater resources, specialists reviewed aerial photographs, conducted inspection at full-moon low tide, and created an underwater topographic view of the Spaulding Turnpike Improvements Project Area via remote sensing. The compilation of Phase IA background research and field studies resulted in the identification of sensitive areas, or areas with the potential for below-ground or underwater archaeological resources.

During the Phase IA inspection, a brickyard site (27-ST-0057) was identified at the base of the GSB, based on the presence of brick debris. The Phase IB effort resulted in the assessment the rubble was not a site (Tumelaire *et al.* 2011: 55), and the NHDOT proposed that a Phase II documentary search and cartographic analysis be undertaken for Test Area 21 (Tumelaire *et al.* 2011:51). The Phase II literature search focused on Dover Point brickyards with special attention on impacts from transportation (*i.e.,* roads, highways, and rail lines). Documentary research included the review of maps, population census data, and historical plans for the GSB and LBB.

For the Phase IB intensive archaeological investigation, archaeologists hand excavated shovel test pits aligned along transects in sensitive areas to confirm the presence or absence of archaeological resources. Archaeologists excavated test holes measuring 0.5 meter by 0.5 meter, screening all soil through 0.25-inch mesh to collect artifacts. The location of each shovel test pit was mapped on a field plan, and coordinates were collected with a hand-held Trimble Juno data collector and Pro 6H GPS receiver. Archaeologists recorded profiles on field forms and with digital photography.

In June 2019, archaeologists conducted additional Phase IB survey on the grounds of Hilton Park to confirm the presence or absence of archaeological resources within the limits of a proposed staging area. Testing was completed with the mechanical excavation of trenches to seek evidence of activities and features related to a brickyard site (27-ST-055). Archaeologists operated a small tracked excavator to excavate trenches to sample for buried features and deposits.

3.10.2.4 Consultation

As part of the Section 106 consultation, the regulations under 36 CFR 800 require that the Federal agencies consult with the public about Projects and their effects on historic properties. By right, "Consulting Parties" include State Historic Preservation Officers (SHPOs); local governments; federally recognized Indian tribes/THPOs; Native Hawaiian Organizations; the Advisory Council on Historic Preservation (ACHP); and applicants for federal assistance, permits, licenses, and other approvals. Individuals and organizations with a demonstrated legal, economic, or historic preservation interest in an undertaking may also request Consulting Party status from the responsible federal agency; their participation is subject to approval by the federal agency. Stakeholders interested in keeping abreast of the progress of Section 106 consultation may also participate as an "Interested Party."

As of January 2021, the following Consulting and Interested Parties have been identified and approved by the FHWA:

- Kitty Henderson, Executive Director, Historic Bridge Foundation
- Nathan Holth, HistoricBridges.org
- Lulu Pickering, Newington Historic District Commission
- Anne Rugg, Manager, CommuteSMART Seacoast (Retired; removed from Consulting Party list on 10/01/2020)
- Karen Saltus, President, Seacoast Area Bicycle Riders (Requested removal from Consulting Party list on 01/02/2020)
- Christopher G. Parker, Assistant City Manager, Director of Planning and Strategic Initiatives, City of Dover
- Karen Anderson, Newington Special Project Coordinator, Town of Newington (Interested Party)
- Martha Roy, Newington City Administrator, Town of Newington (Interested Party)
- Senator David Watters, New Hampshire State Senate District 4 (Interested Party)

Information regarding Section 106 consultation meetings and public information meetings can be found in **Chapter 7**, *Public, Agency and Tribal Coordination*. During the process, the PAF update, inventory forms, and effects determinations were distributed to the Consulting and Interested Parties for review and input. These documents were also made available on the Project's website, at www.newington-dover.com/gsb_subsite.

3.10.3 Affected Environment

3.10.3.1 Identified Above-Ground Historic Properties

Based on a review of the architectural and/or historical significance of above-ground resources in the APE pursuant to 36 CFR 800.4 and 36 CFR 67.8, three properties were identified as listed in the National Register or eligible for listing.

A description of the three properties and a summary of their significance is listed below. These properties are also identified in **Figure 3.10-2**, *Cultural Resources*. Additional documentation and a discussion of eligibility is available at NHDHR, NHDOT and FHWA.

General Sullivan Bridge (DOV0158) (GSB)

Built in 1934, the GSB is a 1,528-foot-long bridge, with the primary superstructure consisting of a combination deck truss and partial through arch truss, over Little Bay between the Town of

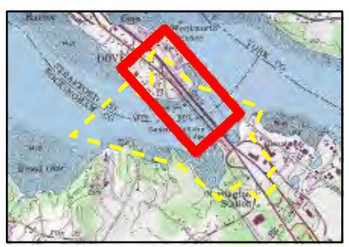
Figure 3.10-2

\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.10-2_Cultural Resources.mxd

0 125 250 500 Feet

Legend

- Area of Potential Effect (APE)
- Parcel Boundaries
- Town Boundaries
- Inventoried Property, Not Eligible
- E — Inventoried Property, NR-Eligible or Listed (shown with boundary)
- Sprague Energy Area, Eligibility Undetermined
- Bloody Point Survey Area Boundary (DOE Not Eligible as a District)



Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Cultural Resources

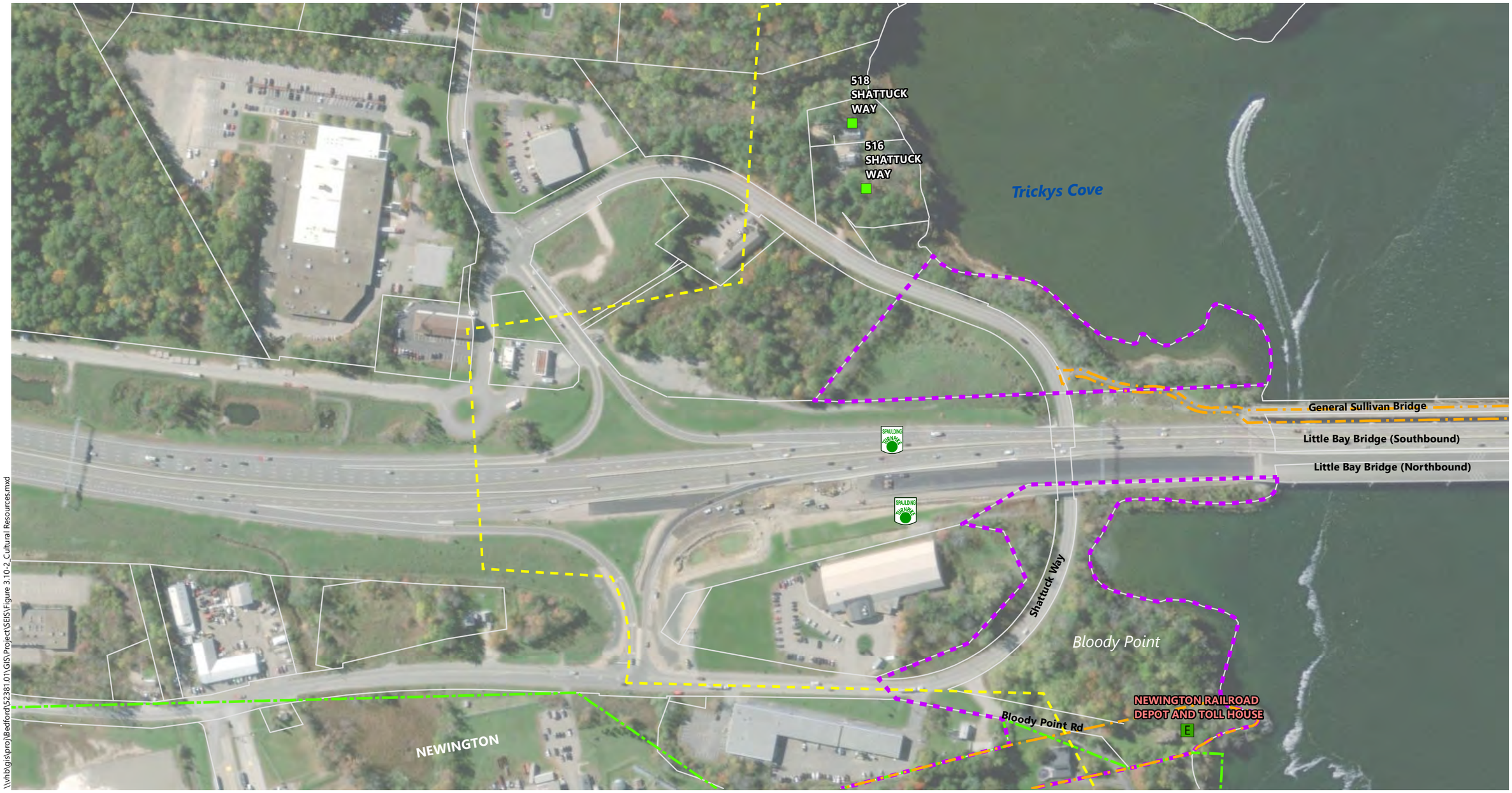
Sheet 1 of 4

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT

Figure 3.10-2



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.10-2_Cultural Resources.mxd

0 125 250 500 Feet

Legend

- Area of Potential Effect (APE)
- Parcel Boundaries
- Town Boundaries
- Inventoried Property, Not Eligible
- Inventoried Property, NR-Eligible or Listed (shown with boundary)
- Sprague Energy Area, Eligibility Undetermined
- Bloody Point Survey Area Boundary (DOE Not Eligible as a District)

Newington-Dover 11238S — Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Cultural Resources

Sheet 2 of 4

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT

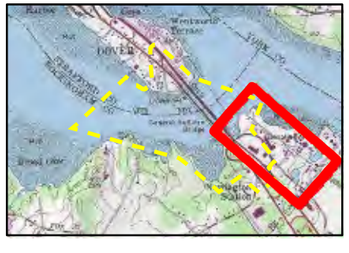
Figure 3.10-2

\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.10-2_Cultural Resources.mxd

0 125 250 500 Feet

Legend

- Area of Potential Effect (APE)
- Parcel Boundaries
- Town Boundaries
- Inventoried Property, Not Eligible
- Inventoried Property, NR-Eligible or Listed (shown with boundary)
- Sprague Energy Area, Eligibility Undetermined
- Bloody Point Survey Area Boundary (DOE Not Eligible as a District)



Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Cultural Resources

Sheet 3 of 4

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT Department of Transportation

Source: VHB, NH GRANIT

Figure 3.10-2

\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.10-2_Cultural Resources.mxd

0 125 250 500 Feet

Legend

- Area of Potential Effect (APE)
- Parcel Boundaries
- Town Boundaries
- Inventoried Property, Not Eligible
- Inventoried Property, NR-Eligible or Listed (shown with boundary)
- Sprague Energy Area, Eligibility Undetermined
- Bloody Point Survey Area Boundary (DOE Not Eligible as a District)

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Cultural Resources

Sheet 4 of 4

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT Department of Transportation

Source: VHB, NH GRANIT

Newington and the City of Dover, New Hampshire. The eligible boundary of the GSB includes the footprint of the bridge itself, its abutments, and the south approach in Newington, leading north from Shattuck Way. The north abutment, and north and south approaches, are considered non-contributing, as they've been rebuilt and/or realigned.

The bridge is significant under Criterion A for its role in the transportation history of the Seacoast area. Constructed at a key crossing along a former turnpike route, the bridge helped reestablish the eastern end of the old turnpike road at Cedar Point in Durham. Previously all traffic between Portsmouth and Concord traveled first to Dover, then through Barrington on NH 9 to join the First New Hampshire Turnpike (US 4) in Northwood. The GSB allowed a more direct route through Durham, Lee, and Nottingham and reestablished the usefulness to the full length of the Turnpike in the early 20th century. At the same time, the bridge, replacing the former road and railroad bridge between Newington and Dover Point, became part of the East Side Road trunk line highway, from the seacoast through Dover to points north. The bridge later carried the Spaulding Turnpike when it was first created in the 1950s.

Construction of the bridge was covered by national engineering publications, due to its technological advances. It was completed in 1934 by the firm of Fay, Spofford & Thorndike, as one of the four textbook examples of the firm's continuous bridge designs that were largely responsible for the adoption of long-span continuous trusses across the country (along with the Lake Champlain Bridge between Crown Point, NY and Chimney Point, VT, and bridges over the Cape Cod Canal in Bourne and Sagamore, MA). Not only did the bridges demonstrate the feasibility of analyzing stresses and the economic advantages in continuous designs, the bridges also became known for an elegant, three-part design of a through-arch truss flanked by deck trusses, which is evident in the GSB. The bridge is nationally significant under Criterion C for its design and engineering.

The Newington Railroad Depot and Toll House (NWN0168/ NR #10000187)

The Newington Railroad Depot and Toll House at 24 Bloody Point Road is located at the tip of Bloody Point in Newington on 3.8 acres of land and marks the former south approach of the Portsmouth and Dover Railroad at a dedicated railroad bridge over the bay, just east of the GSB and LBBs. Constructed in 1873, the 2½-story building retains clapboard siding and wood trim and is a relatively rare example of a depot that also served as a toll house and residence for the stationmaster/toll taker, resulting in a residential form for a railroad-related resource. The railroad tracks and bridge were removed following the abandonment of the line and the operation of the station in 1934. The building is in fair condition, currently vacant but "mothballed" for potential future use.

The property was listed in the National Register in 2010 and is significant under Criteria A and C in the areas of transportation and architecture. It is noted in the nomination that the ending date for the period of significance, 1934, coincided with the construction of the GSB and the abandonment of the railroad line, which ended the utilization of the depot property for transportation purposes.

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093)

The Ira F. Pinkham House/Wentworth Summer Residence at 430 Dover Point Road in Dover (DOV0093) was constructed c. 1853 for farmer and brickmaker Ira Pinkham. The 1 ½-story house is located on a 0.8-acre property adjacent to the Spaulding Turnpike in Dover. The house has a sidehall plan, is oriented gable-end to the street, and features an early 20th century 1-story enclosed wraparound porch with a pedimented entrance. It was purchased as a summer residence by businessman Frank E. Wentworth and his wife Annie in 1912, who likely enclosed the porch and applied the asbestos shingles in the 1930s and 1940s. A 19th-century barn associated with the house was relocated off-site in 2011-2012.

The property, including the house and an associated barn, was determined eligible for listing in the National Register under Criteria A and C in 2005 for significant associations with Dover Point's former brick-making industry, and the 20th century development of Dover Point as a seasonal destination.

3.10.3.2 Identified Archaeological Resources

Archaeologists conducted a Phase IA archaeological sensitivity assessment (Bunker *et al.* 2003) and a Phase IB intensive archaeological investigation/Phase II Determination of Eligibility (Tumelaire *et al.* 2011; Tumelaire *et al.* 2012) in the Study Area. The 2007 FEIS identifies areas of archaeological sensitivity based on these Phase 1A and Phase 1B findings, for the larger Newington-Dover, Spaulding Turnpike Improvements Project.

The FEIS Phase IA archaeological analysis identified the western side of Hilton Park in Dover, and additional developed area to the northwest (approximately 12.7 acres), as exhibiting sensitivity (*i.e.*, Area 16). This area includes an approximately 0.5-acre verified site, identified as a brickyard (27-ST-55 and 27-ST-56, *i.e.*, Area 17) within Hilton Park. The FEIS Phase IA archaeological analysis also identified the eastern side of Hilton Park to be sensitive (*i.e.*, Area 18). This area includes a portion of Dover Point (*i.e.,* Area 22) associated with an historic railroad bed and pilings.

Within Dover, a thin strip of ground (approximately 0.2 acre) curving along the northern shore of the Piscataqua River beneath the GSB and LBB was identified as a brickyard (identified as Area 21 or site 27-ST-57) during a Phase IA sensitivity assessment completed in 2003. Additional background research and cartographic analysis revealed that the shoreline had been altered and filled from construction of the GSB in 1933, and construction of the LBB in the 1960s and 1980s. Inspections in 2009 resulted in the conclusion that this area was not an archaeological site.[43]

For the Phase IB intensive archaeological investigation, archaeologists hand excavated shovel test pits aligned along transects in five sensitive areas (**Table 3.10-2**), to confirm the presence or absence of archaeological resources.

[43] In May 2009, Dr. Kathleen Wheeler inspected the area with Dr. Joyce McKay of the New Hampshire Department of Transportation, at which time both agreed that the resource (identified as Area 21 or site 27-ST-57) was not an archaeological site (Tumelaire, *et al*. 2011:55).

Table 3.10-2 Findings of the Phase IB Intensive Archaeological Investigation

Contract	Test Area	Results
L	14	No Archaeological Resources Identified
L	16	No Archaeological Resources Identified
L	21	No Archaeological Resources Identified
L	HP1	No Archaeological Resources Identified
M	30	No Archaeological Resources Identified

In June 2019, a Phase IB intensive archaeological investigation was completed in Hilton Park to confirm the presence of archaeological deposits and features relating to Brickyard 27-ST-0055, which was identified in 2003 for the larger Newington-Dover, Spaulding Turnpike Improvements Project.[44] The recent Phase IB intensive archaeological investigation identified a brick floor and evidence of thermally altered soil within the western side of Hilton Park. The brick floor extends across a portion of Hilton Park that is adjacent to the area proposed for construction staging. Within Newington, the immediate area surrounding the GSB and LBB abutments was determined to lack integrity and does not exhibit sensitivity for archaeological resources.

3.10.4 Environmental Consequences

3.10.4.1 Impact Methodology

In the Section 106 implementing regulations, the consultation process may have the following outcomes:

No Historic Properties Affected. If the agency official finds that either there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them (36 CFR 800.4(d)(1)).

Finding of Adverse Effect. An adverse effect is determined 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, and association (36 CFR 800.5(a)(1)).

Adverse effects include, but are not limited to (36 CFR 800.5(a)(2)):

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Finding of No Adverse Effect. The agency official, in consultation with the SHPO/THPO, may propose a finding of no adverse effect when the undertaking's effects do not meet the above definition of "adverse effect." This finding may also occur when undertaking is modified or conditions are imposed such as the subsequent review of plans for rehabilitation by the SHPO/THPO to ensure consistency with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines, to avoid adverse effects (36 CFR 800.5(b)).

For the purposes of this DSEIS, adverse effects on historic properties are further evaluated as direct or indirect. The Section 106 implementing regulations do not define "direct" and "indirect" impacts, other than to note, "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" [36 CFR 800.5(a)(1)].

While effects evaluations on historic properties have often interpreted "direct effects" as physical impacts and "indirect effects" as non-physical impacts, a recent opinion by the US Court of Appeals for the District of Columbia provides guidance on more nuanced definitions.[45] Although the court case examined evaluation of effects under Section 110(f) of the NHPA[46], the ACHP has indicated the definitions of "direct" and "indirect" may be applied to Section 106 as well. Based on the guidance provided by this ruling, the distinction between direct and indirect effects is determined by the causality of the effect, not the physicality of the effect.

Direct effects occur when an effect comes from the time and place of the Project with no intervening cause. These effects may include physical, visual, auditory, or other impacts resulting directly from the Project.

Indirect effects to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable.[47]

This DSEIS also considers adverse effects to historic properties in terms of duration, as temporary or permanent.

---

[44] Independent Archaeological Consulting. 2019. End-of-Field Report, Hilton Park 11238, Phase IB Intensive Archaeological Investigation, Proposed Staging Area. Unpublished Technical Report issued July 12, 2019.

[45] US Court of Appeals. 2019. *National Parks Conservation Association v. Todd T. Semonite, ACOE Chief, et al*. Appeal from the US District Court from the District of Columba. USCA Case No. 18-5179.

[46] Section 110 requires each Landholding Agency to identify, evaluate, and protect any historic property, and ensure that the historic property within its inventory is managed with consideration for its historic value. Section 110(f) of the NHPA (54 USC 306107) requires an agency to minimize harm to any National Historic Landmark "directly and adversely" affected by a project.

[47] The definitions outlined in the court opinion have been summarized on the ACHP website: Advisory Council on Historic Preservation. 2019. *Court Rules on Definitions; Informs Agencies on Determining Effects*. June 10, 2019. Accessed from https://www.achp.gov/news/ court-rules-definitions-informs-agencies-determining-effects. Accessed on July 15, 2019.

Temporary effects are most often related to the period of construction. They may include impacts due to construction activities, or protective measures implemented during construction such as the establishment of detour routes for bicycles and pedestrians.

Permanent effects are ongoing and will be in place for the reasonably foreseeable future.

3.10.4.2 Impacts to Above-Ground Historic Properties

Direct Impacts

No-Action Alternative

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): The Ira F. Pinkham House/Wentworth Summer Residence is located nearly a quarter-mile northwest of the GSB, on Dover Point Road and the intervening road alignment and topography preclude a visual relationship between this historic property and the bridge crossing. As there is no physical or visual connection between this resource and the bridge crossing, there would be no direct, permanent or temporary impacts under the No-Action Alternative.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): The bridge crossing is located approximately 1,400 feet from this resource's National Register boundary and is set on the far side of multiple bridge structures constructed over the last fifty-plus years. Thus, visibility of the bridge crossing is limited to the tip of Bloody Point along the water, where the center span of the GSB peeks up above the LBB, and portions of the truss can be seen between the piers of the modern bridges. As the No-Action Alternative retains the GSB, there would be no direct, permanent or temporary impacts on this historic property.

General Sullivan Bridge (DOV0158): Under the No-Action Alternative the GSB (DOV0158) would only undergo routine maintenance. This alternative would not correct the existing state of substantial deterioration, which has resulted in the bridge being structurally deficient. Due to the continued and rapid deterioration of the GSB, the No-Action Alternative would result in an adverse, direct, and permanent effect to this historic property. Additionally, under the terms of the existing permit for the GSB and expanded LBB issued by the USCG, the GSB would eventually need to be removed.[48]

Alternative 1

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): As in the No-Action Alternative, the bridge crossing is located outside of visual distance from this historic property. Additionally, no roadwork on the north approach from Dover Point Road would be required under Alternative 1, meaning all elements of the Project associated with the rehabilitation of the GSB would remain far removed from the Ira F. Pinkham House/Wentworth Summer Residence. As described in **Section 3.8**, *Noise*, the Action Alternatives would result in a temporary increase in noise associated with construction equipment, and no permanent changes in noise level. Alternative 1 would result in the greatest duration of increased noise level, three years. However, temporary increases in noise levels would not impact the character-defining features for which this property is eligible. Therefore, there would be no direct, permanent or temporary impacts to this property under Alternative 1.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): As the GSB would be rehabilitated under Alternative 1, much of the potential impacts to the Newington Railroad Depot and Toll House would be similar to those under the No-Action Alternative. As noted above, **Section 3.8**, *Noise* concludes that increased noise levels associated with the Action Alternatives would be temporary in nature; as a historic transportation resource, having a quiet setting is not a character-defining feature of this property, and an increased noise level for any length of time would not diminish the qualities that make the property eligible for the National Register. Thus, Alternative 1 would have no direct, permanent or temporary impacts to this historic property.

General Sullivan Bridge (DOV0158): The rehabilitation of the GSB would include the replacement of the bridge deck and repairs to the substructure and truss superstructure to support loading requirements. On the sides of the truss superstructure, approximately 39 members and 54 gusset plates require repairs or replacement in kind. In addition, eight of the nine spans of the upper, overhead lateral bracing and all nine spans of the lower lateral bracing require repairs or replacement in kind. A pedestrian bridge railing would be installed, and the Newington (south) abutment would be rehabilitated. Work would also include cleaning, repainting, and repointing bridge elements.

The 2008 MOA stipulated that the NH SHPO agreed that "…the removal and replacement of the floor system and any necessary replacement of rivets with bolts are not considered to be adverse effects." Similarly, it is assumed that in-kind replacement of braces and other structural and substructure elements would not be considered adverse effects and would have an overall beneficial effect of saving the bridge. The new pedestrian railing would be designed to have minor physical and visual impact, so as not to diminish the historic materials and aesthetic of the GSB. Therefore, Alternative 1 would result in a direct and permanent impact to the bridge, but these impacts would not constitute an adverse effect.

Alternative 3

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): Under Alternative 3, roadwork on Dover Point Road would be necessary. These road improvements would be limited to resolving minor alignment concerns between Dover Point Road and the new approach leading to the new bridge spans, and would end approximately 400 feet from this historic property. Therefore, there would be no physical impacts to the property. As described in **Section 3.8**, *Noise*, Alternative 3 would increase noise levels due to construction temporarily for a period of 1.5 to two years, a shorter duration than Alternative 1 but potentially at a slightly higher intensity. However, temporary increases in noise levels would not impact the character-defining features for which this property is eligible. Thus, Alternative 3 would result in no direct, temporary or permanent effects on the Ira F. Pinkham House/Wentworth Summer Residence.

[48] On November 30, 2006, Gary Kassof of the USCG sent a letter to Marc G. Laurin, Senior Environmental Manager of NHDOT, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 project. The USCG advised NHDOT that the GSB should be removed as it no longer served a transportation purpose, and that a clear and reasonable rationale must be presented for retaining or rebuilding the structure. The letter also stipulated that the bridge permit application to be submitted must address the need to retain or rebuild the GSB and, if the old bridge is to be removed, should include complete removal of all parts not utilized in the new structure.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): As noted above, there are no physical impacts to this property under any alternative. However, the replacement of the approach spans of the GSB would remove portions of the truss that have been visible features of the landscape of the bridge crossing, in which the Newington Railroad Depot and Toll House and the GSB have co-existed for over seven decades. Although the last remnant of visual connection between the Depot and the GSB would be removed under Alternative 3, for the most part the visual link between the two resources was previously severed by the twentieth- and twenty-first century construction of new bridge structures. Therefore, the removal of the approach spans under Alternative 3 would be noticeable from this property, but this effect would not be adverse.

Additionally, a temporary increase in noise levels associated with the construction of Alternative 3 would not diminish the qualities that make this property eligible for the National Register. Thus, Alternative 3 would cause permanent, direct impacts to this historic property, but these impacts would result in no adverse effect.

General Sullivan Bridge (DOV0158): Under Alternative 3, the GSB's central spans (Spans 4, 5, and 6) would be retained, while the approach spans (Spans 1, 2, 3, 7, 8, and 9) would be replaced. The piers and abutments would be retained. This alternative would retain the visually prominent arched central spans, as well as the elegant continuous deck truss/through-truss configuration that defines the bridge as a significant and influential design marrying technological innovation and aesthetics. However, Alternative 3 would result in the removal and replacement of two-thirds of the spans with modern materials, representing a consequential loss of historic materials. Retention of the substructure would not offset the loss of the superstructure spans, as the significance of the bridge's design is carried in its notable and recognizable superstructure truss system.

Removal of a notable and recognizable part of the bridge superstructure essentially negates its significance under Criteria A and C. As the most visible and recognizable element of the GSB, the superstructure embodies the engineering advances and aesthetics that define the bridge's contribution to the development of the national highway network. The replacement of the historic bridge would result in the physical loss of an early, nationally-significant example of its engineering design; dwindling of the bridge type in New Hampshire and nationally; and the loss of this major link in the transportation network of the region, whose evolution is intertwined with the history of the region itself.

Thus, Alternative 3 would have an adverse, direct, and permanent effect on this historic property, although minimized to an extent by the retention of the arched central spans and characteristic continuous deck truss/through-truss configuration.

Alternative 6

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): Although Alternative 6 includes the replacement of the entire GSB superstructure (both the approach and center spans), the impacts to the Ira F. Pinkham House/Wentworth Summer Residence would be similar to that of Alternative 3. Thus, there would be no temporary or permanent direct impacts to this historic property.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): The replacement of the GSB superstructure would result in a direct, permanent impact to this historic resource. However, for the reasons discussed in Alternative 3, these impacts would not constitute an adverse effect.

General Sullivan Bridge (DOV0158): Under Alternative 6, the entire GSB superstructure would be demolished, increasing the magnitude of the loss of this primary character-defining feature. The removal of the superstructure would irreversibly impact the historic integrity of the bridge, and therefore its eligibility for the National Register. Therefore, this alternative would result in an adverse, direct, and permanent effect to the GSB.

Alternative 7

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): For the same reasons as those outlined under Alternatives 3 and 6, Alternative 7 would result in no direct, temporary or permanent effects to this property.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): The replacement of the GSB superstructure would result in a direct, permanent impact to this historic resource under Alternative 7. However, for the reasons discussed in Alternatives 3 and 6, these impacts would not constitute an adverse effect.

General Sullivan Bridge (DOV0158): Under Alternative 7, the GSB superstructure would be demolished. For the same reasons as those outlined under Alternative 6, Alternative 7 would result in an adverse, direct, and permanent effect to the GSB.

Alternative 9 *(Preferred Alternative)*

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): Alternative 9 would involve roadwork on Dover Point Road. These road improvements would be limited to resolving minor alignment concerns between Dover Point Road and the new approach leading to the new bridge spans, and would end approximately 400 feet from this historic property. Therefore, there would be no physical impacts to the property. As described in **Section 3.8**, *Noise*, Alternative 9 would increase noise levels due to construction temporarily for a period of 1.5 to two years, a shorter duration than Alternative 1 but potentially at a slightly higher intensity. However, temporary increases in noise levels would not impact the character-defining features for which this property is eligible. Thus, Alternative 9 would result in no direct, temporary or permanent effects on the Ira F. Pinkham House/Wentworth Summer Residence.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): As noted above, there are no physical impacts to this property under any alternative. However, the replacement of the approach spans of the GSB would remove portions of the truss that have been visible features of the landscape of the bridge crossing, in which the Newington Railroad Depot and Toll House and the GSB have co-existed for over seven decades. Although the last remnant of visual connection between the Depot and the GSB would be removed under Alternative 9, for the most part, the visual link between the two resources was previously severed by the twentieth- and twenty-first century construction of new bridge structures. Therefore, the removal of the approach spans under Alternative 9 would be noticeable from this property, but this effect would not be adverse.

Additionally, a temporary increase in noise levels associated with the construction of Alternative 9 would not diminish the qualities that make this property eligible for the National Register. Thus, as with Alternatives 3, 6, and 7, Alternative 9 would cause permanent, direct impacts to this historic property, but these impacts would result in no adverse effect.

General Sullivan Bridge (DOV0158): Under Alternative 9, the entire GSB superstructure would be demolished, increasing the magnitude of the loss of this primary character-defining feature. The removal of the superstructure would irreversibly impact the historic integrity of the bridge, and therefore its eligibility for the National Register. Therefore, this alternative would result in an adverse, direct, and permanent effect to the GSB.

Indirect Impacts

This section describes the potential indirect impacts of the Proposed Action on cultural resources. The APE identified for the Proposed Action (**Section 3.10.2**, *Methodology for the Identification of Historic Properties*) extends beyond the Study Area defined in **Section 1.1**, *Study Area*, namely along the banks of the Little Bay from which the GSB is visible. However, the reasonably foreseeable actions considered for the assessment of indirect effects to historic properties do not differ between the Study Area and the APE.

No-Action Alternative

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): Under the No-Action Alternative, potential indirect impacts would consist of the permanent lack of direct recreational access and connectivity for non-vehicular use between Newington and Dover over the Little Bay. The lack of connectivity would not indirectly impact this historic resource.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): For similar reasons, there would be no measurable indirect impacts to the historic Newington Railroad Depot and Toll House resulting from the No-Action Alternative. There may be less use of the property for recreational reasons if the non-motorized connection to Dover is eliminated, but this would not affect the property's character-defining historic features.

General Sullivan Bridge (DOV0158): Under the No-Action Alternative, impacts to the GSB would be direct in nature; the permanent severance of recreational access over the Little Bay would result in increased deterioration of the bridge and safety hazards associated with that determination, which are all direct impacts. Thus, there would be no indirect impacts to the GSB under the No-Action Alternative.

Action Alternatives

Ira F. Pinkham House/Wentworth Summer Residence (DOV0093): None of the Action Alternatives would result in measurable indirect impacts on the Ira F. Pinkham House/Wentworth Summer Residence. Improving connectivity for non-motorized transportation across the Little Bay, whether through the rehabilitation of the GSB through Alternative 1 or the partial or wholesale replacements of the bridge under the other Action Alternatives, would result in induced growth. There are no anticipated indirect effects to this property's character-defining historic features.

Newington Railroad Depot and Toll House (NWN0168/NR #10000187): Indirect impacts to this historic property are identical across all Action Alternatives. The re-introduction of recreational connectivity across the Little Bay, through the reopening of the GSB or the construction of a new structure, would not indirectly impact the property in a measurable way. It is possible that connection improvements may encourage increased visitation to the Newington Railroad Depot and Toll House property by recreation users, but this would not impact its historic, character-defining features.

General Sullivan Bridge (DOV0158): Under Alternative 1, impacts associated with maintaining connectivity between Newington and Dover via the GSB would consist entirely of physical, direct impacts to this historic structure, resulting in no adverse effect. Thus, there would be no indirect impact to the GSB under this Action Alternative.

The adverse effects of Alternatives 3, 6, 7, and 9, when considered with other past, present, and reasonably foreseeable projects, would not result in indirect impacts to the GSB because the superstructure would be removed or altered to the extent of permanently impacting the bridge's eligibility for listing in the National Register. Thus, no reasonably foreseeable projects could cause further adverse effects to the GSB.

Section 106 Findings

The Section 106 finding of effect for Alternative 9 (the Preferred Alternative) is a finding of Adverse Effect. Applying the criteria of effect at 36 CFR 800.5(a)(2), it was determined that the project will result in an Adverse Effect to the General Sullivan Bridge; No Adverse Effect for the Newington Railroad Depot and Toll House; and No Historic Properties Affected for the Ira F. Pinkham House/Wentworth Summer Residence. The Section 106 findings are provided in an Adverse Effect Memo (**Appendix I**), signed on January 2, 2020 which documents concurrence on effects by FHWA, NHDOT, and NHDHR.

3.10.5 Mitigation

If a project cannot be designed to avoid historic properties, then appropriate mitigation to resolve adverse effects must be established. The identification of measures to mitigate the adverse effects resulting from the Preferred Alternative is ongoing at this time and will be stipulated in a new MOA.

For the single archaeological resource in the APE – the Brickyard known as Site 27-ST-55 – no mitigation is needed, as no impacts are proposed. Appropriate protection measures will be identified, established and enforced to prevent potential impacts to the site from adjacent construction staging that would be located in Hilton Park. If the project footprint is revised during the final design, then the revised APE would be evaluated for potential impacts. If impacts are likely, all phases of archaeological investigation would be completed.

The NHDHR, FHWA, NHDOT, and Consulting and Interested Parties have discussed potential mitigation measures for the loss of the GSB and a list of ideas was updated periodically as input was provided. After the Adverse Effects Memo was signed on January 2, 2020, meetings among NHDOT, NHDHR, FHWA, ACOE, and the Consulting/Interested Parties focused exclusively on developing mitigation for adverse effects resulting from the project.

While the language of the stipulations to be included in a Memorandum of Agreement (MOA) will be finalized following the public input on the DSEIS, the following mitigation measures relate

directly to the adverse effects resulting from the GSB Project, and have support among most of the agencies and Consulting/Interested Parties. Note that other measures will be considered in response to public comments on this DSEIS. The draft mitigation measures, entitled *"Newington-Dover 11238S, Section 106 – Draft Mitigation Stipulations,"* dated March 31, 2021, are detailed in **Appendix I**, and currently include the following:

- Marketing the GSB for re-use in compliance with 23 USC Section 144;
- Documentation of the GSB in accordance with the Historic American Engineering Record standards;
- Promotion and providing access to the NHDOT Historic Bridge Inventory and Management Plan;
- Development of an interpretive program including on-site interpretive panels and an installation at the Woodman Museum in Dover;
- Development of a plan for the rehabilitation of the Newington Railroad Depot and possible transfer of the building along with the state-owned land on Bloody Point to the Town of Newington; and
- Completion of a feasibility study of a future link between the Dover Community Trail and the new/rehabilitated GSB, including development of interpretive signage to highlight the history of the Newington-Dover Branch Line.

The significance of the GSB is tied to its design and engineering, parts of which are invisible to observers, and its role in the development of the regional transportation network, much of which has been overlain by subsequent modernizations in this still-evolving landscape. Thus, the institution of an educational interpretive program has been discussed as particularly apt, as it allows the presentation of historic themes that are not readily apparent. Bloody Point and Hilton Park offer views of the bridge crossing, which would allow a direct visual connection between these areas and the site of the GSB, strengthening the message of an interpretive program. Other benefits include the ability to build upon mitigation carried out to resolve adverse effects resulting from the replacement of the Lake Champlain Bridge, which had a similar history and significance, and the potential use of the proposed new bridge as an additional location for interpretive materials.

Understanding the specific maintenance and preservation needs of each bridge type is essential to their long-term care and would better inform the public agencies that serve as their stewards amid changing needs and transforming land use. The NHDOT is preparing a historic bridge inventory and management plan to address these needs. The education potential of the conclusions and guidelines is pertinent to the story of the GSB over the last 90 years and would allow municipalities and agencies to better program their maintenance into annual budgets and long-term planning. Utilizing mitigation measures that expand the reach of this educational potential is a meaningful use of resources.

The Newington Railroad Depot and Toll House (NWN0168/ NR #10000187) property on Bloody Point is underutilized. Although it is currently owned by the State, it has previously been leased by the Town of Newington, and discussions regarding a renewed lease or a transfer of ownership to the Town have occurred sporadically over the last few decades. Multiple parties are supportive of rehabilitating the Depot building and developing the recreational space surrounding it, which extends to the waterfront overlooking the bridge crossing. Logistical complications include ensuring rehabilitation is carried out in a historically-sensitive manner; the identification of a feasible use for the building; initial and operational costs associated with improving the property, and the legal complications of land transfer.

While other off-site mitigation ideas have been discussed, there is ample opportunity to develop appropriate and relevant mitigation that have a close connection to the effects of the Project. Thus, consideration of measures that are geographically distant from the GSB may not be necessary or appropriate.

The mitigation measures continue to be refined through the Section 106 consultation process, including input by stakeholders, Consulting and Interested Parties, and the public. Once finalized, the measures will be incorporated into a new MOA.

3.11 Contamination and Hazardous Materials

As defined by the US Environmental Protection Agency, hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. The NHDES defines hazardous waste as a waste which may pose a present or potential threat to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Federal polices, regulations, and guidance that may pertain to hazardous materials include:

- Toxic Substances Control Act Polychlorinated Biphenyl regulations, Title 40 CFR 761;
- Toxic Substances Control Act, 15 USC 2601-2692 including the Asbestos Hazard Emergency Response Action;
- Occupational Safety and Health Administration (OSHA) Lead in Construction Standard, Title 26 CFR 1926.62;
- OSHA Standards for Hazardous Materials, Title 29 CFR 1910 and 1926;
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended, 42 USC 9601 *et seq.*; and RCRA and Superfund Amendments and Reauthorization Action, 42 USC 6901 *et seq.*;
- USDOT Hazardous Materials Transportation act of 1975 as amended, 49 USC 5101-5127.

State polices, regulations and guidance that may pertain to hazardous materials include:

- NHDES Env-Or 600 Contaminated Site Management
- New Hampshire Statues Title X Chapter 147-A Hazardous Waste Management

3.11.1 Affected Environment

An assessment of potential petroleum and hazardous materials sites at the corridor level was reported in the 2007 FEIS to identify existing conditions including the release or threat of release of oil and/or hazardous materials (OHM) within the Study Area. An online file review was conducted in 2021 to identify properties within the Study Area that have had a release or pose a threat of release of OHM, and which may impact the environmental quality of the Study Area.

Included in these reviews were federal and state environmental databases from EDR® and the NHDES.

Based on a review of the 2007 assessment and online file review in 2021, no properties impacted by hazardous materials were identified within the Study Area. However, there are four properties near the Study Area that based on their regulatory listing have the potential to impact environmental conditions within the Study Area. A description of these properties is provided in **Table 3.11-1** below. The location of these NHDES listed properties and associated Groundwater Management Zone (GMZs) are included in **Figure 3.11-1**.

Table 3.11-1 NHDES Listed Properties within 1,000 feet of the Study Area

Address	Property Name	City	NHDES ID	Databases	Spill Status
410 Shattuck Way	Tradbe Treatment & Recycling of Newington	Newington	17240	Hazardous Waste Generator, Solid Waste Facility, Aboveground Storage Tank Program, Initial Response Spill Site, Leaking underground storage tank	Closed
1149 Spaulding Turnpike	Mitchell's Gulf	Newington	4342	Hazardous Waste Generator, Underground Storage Tank Program, Leaking underground storage tank	Active
430 Dover Point Road	K-9 KAOS	Dover	60233	Initial Response Spill Site	Closed
NH 16	Former Newington Country Store	Newington	17190	Leaking Underground Storage Tank	Active

In October 2008, marine sediments within Little Bay were sampled as part of the larger Newington-Dover Spaulding Turnpike Improvement Project for purposes of complying with Clean Water Act Section 401 Certification requirements. Sediment analytical results from the sampling event indicating that eight contaminants detected in marine sediments were above the threshold effect concentrations and four contaminants were identified above probable effect concentrations. These contaminants included polyaromatic hydrocarbons such as 2-methylnaphthalene, fluoranthene, naphthalene and pyrene as well as metals including copper, lead, mercury, and nickel. However, it should be noted that all concentrations of contaminants detected in marine sediments were below the NHDES Contaminated Soil Disposal and Reuse Criteria.

In 2009, soil and groundwater within the vicinity of the larger Newington-Dover, Spaulding Turnpike Improvements Project were sampled in order to assess potential OHM concerns associated with the Spaulding Turnpike Improvements Project. With the exception of arsenic, all soil and groundwater results were below the applicable NHDES regulatory thresholds. Arsenic was detected above the NHDES Soil Category 1, 2, and/or 3 standards. The elevated arsenic concentrations were attributed to the nature of the native marine deposits throughout the area.

In 2018, NHDES initiated rulemaking to establish Maximum Contaminant Levels and Ambient Groundwater Quality Standards (AGQS) for four PFAS: perfluorooctanioic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid and perfluorohexane sulfonic acid. The current standards, ranging from 11 to 18 nanograms per liter, became effective on September 30, 2019. Under these rules, groundwater that has the potential to have PFAS-impacted groundwater above AGQSs may be subject to management through a GMP.

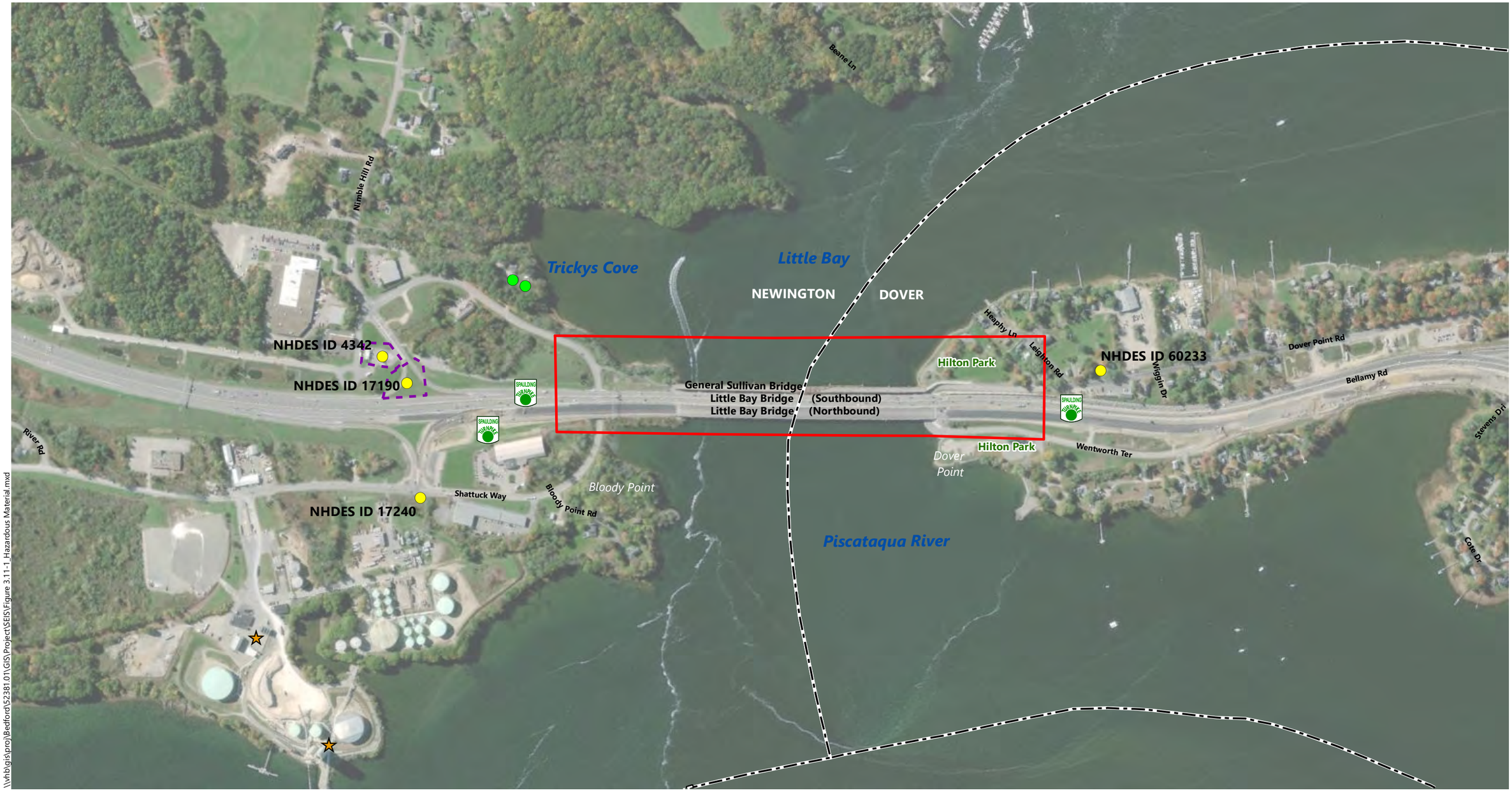
The Pease Airforce Base EPA Superfund Site is a remediation site being addressed by the United States Air Force for the presence of various petroleum plumes associated with the historical use of the property. In 2012, initiatives begun to assess for the presence of PFOS and PFOA at the Pease Airforce Base, which subsequently identified elevated concentrations of PFOS and PFOA across a portion of the Air Force Base. The petroleum plumes present at the Pease Air Force Base are actively being monitored under a GMZ located along the flight line of the Air Force Base. According to the 2018 Annual Report, an Airfield Interim Mitigation System is being constructed to treat the PFOS and PFOAs in groundwater within the Air Force Base. The GMZ associated with the Pease Air Force Base is located more than 1.5. miles south of the Site. Therefore, although elevated concentrations of PFOS and PFOAs are present at the Pease Air Force Base, due to the location of the GMZ greater than 1.5 miles from the Project Area and the location of sampling points in close proximity to the Project Area, it is unlikely PFOS or PFOAs emanating from the Pease Air Force Base would be encountered during construction of the Project.

According to information obtained from the available online database, sampling was conducted south of the Study Area in September 2014 and 2017 that identified concentrations of PFOS and perfluorohexane sulfonic acid below the current AGQS standards. Additional PFAS sampling conducted in the vicinity of the NHDES site at 372 Shattuck Way detected select PFAS below the current AGQS standards; however, NHDES has requested additional sampling be conducted to evaluate the presence of the remainder of the regulated PFAS compounds. The PFAS sampling locations are shown in **Figure 3.11-1**.

In December 2015, Coating Condition Assessment was performed for the GSB to evaluate the condition of the existing coating system applied to the structure.[49] The results of the assessment determined that the coating system was in poor conditions with widespread corrosion and rust observed throughout the bridge components. Laboratory analysis identified lead in the existing coating on the bridge. Based on the presence of lead paint on the bridge, the OSHA Lead in Construction Standard (29 CFR 1926.62) must be invoked during any activities that disturb the paint. It should also be noted that other hazardous materials such as heavy metals may be present in the coating which will also require management under the applicable OSHA Standards.

[49] KTA-Tator, Inc. 2016. Coating Condition Assessment of the General Sullivan Bridge over the Little Bay, Dover, NH. Technical Report issued to VHB, Inc., April 1, 2016.

Figure 3.11-1



\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.11-1_Hazardous Material.mxd

0 300 600 1200 Feet

Legend

- Study Area
- Town Boundaries
- Approximate Location of NHDES Listed Property
- Select PFAS < NHDES 9/30/2019 AGQS; Additional Sampling Required
- PFAS<NDHES 9/30/2019 AGQS
- Approximate NHDES GMZ Boundary

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Hazardous Materials

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: NHGRANIT, VHB

3.11.2 Environmental Consequences

This section discusses the direct and indirect effects of the No-Action Alternative and the Action Alternatives on the generation and handling of potential contamination and hazardous materials within the Study Area.

3.11.2.1 Direct Impacts

No-Action Alternative

The No-Action Alternative would have no adverse direct impacts on the environment and human health relative to hazardous materials. Because the No-Action Alternative would not change current infrastructure or operations, it would have no permanent impact on known contaminated properties.

Alternative 1

Alternative 1 would have minor direct impacts on the environment and human health relative to contamination and hazardous materials.

Construction of Alternative 1 would generate construction debris associated with the rehabilitation of the GSB. Asbestos-containing materials may be encountered during demolition activities in a number of components associated with the bridge or within unidentified conduits beneath the roadway, depending on their age. Based on the findings of the Coating Conditions Assessment, lead-based paint in present within the Project Area and due to the poor condition of the paint, total coating removal and replacement would likely be conducted during the rehabilitation of the GSB. In addition, mercury, polychlorinated biphenyls (PCBs), and other special wastes may also be present in conduits and bridge structures. The abatement of these materials would be performed in accordance with appropriate regulations in order to ensure that there would be no adverse effect such as releases or misdirected wastes.

Construction-related equipment contains mechanical fluids have the potential to result in spills or leaks when not maintained in good working order. Contractors may also employ the use of supplies containing hazardous materials in order to conduct their work. Although the spill or release of OHM in the process of construction is an unlikely event; spill prevention plans would be required to prevent and control any such spills. Therefore, construction-related equipment being used during construction phases of the Project is not anticipated to result in an adverse effect.

Based on soil analytical results collected from within the Project Area, there is the potential to encounter arsenic-impacted soils during construction phases of the Project. Although the concentrations of arsenic are likely attributed to the native marine deposits throughout the area, arsenic impacted soils will be managed in accordance with a Project-specific Soil Management Plan as outlined in **Section 3.11.3**. There is also the potential that undocumented releases of OHM will be encountered during construction phases of the Project. These releases would be reported to NHDES as appropriate and remediated per applicable regulations. The removal of a percentage of contaminated environmental media from within the Project area would likely have a beneficial effect.

Alternative 3

Alternative 3 would have minor direct impacts on the environment and human health relative to contamination and hazardous materials.

Alternative 3 retains the GSB substructure, rehabilitates the central span, but replaces the approach spans. It would therefore generate more construction debris than Alternative 1. However, the abatement of these materials would be performed in accordance with appropriate regulations in order to ensure that there would be no adverse effects, such as releases or misdirected wastes. Therefore, this would be considered a minor direct impact.

Additionally, the existing piers would be maintained. Therefore, marine sediments would not be generated under this Alternative and there are no impacts to marine sediments under this alternative.

Impacts related to releases from construction-related equipment and potential to encounter impacted soils and/or groundwater would be similar to Alternative 1.

Alternative 6

Alternative 6 would have minor direct impacts on the environment and human health relative to contamination and hazardous materials.

During the demolition of the superstructure, a moderate to high volume of construction debris would be generated. However, the abatement of these materials would be performed in accordance with appropriate regulations in order to ensure that there would be no adverse effects such as releases or misdirected wastes. Therefore, this would be considered a minor direct impact.

A new pier would be constructed within Little Bay and Hilton Park as part of Alternative 6, which would generate sediments that would require proper disposal. Based on the October 2018 sediment sampling analytical data, sediment is impacted by low levels of polyaromatic hydrocarbons and metals. Although there is the potential for adverse ecological impacts associated with sediment disturbances during the installation of piers, based on the low levels of contaminants identified in sediments in conjunction with the implementation of proper sediment containment measures that limit turbidity in marine waters during construction, the direct impacts of removing sediment from Little Bay would be considered minor.

Impacts related to releases from construction-related equipment and potential to encounter impacted soils and/or groundwater would be the same as Alternative 1.

Alternative 7

Direct impacts to contamination and hazardous materials would be the same as outlined under Alternative 6.

Alternative 9 (Preferred Alternative)

Alternative 9 would have minor direct impacts on the environment and human health relative to contamination and hazardous materials. Under Alternative 9, the bridge superstructure would be replaced, generating a moderate to high volume of construction debris, similar to Alternatives 6

and 7. The abatement of these materials would be performed in accordance with appropriate regulations to ensure that there would be no adverse effects such as releases or misdirected wastes. Therefore, this would be considered a minor direct impact.

No new piers would be installed under Alternative 9 and no sediments would be generated. Therefore, there would be no permanent impacts to marine sediments under this alternative.

Impacts related to releases from construction-related equipment and potential to encounter impacted soils and/or groundwater would be the same as Alternative 1. As with all alternatives, new materials would use utilized as applicable during construction, and standard marine construction BMPs would be implemented wherever feasible to mitigate the potential for suspension of sediments and consequent siltation.

3.11.2.2 Indirect Impacts

No-Action Alternative

There would be no indirect impacts to hazardous materials for the No-Action Alternative.

Action Alternatives

Minor indirect impacts are possible under the Action Alternatives due to the potential amount of construction debris generated. Construction debris would require proper disposal; the movement of contaminated materials could have a minor adverse indirect impact during the transportation, disposal, and management of contaminated media due to the potential for improper handling or misdirection of wastes. This potential effect is proportionate to the amount of waste generated by each alternative. Alternatives 1 and 3 would have the least potential for such effects, whereas Alternatives 6 and 7 would have the most due to the work related to the replacement of GSB Pier 1.

3.11.3 Mitigation

As noted throughout this section, the primary impacts associated with the Action Alternatives is the generation of potentially hazardous building materials. Hazardous materials (asbestos, lead-based paint, PCBs, mercury, etc.) will be inventoried prior to any structural demolition or renovation work in accordance with Section 5.2 of the NHDOT *Standard Specifications for Road and Bridge Construction*. If these hazardous materials are found to be present in the structures, they would be properly abated by a licensed contractor in accordance with state and local regulations and shipped to a receiving facility licensed to handle the specific type of solid waste under the appropriate shipping documents such as manifests.

A Soil Management Plan (SMP) shall be developed in accordance with NHDOT specifications that would be based upon the results of subsurface investigations for the Project. These investigations should be conducted in order to pre-characterize soils that are designated for excavation during construction phases of the Project. A typical SMP outlines standards and procedures for the identification and disposal of contaminated materials that may be encountered during construction. Tracking protocols for contaminated soils will be detailed from the point of excavation to designated testing areas and to the ultimate disposal site.

Furthermore, a Health and Safety Plan shall be developed which provides the minimum health and safety specifications that contractors must meet during construction including requirements for environmental monitoring, personnel protective equipment, site control and security, and training.

The Project would also require excavation of Limited Reuse Soils (LRS), which are soils that are likely (based on "generator knowledge") and/or demonstrated (through laboratory analyses) to contain contaminant concentrations in the range of the NHDOT specific Acceptable Reuse Concentrations. Roadside LRS commonly encountered at NHDOT construction projects include:

- Soils with elevated concentrations of several polynuclear aromatic hydrocarbons and a few common metals; and
- Soils with petroleum residue (total petroleum hydrocarbons) related to the normal operation of motor vehicles and asphalt pavement.

The NHDOT has determined that roadside LRS may be encountered in all topsoil within the limits of the existing right-of-way, regardless of its depth. In instances where topsoil is not present, soil from the top of ground to a depth of 6 inches is considered to be LRS. Soils excavated from beyond and/or below the specified LRS limits that do not exhibit visual or olfactory evidence of potential contamination shall not require handling as impacted material.

Contractors will be advised that roadside LRS occurs within the limits of disturbance. The previously mentioned SMP will provide guidance for the identification, handling, storage, reuse, and disposal of LRS soils generated during construction activities.

In the event that PFAS-impacted groundwater is encountered during construction phases, dewatering activities shall be conducted in accordance with applicable NHDES rules and/or Groundwater Management Plans.

The Contractor will develop a Project Operations Plan, which shall specify the Contractor's means and methods for handling and managing LRS, and Contaminated Soil and Groundwater. This will include the implementation of the BMPs described in the SMP. No excavation would take place until the Project Operations Plan has been approved by the NHDOT. In addition, following approval of the Project Operations Plan, the Contractor shall be required to notify the NHDOT's Bureau of Environment at least two weeks prior to beginning excavation.

3.12 Visual Resources

Visual and aesthetic resources include naturally occurring landscape features as well as man-made resources or structures. The anticipated visual and aesthetic impacts of the Project - both beneficial and adverse - are discussed in this section. Both impacts to visual resources and viewers (the population affected by the Project) are considered. The visual resources analysis is consistent with the following list of laws, regulations, guidance and plans pertaining to the protection and enhancement of scenic qualities.

- Federal-aid Highway Act of 1970
- FHWA's Guidelines for Visual Impact Assessments of Highway Projects (2015)
- FHWA's NEPA procedures codified in 23 CFR 771

- Intermodal Surface Transportation Efficiency Act of 1991
- Wild and Scenic Rivers Act of 1968
- National Trails Systems Act of 1968
- Antiquities Act of 1906
- Section 106 of the National Historic Preservation Act of 1966[50]
- Section 4(f) of the USDOT Act of 1966[51]
- Section 6(f) of the Land and Water Conservation Fund (LWCF)
- City of Dover, New Hampshire Master Plan: 2009 Update to the Recreation Chapter

State public land management programs and plans may contain measures to protect the visual quality of protected areas (*e.g.*, forests and parks, public landscapes, restoration areas, and others). Refer to **Section 3.9**, *Parks, Recreation and Conservation Land* for information on these protected areas.

3.12.1 Affected Environment

A visual assessment was completed using site photographs and aerial mapping programs. The visual Study Area was identified through these efforts, and includes adjacent areas visible from the GSB, and areas from which the GSB can be seen by viewers, including the Spaulding Turnpike, LBBs, Piscataqua River and Hilton Park. The visual inventory within the Study Area includes existing buildings and infrastructure, visually sensitive resources, as well as the general components that form the basis of all landscapes. The inventory includes:

- Landscape features - such as topographic features, vegetation, and landscapes such as wetlands and farmlands.
- Manmade development – such as urban centers, industrial, commercial, institutional and residential areas, and utilities lines.
- Parks and recreation facilities – including properties protected by Section 4(f) and Section 6(f).
- Historic and archaeological resources – such as properties protected under Section 106.
- Other protected or iconic cultural resources – such as scientific or natural areas, scenic byways, routes, and vistas.

This visual impact assessment identifies areas that would be impacted by the alternatives.

3.12.1.1 Visual Resources and Viewshed Overview

The project viewshed is primarily centered around the GSB, LBBs, Piscataqua River and Hilton Park. The GSB center arched truss is highly visible to vehicular traffic traveling northbound or southbound over the LBBs, marine vessels, and viewers in Hilton Park (see **Appendix A**, Site Photo 1). The GSB has a distinctive and aesthetically-pleasing composition of a center arched through truss with deck side trusses. The addition of the LBB in 2011 directly adjacent to the GSB has affected the setting of the GSB, impeding viewsheds to and from the GSB on the east side. However, the setting on the west side of the GSB, overlooking the Little Bay, Dover Point, and Hilton Park, is largely intact, so while the integrity of setting has been diminished, it has not been eliminated. Subsequent deterioration has affected the physical integrity of the bridge, but the historically significant features of the structure are still evident.

As part of the construction of the new LBB, the north and south approaches to the adjacent GSB were re-routed in 2011. At the south end of the GSB in the Town of Newington, a paved curvilinear path provides access for pedestrians and bicycles between Shattuck Way and the GSB (Site Photo 2). The south approach to the GSB in Newington is an on-grade pedestrian path. The north abutment, located in Hilton Park in the City of Dover, was reconstructed in 2010 along with a new north approach bridge (Site Photo 3). Prior to 2015, pedestrians and bicyclists traveling on the GSB had open, picturesque views of the Little Bay to the west (Site Photo 4). In 2015, chain link fencing was added to the center of the bridge along the entire length, as a safety measure to keep pedestrians away from the outside deck extremes, which impeded the view to the west. The subsequent closure of the bridge in September 2018 eliminated the views of the Little Bay to the west. However, as previously discussed in **Section 2.4**, NHDOT established a temporary detour along northbound LBB in August 2019. For pedestrians using the temporary detour over the northbound LBB, the lanes of traffic of the southbound bridge and the GSB block the view of Little Bay to the west but provide open views of the Piscataqua River and Hilton Park to the east.

3.12.1.2 Views from the Highway

Roadway travelers heading north on the Spaulding Turnpike (NH 16) from Newington into Dover get a very picturesque and panoramic view of mountains in the distance and the arched GSB and LBBs in the foreground. Roadway travelers have an exceptional view of the broad waters of the Piscataqua River and Hilton Park. In the summer months, the manicured lawns of Hilton Park and its pier, as well as boats in the river, provide a very scenic viewscape. Crossing over the northbound LBB, the lanes of traffic of the southbound bridge and the GSB partially block the view of Little Bay to the west. In this area of the City of Dover, the main visual components include suburban residences, small pockets of forest, open space, and shoreline. The Spaulding Turnpike (NH 16) and associated approach roadways and ramp infrastructure, noise barriers, visually characterize this area for both roadway travelers and other viewers, such as residents or boaters.

Roadway travelers heading south on the Spaulding Turnpike (NH 16) from Dover into Newington can see the GSB center arch once they are within a half mile of the GSB. The Spaulding Turnpike (NH 16) and associated ramp infrastructure, also visually characterize this area. Sound walls limit roadway travelers' views as they drive south. Crossing over the southbound LBB, roadway travelers have relatively unobstructed views of Little Bay and the GSB center arched truss to the west. In this area of the Town of Newington, the main visual components include Trickys Cove, shoreline, pockets of forested areas, vegetation, and local roadways. Rockingham Electrical Supply is visible to the east, along with a few other commercial developments. As in Dover, the Spaulding Turnpike (NH 16), and associated approach roadways and ramp infrastructure, also visually characterizes this area for roadway travelers.

[50] Visual impacts to historic resources are also discussed in **Section 3.10**, *Cultural Resources*.

[51] For information on Section 4(f) properties, refer to **Chapter 4**, *Programmatic Section 4(f) Evaluation for the Use of Historic Bridges*.

3.12.1.3 Views from the Water

Marine traffic is prevalent in this coastal area of New Hampshire. Because the GSB crosses the Piscataqua River, marine vessels are allowed to pass under the center arched truss, providing boaters with exceptional views of the GSB structure (Site Photo 6). Boaters traveling east toward the GSB get an unobstructed, picturesque and panoramic view of the entire GSB superstructure and stone masonry piers (Site Photo 7).

3.12.1.4 Views from Hilton Park

In its description of Hilton Park, the *2009 Dover Recreation Master Plan* states that, "*There are outstanding views of the Piscataqua River and Little Bay.*"[52] In addition to views of these waterways, the entire GSB is visible from the west side of Hilton Park (Site Photo 8). Looking southwest, viewers in Hilton Park also experience exceptional views of marine vessels and Newington's distant shoreline (Site Photo 9). The built features of Hilton Park, including benches, picnic tables, and the pavilion, are described in **Section 3.9**, *Parks, Recreation and Conservation Land*. The paved access road into the west side of Hilton Park is lined with mature trees and a few shrubs, which provide shade for park users (Site Photo 10).

The visual landscape from the east side of Hilton Park are more centered around unobstructed views of the marine environment and marine vessels, the shoreline of the Piscataqua River, as well as the LBBs and associated roadway infrastructure (Site Photo 11). The top of the GSB center arched truss is barely visible from this side of the 16-acre Hilton Park. As described in **Section 3.9**, *Parks, Recreation and Conservation Land*, the east side of Hilton Park provides more recreational opportunities for park visitors than the west side of Hilton Park (*i.e.,* boat launch, fishing dock, and play area).

3.12.2 Environmental Consequences

Potential impacts to visual resources were evaluated based on noticeable changes in the physical characteristics of the existing environment, types of project features and construction impacts that are proposed, and whether the Project would complement or contrast with the visual character of the existing environment.

3.12.2.1 Direct Impacts

Potential direct impacts to visual resources and viewers are described in this section. Direct visual impacts, or changes to a visual landscape, may be either temporary or permanent. According to FHWA's *Guidelines for Visual Impact Assessments of Highway Projects*, temporary impacts are those impacts resulting from construction or short-term activities that fall within a period of two years or less. The guidelines also define permanent impacts as those resulting from construction activities lasting for two or more years, the built project, or the operations and maintenance associated with the built project.

No-Action Alternative

Under the No-Action Alternative, there would be no permanent, noticeable visible changes to visual resources, viewers, or visual quality. The existing physical characteristics and structural components of the GSB would remain unchanged from the bridge's current, deteriorated conditions.[53] The GSB would continue to be closed to pedestrians and bicyclists, as it has been since September 2018.

Alternative 1

Under Alternative 1, the existing physical characteristics of the GSB would remain, as the bridge would be rehabilitated and visually consistent with the present structure. The rehabilitation of the GSB would include the replacement of the bridge deck and repairs to the substructure and truss superstructure. On truss elevations, approximately 39 members and 54 gusset plates would require repairs or replacement in kind. In addition, eight of the nine spans of the upper lateral bracing and all nine spans of the lower lateral bracing would require repairs or replacement in kind. A pedestrian bridge railing would be installed, and the Newington abutment would need to be rehabilitated, maintaining visual consistency with the existing Newington abutment. Work would also include cleaning, repainting, and repointing bridge elements.

As a beneficial impact, Alternative 1 would enhance views of the natural visual resources (*e.g.*, land, water, and vegetation) and landscape characteristics of the surrounding area (see **Figure 2.3-1**). The portions of open deck and safety rail design would benefit viewers by providing views of Little Bay, the Piscataqua River, Hilton Park, marine traffic, Trickys Cove, and coastal shoreline. The visually prominent arched central spans would be retained, further benefiting the visual character of the bridge.

Temporary, direct visual impacts would occur under Alternative 1 due to the 3-year construction period because construction equipment and fenced areas for staging would temporarily disrupt the current views of the GSB from Hilton Park. Once construction is complete and all staging areas restored, there would be no permanent, noticeable visible changes to visual resources, viewers, or visual quality.

Alternative 3

Under Alternative 3, there would be no permanent, noticeable visible changes to visual resources, viewers, or visual quality. The existing physical characteristics of the GSB would remain. Under Alternative 3, the GSB's central spans (Spans 4, 5, and 6) would be retained, while the approach spans (Spans 1, 2, 3, 7, 8, and 9) would be replaced with visually consistent spans. The substructure piers would be retained, the Newington abutment would be rehabilitated, and the Dover abutment would be reused. This alternative would retain the visually prominent arched central spans, as well as the aesthetically-pleasing continuous deck truss/through-truss configuration (see **Figure 2.3-2**).

---

[52] Department of Planning and Community Development. *City of Dover, New Hampshire Master Plan: 2009 Update to the Recreation Chapter.* Accessed from https://www.dover. nh.gov/government/city-operations/planning/master-plan/index.html. Accessed on July 19, 2019.

[53] Note, however, that the USCG would likely require removal of the GSB if it no longer serves a transportation purpose. See November 30, 2006 letter from Gary Kassof, USCG, to Marc G. Laurin, NHDOT, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 Project.

Similar to Alternative 1, Alternative 3 would enhance views of the natural visual resources (*e.g.*, land, water, and vegetation) and landscape characteristics of the surrounding area, resulting in a beneficial impact to pedestrians and bicyclists crossing the bridge.

Temporary, direct visual impacts would occur under Alternative 3 due to the 2-year construction period because construction equipment and fenced areas for staging would temporarily disrupt the current views of the GSB from Hilton Park.

Alternative 6

Under Alternative 6, there would be permanent, substantial visible changes to visual resources, viewers, or visual quality. Except for the original stone masonry piers, the GSB, a key visual resource, would be removed. The removal of the superstructure would be highly noticeable to viewers and would remove a key visual resource within the Study Area. The new superstructure would not be in the form of a truss, and therefore would not be visually consistent with the existing GSB.

Under Alternative 6, the multi-use path would be immediately adjacent to the LBB deck. Chain link fencing would be installed on top of a 2-foot wide concrete barrier; this would provide a measure of safety but would not shield users of the path from noise and wind generated by vehicles passing at highway speeds on the LBB. The lack of separation between vehicular traffic and recreational and non-motorized travelers, and the associated noise, wind, and perception of risk is a substantial disadvantage of this alternative which the public has viewed unfavorably. Pedestrians and bicyclists would be located directly adjacent to high speed vehicle traffic, thus adversely affecting safety and user experience, in addition to negatively impacting views of the Piscataqua River to the east.

Additionally, Alternative 6 would involve reconstruction of the Dover approach span from Hilton Park, including relocation of an existing pier. Removal and replacement of one of the eight original stone masonry piers would create an inconsistent, or incoherent, visual effect. This change would be most noticeable to viewers on the west side of Hilton Park. The visual character of the stone piers would be permanently altered due to the removal and replacement; the seven remaining stone masonry piers would be left in place for support of the pier extensions, resulting in a visual change in superstructure alignment from the existing GSB (see **Figure 2.3-3**).

As a beneficial impact, Alternative 6 would enhance pedestrians' and bicyclists' views of the natural visual resources (*e.g.*, land, water, and vegetation) and landscape characteristics of the surrounding area. The open deck and safety rail design and chain link fencing on the west facing side of the new bridge would benefit viewers by providing views of Little Bay, the Piscataqua River, Hilton Park, marine traffic, Trickys Cove, and coastal shoreline.

Temporary, direct visual impacts would occur under Alternative 6 due to the 1.5-year construction period because construction equipment and fenced areas for staging would temporarily disrupt the current views of the GSB from Hilton Park.

Alternative 7

Substantial alteration of visual environment would occur under Alternative 7, similar to the impacts described for Alternative 6. The removal of the superstructure would be highly noticeable to viewers and would remove a key visual resource within the Study Area. The new superstructure would not be in the form of a truss, and therefore would not be visually consistent with the existing GSB.

Alternative 7 is similar to Alternative 6 but would construct a new, separate multi- use path adjacent to the existing southbound LBB superstructure rather than extend the LBB deck. A new multi-use path deck would be constructed approximately 7.5 feet from the existing southbound LBB superstructure. Pedestrians and bicyclists would be located further from high speed vehicle traffic than Alternative 6. However, views of the Piscataqua River to the east would be reduced by the addition of chain link fencing on the east side of the new bridge (see **Figure 2.3-4**).

Similar to the impacts described for Alternative 6, Alternative 7 would involve reconstruction of the Dover approach span from Hilton Park, including relocation of an existing pier. Removal and replacement of one of the eight original stone masonry piers would create an inconsistent, or incoherent, visual effect. This change would be most noticeable to viewers on the west side of Hilton Park. The visual character of the stone piers would be permanently altered due to the removal and replacement; the seven remaining stone masonry piers would be left in place for support of the pier extensions, resulting in a visual change in superstructure alignment from the existing GSB.

As a beneficial impact, Alternative 7 would enhance pedestrians' and bicyclists' views of the natural visual resources (*e.g.*, land, water, and vegetation) and landscape characteristics of the surrounding area. The open deck and safety rail design would benefit viewers by providing unobstructed, expansive views of Little Bay, the Piscataqua River, Hilton Park, marine traffic, Trickys Cove, and coastal shoreline.

Temporary, direct visual impacts would occur under Alternative 7 due to the 1.5-year construction period because construction equipment and fenced areas for staging would temporarily disrupt the current views of the GSB from Hilton Park.

Alternative 9 (Preferred Alternative)

Substantial alteration of visual environment would occur under Alternative 9. Under Alternative 9, the GSB superstructure would be replaced with a steel girder superstructure with a structural steel frame, in the form of a "V" longitudinally, extending from the bottom of the girders to the top of the existing GSB piers (see **Figure 2.3-5**). This alternative follows the existing GSB alignment, thereby allowing the reuse of the existing repointed GSB stone masonry piers without requiring substantial modifications.

The removal of the superstructure would be highly noticeable to viewers and would remove a key visual resource within the Study Area. The new superstructure would not be in the form of a truss, and therefore would not be visually consistent with the existing GSB. However, unlike Alternatives 6 and 7, the recently constructed approach span at the Dover end of the bridge would be retained and reused as part of Alternative 9, and the alignment of the existing GSB would be maintained. Additionally, unlike Alternatives 6 and 7, all eight of the original stone masonry piers would be retained, adding to the substructure's coherent and harmonious visual character.

As a beneficial impact, Alternative 9 would enhance pedestrians' and bicyclists' views of the natural visual resources (*e.g.*, land, water, and vegetation) and landscape characteristics of the surrounding area. The open deck and safety rail design would benefit viewers by providing fully unobstructed, expansive views of Little Bay, the Piscataqua River, Hilton Park, marine traffic, Trickys Cove, and coastal shoreline.

Temporary, direct visual impacts would occur under Alternative 9 due to the 1.5-year construction period because construction equipment and fenced areas for staging would temporarily disrupt the current views of the GSB from Hilton Park.

3.12.2.2 Indirect Impacts

Under the No-Action Alternative and Alternatives 1, 3, 6, 7, and 9 there would be no visual impacts to the historic GSB, as all potential impacts would be physical in nature. Therefore, the Project would result in no indirect visual impacts, either permanent or temporary.

3.12.3 Mitigation

This section identifies possible mitigation measures for impacts to visual resources, viewers, or visual quality. Both construction-related and design-related mitigation are described, as well as potential visual enhancements to Hilton Park.

Disturbed areas in Dover and Newington used for construction staging would be restored to as near pre-existing conditions as practicable once construction is complete. As needed, the visual character of the disturbed areas would be restored with replacement plantings. Replacement plantings should be native and indigenous to the area for visual consistency with the surrounding landscape and natural environment.

Additional design-related treatments that could be implemented for the purpose of enhancing and improving bridge aesthetics include:

- Design structural features to blend with the surrounding built and natural environments to complement the visual landscape.
- Select low-sheen and non-reflective surface materials to reduce potential for glare.
- Choose durable paint colors with a dull, flat, or satin finish (not glossy) to reduce potential for glare.
- Develop an aesthetically pleasing design to minimize effects of visual intrusion upon the natural and built landscape.
- Design bridge lighting to maximize energy efficiency, safety and security, and be aesthetically pleasing.

The list above is meant to provide examples of final-design features that could benefit viewers, visual resources, and visual quality.

3.13 Construction Impacts

Construction activities have the potential to adversely impact adjacent populations or natural resources by exposing them to impacts or hazards they are otherwise not regularly exposed to. This section describes anticipated construction period impacts resulting from the Project and proposes mitigation measures for those impacts. Potential construction impacts include noise and vibration, air quality, truck traffic, construction staging areas, and traffic control measures.

3.13.1 Affected Environment

See each resource section within **Chapter 3**, *Affected Environment and Environmental Consequences*, for a discussion of what specific resources are present within the Study Area.

3.13.2 Environmental Consequences

All construction-related impacts are temporary, since construction would take place for a limited duration. Potential construction impacts are related to potential noise and vibration, air quality emissions, water quality impacts, generation of truck traffic, use of property for construction staging areas, and implementation of traffic control measures. The resources affected by the Project are generally the same for all Action Alternatives, with additional transportation and noise impacts under Action Alternatives 6 and 7. It is important to note there are no statewide noise regulations that relate to construction activities in New Hampshire. NHDOT would coordinate construction activities with the Town of Newington and City of Dover.

Construction phasing and contractor access would be further defined during the final design and construction phases of the GSB Project. While conceptual construction plans show the placement of temporary structures in Little Bay (**Appendix D**), the final design of these structures is dependent on contractor means and methods.

3.13.2.1 Direct Impacts

Direct temporary impacts were evaluated for each alternative. As noted above, construction impacts are resource specific and largely dependent on the activities necessary to build each alternative. For example, Action Alternatives which propose superstructure replacement would result in similar construction impacts. The potential impacts from construction are also dictated by the estimated construction duration, which vary from 1.5 to 3 years depending on the alternative.

No-Action Alternative

No construction would take place under the No-Action Alternative; therefore, no direct construction impacts would occur.

Alternative 1

Alternative 1 has the longest construction period of the five Action Alternatives evaluated for the Project with an estimated construction period of 3 years. Predominant work under this alternative would involve removal and replacement of the existing bridge floor system, removal and replacement in-kind of upper and lower lateral braces, in-kind replacement of several sway braces, rehabilitation of the Newington abutment, steel truss repair work, repointing the existing stone masonry piers, cleaning and painting existing structural steel, and installing a pedestrian

bridge railing. A longer construction period means temporary impacts would persist longer than other alternatives.

Emissions from stationary and mobile sources during construction would include oxides of nitrogen and sulfur, carbon monoxide, and particulate matter. The use of construction equipment would continue throughout rehabilitation of the GSB. The air quality impact assessment concluded that although the duration is longer, the rehabilitation work would likely be less pollutant intensive than the complete replacement of spans and piers occurring under other Action Alternatives. These emissions would be temporary and the locations at which they occur would change over time.

Due to the location of the Project, adjacent to and over Little Bay, temporary impacts to water quality are possible during earthwork activities through siltation and erosion. Additional temporary impacts are possible from the presence of mechanical fluids (*e.g.*, effluents, solvents, or oils) typically present at construction sites. With the proper mitigation measures, temporary impacts to water quality are not anticipated to be adverse.

Temporary impacts to approximately 0.2 acre of the northern portion of the blue mussel shellfish bed under the GSB may occur during the installation and removal of the causeways and trestle at the beginning and end of construction. The causeways and trestles would be in place throughout the duration of construction, which is anticipated to take approximately 3 years. Standard marine construction BMPs would be implemented wherever feasible to mitigate the potential for suspension of sediments and consequent siltation.

Construction access anticipated to require the installation of two temporary causeways and trestles. The placement of these structures would divert floodwaters to other areas of the Great Bay Estuary; however, these impacts would be negligible due to the extensive area of the Little Bay and Great Bay Estuary. The Great Bay National Estuarine Research Reserve (part of the Great Bay Estuary) encompasses 10,235 total acres, approximately 7,300 acres of open water and wetlands. The approximate size of the causeways and trestles equals 0.72 total acre, or 0.007 percent of the total area of Great Bay National Estuarine Research Reserve. Post construction, coastal and marine habitats would be restored to pre-construction conditions (*e.g.*, sloping and grading). Conditions are anticipated to rebound to existing conditions.

The placement of causeways and trestles would temporarily alter hydrodynamics on a localized scale in the areas directly adjacent to temporary structures. Current water flow in the area is complex and has a wide range of directional components and speeds due to the dynamic tidal changes within Little and Great Bay. The placement of temporary structures would result in minor shifts or changes in tidal flows, currents, and wave patterns. The temporary causeways would be located approximately 60 feet from the causeway locations evaluated in the 2007 FEIS and 2010 Hydraulic Modeling Report.[54] The hydrodynamic models predicted a minor increase in tidal maxima of 0.02 to 0.35 inches across Little Bay and the Great Bay Estuary from the placement of temporary causeways and trestles. Temporary impacts on hydrodynamics from the temporary structures would increase the current velocity at a maximum of 10 percent through the navigation channel (between GSB Piers 4 and 5). These temporary shifts or changes would persist the longest under Alternative 1, when compared to the other alternatives.

Construction-related equipment used during construction phases of Alternative 1 is not anticipated to result in an adverse effect from hazardous materials. The operation of construction equipment involves the use of mechanical fluids (*e.g.*, solvents, oils, and gasoline) that have the potential to result in spills or leaks when not maintained in good working order. Some of these materials may be considered hazardous to the general public, workers or the environment. Although the spill or release of these materials or fluids during construction is unlikely, spill prevention plans would be required to prevent and control any such spills. Construction debris can also contain hazardous materials, for example, lead-based paint or asbestos. Any construction debris removed from the site would be handled and disposed of off-site to not impact public health, or the environment. The abatement of these materials would be performed in accordance with appropriate regulations in order to ensure that there would be no adverse effects such as releases or misdirected wastes.

Under Alternative 1 (and all Action Alternatives), the construction access, laydown, and staging would only occur within the western side of Hilton Park; no access, laydown, or staging is proposed within the eastern side of Hilton Park. During construction, approximately 48,000 square feet of the western side of Hilton Park would not be publicly accessible because the area would be used for access and staging. The Hilton Park driveway off of Dover Point Road would be used for construction access under Alternative 1 (and all Action Alternatives) but would not be fenced off, allowing for continued public use and access to the west side of Hilton Park. The remaining 14.9 acres of the 16-acre Hilton Park would remain open to the public throughout construction. NHDOT would determine relocation details for the pavilion, such as the structure's final location and whether the structure would be relocated or replaced. The construction staging area would be fenced for safety. Under Alternative 1, temporary impacts to Hilton Park would last for the duration of construction, which is estimated to take three years. The sidewalk along Wentworth Terrace, which passes underneath the Spaulding Turnpike and runs along Dover Point Road, connects the east and west sides of Hilton Park. This sidewalk would remain open for continued public use, which would retain the existing connectivity of the east and west sides of Hilton Park.

Temporary noise impacts caused by Alternative 1 would persist the longest of the alternatives. However, although the estimated duration of construction is longer, the equipment associated with the rehabilitation work would likely be less noise intensive than the complete replacement of spans and piers occurring in other Action Alternatives.

Temporary visual changes would occur under Alternative 1 due to the estimated 3-year construction period because construction equipment and fenced areas for staging would temporarily alter views of the GSB, most notably from Hilton Park. These temporary changes to the viewshed would be present through the duration of construction. Fencing or barriers around construction staging areas are necessary to ensure public safety and to protect equipment and materials.

[54] AECOM. 2010. Hydraulic Modeling Analysis – Spaulding Turnpike Improvements, Little Bay Bridges Newington to Dover, New Hampshire. Prepared for VHB.

Alternative 3

Generally, Alternative 3 would have similar construction impacts described under Alternative 1; however, the partial rehabilitation would result in slightly more temporary impacts related to noise and hazardous materials, due to the use of heavy machinery and an increase in construction debris. Abatement of construction debris would still need to be performed in accordance with appropriate regulations in order to ensure that there would be no adverse effects, such as releases or misdirected wastes. Construction debris would be created through the replacement of spans 1, 2, 3, 7, 8 and 9. Work would require the use of heavy machinery which would cause minor, temporary increases in ambient noise levels in the surrounding area. Construction of Alternative 3 is anticipated to take two years. As with Alternatives 1 and 9, the sidewalk along Wentworth Terrace, which passes underneath the Spaulding Turnpike and runs along Dover Point Road, would remain open for continued public use during construction, which would retain the existing connectivity of the east and west sides of Hilton Park. Conversely, a shorter construction period (relative to Alternative 1) would reduce the potential impacts on other resources, including, air quality, water quality, wildlife and fisheries, hydrodynamics, parks and recreation, noise, and visual resources.

Alternative 6

Alternative 6 would generally have similar construction impacts as Alternative 1, with additional temporary impacts to transportation, connectivity of Hilton Park, hazardous materials and noise. Under Alternative 6, the deck of the southbound LBB would be widened approximately 17.5 feet to the west to accommodate the new multi-use path. The GSB superstructure would be removed, and the Dover approach span and northernmost pier (GSB Pier 1) would be replaced. At the Newington approach, the existing abutment would be removed in its entirety and replaced, due to changes in geometry and bridge type. Construction of Alternative 6 is anticipated to take 1.5 years. This shorter construction period would reduce impacts on natural resources in the Study Area; however, the additional transportation and noise impacts would result in more impacts than Alternative 9, which also has a construction duration of 1.5 years.

In contrast to Alternatives 1, 3, and 9, Alternative 6 would involve partial closure of the sidewalk along Dover Point Road, which passes underneath the Spaulding Turnpike and runs along Wentworth Terrace (**Appendix D**). This portion of sidewalk connects the east and west sides of Hilton Park. This sidewalk would remain closed during construction for public safety reasons, resulting in a temporary loss of connectivity between the east and west sides of Hilton Park.

The use of traffic control measures on the southbound LBB during construction would cause temporary, direct impacts to transportation. Traffic control measures would potentially cause congestion on the Spaulding Turnpike due to the temporary lane closures and speed limit decreases. These traffic control measures are necessary to provide safe worker and motorist conditions.

Construction debris would be created from the removal and replacement of GSB Pier 1, the Dover approach span, and GSB superstructure. All construction debris would be handled and disposed of off-site to not impact public health or the environment.

Work associated with construction of Alternative 6 would involve the use of heavy machinery, which would temporarily increase ambient noise levels. The replacement of Pier 1 would also require foundation work to secure the new pier which would likely require pile driving, creating more noise impacts. Although the construction duration is shorter, noise associated with the LBB deck widening, approach span replacement, and pier replacement would be more intensive than the other Action Alternatives.

Alternative 7

Construction impacts under Alternative 7 are similar to Alternative 6. The difference between these Alternatives 6 and 7 is minor, as Alternative 7 would construct the multi-use path adjacent to the southbound LBB (7.5 feet away) on an independent deck. The construction of the independent deck would require traffic control measures, similar to what would be needed under Alternative 6.

Similar to Alternative 6, Alternative 7 would involve partial closure of the sidewalk along Dover Point Road, which passes underneath the Spaulding Turnpike and runs along Wentworth Terrace (**Appendix D**). This portion of sidewalk connects the east and west sides of Hilton Park. This sidewalk would remain closed during construction for public safety reasons, resulting in a temporary loss of connectivity between the east and west sides of Hilton Park.

Alternative 9 (Preferred Alternative)

Generally, Alternative 9 would have similar construction impacts as Alternative 1; however, the superstructure replacement would result in slightly more temporary impacts to noise and hazardous materials from the use of heavy machinery and increase in construction debris. Alternative 9 would have similar temporary construction impacts on air quality, water quality, wildlife and fisheries, hydrodynamics, parks and recreation, noise, and visual resources as Alternative 1; however, all temporary impacts would be less due to the shorter construction duration. Construction of Alternative 9 is estimated to take about 1.5 years, which is half the time estimated for Alternative 1, and equivalent to construction of Alternatives 6 and 7.

As with Alternatives 1 and 3, the sidewalk along Wentworth Terrace, which passes underneath the Spaulding Turnpike and runs along Dover Point Road, would remain open for continued public use during construction, which would retain the existing connectivity of the east and west sides of Hilton Park.

As other Action Alternatives, Alternative 9 would cause temporary increases in noise levels in the Study Area for short periods of time. Although the construction period for Alternative 9 is less than Alternative 1 and 3, noise levels resulting from the superstructure replacement would be more intensive since Alternative 9 proposes full replacement of the GSB superstructure. During construction, heavy machinery would be used to replace the existing superstructure. Alternative 9 does not propose the replacement of GSB piers, therefore no pile driving, or foundation work would be needed.

The majority of construction debris created would be due to replacement of the entire superstructure of the GSB. All construction debris removed or created would be handled and disposed of off-site to not impact to public health or the environment.

3.13.2.2 Indirect Impacts

Indirect or secondary impacts are unlikely to occur as a result of construction. The temporary impacts resulting from construction activities would not cause impacts on resources that are reasonably foreseeable or removed from time or space from the Project. Post construction, areas impacted by staging and temporary structures would be restored to pre-construction conditions; these areas are anticipated to rebound to existing conditions.

3.13.3 Mitigation

Construction activities are not anticipated to result in permanent direct impacts to any of the above-mentioned resource areas. Mitigation measures and BMPs to be incorporated to minimize or eliminate construction-related impacts to nearby natural, cultural, and social resources are described in the resource-specific sections of **Chapter 3** of this DSEIS. Mitigation measures would be implemented in accordance with applicable laws and regulations during construction. Examples of resource-specific, construction-related mitigation measures include but are not limited to siltation or erosion control barriers, spill prevention plans, and wetting soils during excavation. No long-term construction mitigation measures are anticipated.

3.14 Social and Economic Resources and Environmental Justice

Potential socioeconomic impacts resulting from transportation projects can relate to population size, property acquisitions, economic growth (or loss), residential or commercial property values, and household income. The 2007 FEIS included an extensive analysis of the regional economics in New Hampshire, spanning 33 municipalities and three counties: Strafford, Rockingham and Carroll. The analysis for this DSEIS focuses on the potential for impacts to the Town of Newington and City of Dover because the scope of the Project is substantially smaller in scale than the larger Newington-Dover, Spaulding Turnpike Improvements Project, and lacks any feature that could induce secondary impacts.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects on the health or environment of minority and low-income populations to the greatest extent practicable. Title VI of the Civil Rights Act of 1964 prohibits discrimination by recipients of federal financial assistance on the basis of race, color, and national origin, including matters related to language access for those persons with limited English proficiency (LEP).[55] Executive Order 13166, *Improving Access to Services for Persons with Limited English Proficiency*, requires Federal agencies examine the services they provide, identify any need for services to those with LEP, and develop and implement a system to provide those services so LEP persons can have meaningful access to them. FHWA Order 6640.23A establishes policies and procedures for FHWA to use in complying with EO 12898, while the CEQ provides guidance on NEPA and Environmental Justice analyses in their publication *Environmental Justice: Guidance Under the National Environmental Policy Act*.

These regulations and associated guidance provide the foundation for this Environmental Justice (EJ) analysis, which is imperative to determine whether EJ populations are disproportionately impacted. The EJ analysis also aids in guiding the public outreach and future hearings. For example, public transit-accessible meeting locations and translation services.

3.14.1 Affected Environment

The Study Area used to evaluate socioeconomic resources encompasses Newington and Dover because the Project does not propose roadway improvements or changes to highway alignment, as was the subject of the larger Newington-Dover, Spaulding Turnpike Improvements Project. Due to the comprehensive socioeconomic evaluation completed in the 2007 FEIS, and the limited scope of the GSB Project, it was not necessary to complete a full economic analysis for this DSEIS.

This section reassessed the information and data presented in the 2007 FEIS and compared that data to recent US Census Bureau American Community Survey (ACS) data. According to the 2010 Census, the total population of the Town of Newington has decreased since 2007; 775 people to 753 people. In contrast, the population in the City of Dover in 2010 was 29,987 people, an increase from 2007 (26,884 people).

In the 2007 FEIS, populations for Newington and Dover were forecasted based on historical growth trends and assumptions. The 2017 populations numbers in Dover and Newington are consistent with the forecasted populations numbers from the 2007 FEIS.[56] The population reported in the 2010 Census (753 people) was slightly less than the projected population reported for Newington in the 2007 FEIS (870 people); conversely, the population reported in the 2010 Census (29,987 people) in Dover was slightly higher than the projected population in the 2007 FEIS (28,930 people). Rockingham and Strafford Counties have either met or exceeded the State of New Hampshire median household income growth rate of approximately 36 percent between 1990 and 2000. Data provided by the US Census Bureau ACS 5-year Estimate regarding median household income showed that both Rockingham ($89,451) and Strafford Counties ($67,805) had median household income over the US average ($60,336) in 2017.

The EJ analysis was completed by the NHDOT Office of Federal Compliance. In this analysis, ACS data published by the US Census Bureau for each Census Tract within the Study Area is analyzed to determine the proportion of minority populations, low-income populations, elderly populations, and LEP persons. The EJ Study Area occurs entirely within Rockingham and Strafford Counties. The two EJ study areas used in the analysis is the *Impacted Area:* the population within a 1-mile radius of the Project limits of work, and the *Surrounding Area*: the population within a 3-mile radius from the Project limits of work, excluding the impact area. Average data pertaining to minority populations, median income, LEP, and age within the Impacted Area and

[55] LEP Definition: Where there is a population of people who speak English as a second language less than well (as indicated by the US Census data). When a particular LEP language group constitutes 5 percent of the impacted population, the NHDOT is required to translate public information meeting notices and take appropriate measures to ensure language access. If this requirement exists, the Project Manager should contact the Title VI Coordinator for further assistance.

[56] US Census Bureau. *2017 American Community Survey Data*. Updated February 4, 2019. Accessed from https://www.census.gov/programs-surveys/acs/news/data-releases.2017.html. Accessed on July 3, 2019.

Surrounding Area is presented **Table 3.14-1**. Based on this analysis, the NHDOT Office of Federal Compliance determined that the impacted and surrounding areas have portions of elderly persons and low-income populations higher than established thresholds within Census Tracts.

Table 3.14-1 Population Characteristics within the EJ Study Area

Study Area: Rockingham County and Strafford County, NH	Average % Elderly Population	Average % Minority Population	Average % Low-Income Household Population	Average % LEP
Impacted Area: 1-mile radius of Project	**15.1**	7.8	**15.9**	0.7
Surrounding Area: 3-mile radius of Project	**17.36**	6.25	**16.16**	0.3

Source:
NHDOT Inter-Office Communication from Jay Ankenbrock to Marc Laurin, entitled *"Environmental Justice Population Analysis, Newington-Dover 11238-S,"* dated July 25, 2018.

3.14.2 Environmental Consequences

Transportation projects can impact socioeconomic resources through the acquisition of properties or lands, loss of municipal tax revenue, or induced or future growth as a result of a project. These changes can impact residential or commercial property values, induce land use changes, or impact commercial businesses through an increase or loss of business.

Examples of direct impacts to EJ populations include property acquisitions, changes to land use, and impacts to properties that serve EJ communities (*e.g.*, low-income housing). There are no proposed property acquisitions, or changes to land use as a result of the alternatives evaluated for this project. Impacts to EJ populations would not exceed more than minor temporary impacts during construction (*e.g.*, noise from construction equipment use and traffic control measures on LBB). These temporary, construction-related impacts would not be disproportionate adverse impacts to EJ populations.

Beneficial economic effects are associated with the expenditure of construction funds, which are distributed to the local economy, and can have a multiplier effect as those funds are reinvested. Cost estimates were prepared for each reasonable alternative, and are summarized in **Table 3.14-2**; detail is provided in **Appendix C**.

Table 3.14-2 Initial Capital and Life Cycle Cost Estimate Summary

Alternative	Descriptions	Initial Capital Cost	Life Cycle Cost (2018 Dollars)
No-Action	Ultimate removal of the General Sullivan Bridge and Supporting Substructure Entirely[1]	$8,000,000	N/A
1	Rehabilitation of the General Sullivan Bridge - 16' Path	$43,000,000	$74,000,000
3	Partial Rehabilitation - 16' Path	$42,250,000	$61,750,000
6	Southbound Little Bay Bridge - Widened Deck on Pier Extension - 16' Path	$28,000,000	$31,250,000
7	Southbound Little Bay Bridge - Independent Deck on Pier Extension - 16' Path	$29,500,000	$32,250,000
9	Superstructure Replacement - Girder Option - 16' Path	$28,500,000	$31,250,000

1 The USCG would likely require removal of the GSB if it no longer serves a transportation purpose. See November 30, 2006 letter from Gary Kassof, USCG, to Marc G. Laurin, NHDOT, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 Project.

3.14.2.1 Capital Cost Estimation

Capital cost estimates were developed for each alternative. These cost estimates were calculated using NHDOT unit bid prices where available. Specialty elements such as micropiles and bolted steel repairs are estimated from projects similar to the alternative being studied. Superstructure replacement with a truss and the complete bridge replacement alternative are estimated using a cost per square foot. Estimates also include provisions for different levels (low, moderate, and high) of risk so that the alternatives can be compared fairly and equally at their higher end of the potential cost ranges. Risk considerations include work items that are subject to variability in quantity or construction that may require special means and methods.

3.14.2.2 Life-Cycle Cost Analysis

A life-cycle cost analysis was developed for all alternatives to evaluate total alternative costs over a 75-year planning horizon. To account for the time-reduction value of the dollar, and to make an equal comparison of alternatives given that future expenditures are valued less than present day expenditures, dollars are discounted at three percent per year in this analysis. This three percent discount follows FHWA guidelines and generally reflects the average discount rate over the past 30 years.[57] The analysis also assumes that future maintenance, operation and repair expenditures are discounted to the year construction is completed, which is referred to as Year 0. Capital costs are assumed to be fully expended in Year 0. The life cycle cost analysis considers regular maintenance and rehabilitation elements for each alternative, such as joint replacement, sealing of pack rust and spot painting. Minor items that are similar across all alternatives, such as navigational lighting maintenance and replacement, are not included in the analysis.

3.14.2.3 Direct Impacts

No-Action Alternative

Under the No-Action Alternative, the GSB would continue to be closed to pedestrian and bicycle access over Little Bay. The closure of the GSB over the long-term has the potential to have minor

[57] Federal Highway Administration. 2002. *Life-Cycle Cost Analysis Primer.* FHWA Technical Report IF-02-047. US Department of Transportation, Office of Asset Management. Issued August 2002.

socioeconomic impacts on businesses in Dover and Newington through a loss of alternative commuting opportunities. Under the No-Action Alternative, the GSB would continue to be closed and not accessible to persons in Newington and Dover, which includes EJ populations.

Alternative 1

Alternative 1 would not have measurable direct adverse impacts on private property, since parcel acquisitions are not required to implement this alternative. The 2007 FEIS analyzed induced growth impacts that could occur from rehabilitation of the GSB, within the 33 municipalities and three counties surrounding the GSB and LBBs. These findings remain unchanged; Alternative 1, rehabilitation of the GSB, would not affect the findings of the 2007 FEIS relative to induced growth in the surrounding communities.

There would be no disproportionately high or adverse impacts to EJ populations because the Project limits are within parcels owned by the State of New Hampshire and on existing bridge infrastructure. After construction is complete, Alternative 1 would have permanent, beneficial impacts by providing a safe and ADA accessible multi-use path over the Little Bay. Alternative 1 would not result in any disproportionately high and adverse impacts on EJ populations.

During the 3-year construction period, there would be temporary beneficial impacts to businesses and wages in the area during the length of construction which is approximately 3 years. Because the initial capital costs for Alternative 1 are higher than other alternatives, this economic benefit would be substantially more than other alternatives, except for Alternative 3 which is similar in cost. Temporary beneficial impacts involve re-circulation of a direct dollar spent throughout the economy because of the construction. These beneficial impacts are short-term, coincidental with the actual phasing and construction of the Project.

Alternative 3

Permanent, direct impacts to socioeconomic resources would be similar to Alternative 1. There would be no parcel acquisitions, and no disproportionately high and adverse impacts on EJ populations. As with Alternative 1, this alternative would provide permanent, beneficial impacts by providing a safe and ADA accessible multi-use path over the Little Bay.

The construction of Alternative 3 is anticipated to take approximately 2 years. A shorter construction timeframe than Alternative 1 would minimize the potential for temporary impacts on socioeconomic resources and EJ populations. A shorter construction duration would also result in the availability of the ADA-accessible multi-use path sooner than Alternative 1. During the construction of the Project there would be temporary beneficial impacts to businesses and wages in the area during the length of construction, 2 years. Temporary beneficial impacts involve re-circulation of a direct dollar spent throughout the economy because of the construction. These beneficial impacts are short-term, coincidental with the actual phasing and construction of the Project.

Alternative 6

Permanent, direct impacts to socioeconomic resources would be similar to Alternative 1. There would be no parcel acquisitions, and no disproportionately high and adverse impacts on EJ populations. As with Alternative 1, this alternative would provide permanent, beneficial impacts by providing a safe and ADA accessible multi-use path over the Little Bay.

Construction of Alternative 6 is estimated to take 1.5 years. Temporary construction-related impacts under Alternative 6 would be similar to Alternative 1; however, Alternative 6 would involve additional impacts on traffic and ambient noise levels. Traffic control measures would be utilized during the construction of the deck extension on the southbound LBB, which could result in temporary impacts to transportation through delays and congestion. Examples of typical traffic control measures include, signage, lane closures, and speed reductions, which would be removed upon completion of construction. The timing and duration of traffic control measures would be determined closer to final design. Traffic control measures would have negligible impacts to EJ populations identified in the Study Area; however, these temporary impacts would not be disproportionately high or adverse.

Temporary noise impacts associated with the replacement of superstructure and GSB Pier 1 would be more intensive than construction activities associated with Alternatives 1, 3, and 9. Although the construction duration is shorter than Alternatives 1 and 3, noise associated with constructing the new superstructure and pier would be more intensive, due to the required removal of the existing GSB superstructure and replacement of GSB Pier 1. Construction of Alternative 6 would require the use of heavy machinery which would increase ambient noise levels in the Study Area. During construction there would be temporary beneficial impacts to businesses and wages in the area during the length of construction which is approximately 1.5 years. Temporary beneficial impacts involve re-circulation of a direct dollar spent throughout the economy because of the construction. These beneficial impacts are short-term, coincidental with the actual phasing and construction of the Project.

Alternative 7

Permanent, direct impacts to socioeconomic resources would be similar to Alternative 1. There would be no parcel acquisitions, and no disproportionately high and adverse impacts on EJ populations. As with Alternative 1, this alternative would provide permanent, beneficial impacts by providing a safe and ADA accessible multi-use path over the Little Bay.

Temporary, direct impacts to EJ populations would be similar to Alternative 6. Traffic control measures would have negligible impacts to EJ populations identified in the Study Area but would not be disproportionately high or adverse.

Alternative 9 (Preferred Alternative)

Permanent, direct impacts to socioeconomic resources would be similar to Alternative 1. There would be no parcel acquisitions, and no disproportionately high and adverse impacts on EJ populations. As with Alternative 1, this alternative would provide permanent, beneficial impacts by providing a safe and ADA accessible multi-use path over the Little Bay.

Temporary, direct impacts to EJ populations would be similar to Alternative 3; however, the construction duration of Alternative 9 is shorter than Alternatives 1 and 3. Due to the removal of the GSB superstructure, noise associated with constructing Alternative 9 would be more intensive than Alternatives 1 and 3, but less intensive than Alternatives 6 and 7. In contrast to Alternatives 6 and 7, Alternative 9 would reuse the existing piers, reducing the need for

foundation work associated with impact noise activities such as pile driving. The shorter construction timeframe for Alternative 9 would involve less potential for temporary impacts on socioeconomic resources and EJ populations, when compared to Alternatives 1 and 3.

3.14.2.4 Indirect Impacts

Indirect impacts on socioeconomic resources and EJ populations were assessed in the 2007 FEIS. Indirect impacts on socioeconomic resources and EJ populations are impacts which are removed in time and distance from the immediate project but are reasonably foreseeable. Indirect impacts (or effects) include growth-inducing effects or other changes in land use, increase vehicular travel, population size, or impacts to the natural environment.

No-Action Alternative

Under the No-Action Alternative, indirect impacts on socioeconomic resources and EJ populations would occur through the lack of availability of recreational access and connectivity between Newington and Dover, across Little Bay, for non-motorized use. The lack of safety improvements to the GSB would sustain the barrier of pedestrian and bicycle access over Little Bay, potentially impacting public health through a decrease in recreational opportunities within Newington and Dover. Additionally, the lack of available non-motorized transportation opportunities could indirectly impact traffic conditions by increasing the number of vehicles traveling over the LBBs, which overtime would increase congestion and emissions in the Study Area.

Action Alternatives

Indirect impacts on socioeconomic resources and EJ populations are nearly identical across all alternatives, which are summarized below.

None of the Action Alternatives would have measurable indirect effects on socioeconomic resources. The improvements to the GSB would not cause indirect impacts from induced growth; however, all Action Alternatives would improve connectivity and non-motorized transportation modes (*e.g.,* walking and biking). Residential and commercial properties in the Study Area could see minor increases in property value, due to the improved recreational opportunities, and access to alternative transportation or commuting options.

Temporary indirect impacts would be minor on EJ populations in Strafford and Rockingham Counties. Indirect impacts would result from temporary, fluctuating increases in truck trips, and construction equipment use. Such indirect impacts would not be disproportionately high or adverse to EJ populations. With the proper implementation of public outreach, it is not anticipated that these construction-related actions would result in indirect adverse effects to EJ populations.

3.14.3 Mitigation

The Project would not result in measurable impacts to socioeconomic resources, such as parcel acquisitions; therefore, no mitigation measures are required. The Project is not anticipated to induce population growth within or outside of the Study Area, as determined through the direct and indirect impacts evaluation in the 2007 FEIS.

The EJ study areas (*i.e.*, the Impacted and Surrounding Areas) determined by the NHDOT Office of Federal Compliance show rates of elderly and low-income populations above their established thresholds. Temporary, construction-related impacts from the Project would result from increased truck traffic, vehicular and non-vehicular emissions, and noise and vibration activities; however, construction of the Project would not cause disproportionately high or adverse effects on any elderly or low-income populations in accordance with the provisions of EO 12898.

Regardless of the lack of impacts, BMPs would be adopted to minimize temporary, construction-related impacts. Public involvement efforts will be undertaken to accommodate and encourage participation by traditionally underserved groups, to ensure program access and minimize the potential for disproportionate project impacts on protected groups.

3.15 Navigation

This section evaluates the potential beneficial and negative impacts of the Project on marine navigation. The GSB spans a navigation channel, which provides access from the Great Bay to the Piscataqua River. Commercial and recreational marine transportation is prevalent in the Great Bay and Piscataqua Region, as the area is a prominent coastal expanse of New Hampshire. Because the GSB crosses the Piscataqua River, a navigable water, recreational boaters and other marine traffic pass under the GSB through a 200-foot-wide navigation channel (between GSB Piers 4 and 5) (see Photo 6 in **Appendix A**).

3.15.1 Affected Environment

The Piscataqua River channel provides important navigational access to Great Bay from the open ocean. The limits of the GSB Project are more than 3,000 feet away from the upstream limit of the Portsmouth Harbor and Piscataqua River Navigation Project (**Figure 3.15-1**), a federal navigation project maintained by the US Army Corps of Engineers. While the federal project accommodates larger vessels, navigation is limited largely to smaller commercial and recreational craft beyond the upstream limit of the channel (*i.e.,* beneath the GSB and LBBs and toward Little Bay).

The 2007 FEIS states that all tidal waters entering and leaving Great Bay, Little Bay, and their associated tributaries pass through the constriction between Dover Point and Bloody Point, resulting in unusually strong currents. As discussed in **Section 3.3**, *Floodplain and Hydrodynamics*, the completed conditions of the Spaulding Turnpike Improvements Project equaled a slight increase in current velocity within the 200-foot-wide navigation channel (between GSB Piers 4 and 5) by a maximum of 5 percent. The currents in the area of the LBBs are in the range of 10 to 12 feet per second at maximum values during both the ebb and flood tides, with the ebb values slightly greater than the flood values.

Combined with the piers of the LBBs and the GSB, these currents can create a difficult navigation problem for vessels which attempt passage through the navigation channel. Additionally, the poor condition of the GSB has become a concern to boaters and safety agencies due to the potential hazards from falling material. Under the terms of the existing permit for the GSB and

Figure 3.15-1

\\vhb\gis\proj\Bedford\523811.01\GIS\Project\SEIS\Figure 3.15-1_Navigation.mxd

0 750 1500 3000 Feet

- Approximate Work Limits
- Study Area
- Approx. Limits of Federal Project
- Town Boundaries
- Temporary Bicycle and Pedestrian Detour (Approximate)

Note: USGS topographic source map is from 1983 and therefore does not reflect all current conditions.

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Navigation

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT, USGS 7.5-minute Topographic Quadrangles Dover East and Portsmouth, dated 1983

expanded LBB issued by the USCG, the GSB superstructure and substructure would eventually need to be removed if it is no longer used for transportation purposes.

3.15.2 Environmental Consequences

Potential impacts to navigation are described in the following section. Under all Action Alternatives, the existing horizontal navigational patterns would be unchanged, as none of the Action Alternatives would involve replacement of GSB Piers 4 and 5, between which the main navigation channel passes. As discussed further below, the most notable differences among the Action Alternatives is in the vertical clearance of the navigation channel and the estimated duration of construction.

3.15.2.1 Direct Impacts

None of the alternatives would affect the Portsmouth Harbor and Piscataqua River Navigation Project, since the limits of this project are more than 3,000 feet away from the GSB project.[58] All Action Alternatives would involve temporary, direct impacts to marine traffic due to periodic closure of the main navigation channel during construction. For public safety reasons, removal of, or work on, the center spans and other construction activities may require brief, temporary closure of the navigation channel. Final construction plans and coordination with the USCG would ultimately determine when, and how often, the 200-foot-wide navigation channel would need to be closed during construction. The timeframe of the periodic, temporary closures of the navigation channel would likely correspond with construction activities and construction timeframes, which vary among the Action Alternatives from 1.5 to 3 years. These temporary, direct impacts to marine traffic would cease after construction. Temporary causeways and trestles would not be installed in the 200-foot navigational channel.

No-Action Alternative

Under the No-Action Alternative, no construction would occur. The existing structural deficiencies of the GSB would remain unaddressed, causing safety concerns and potential direct impacts to marine traffic. Due to these concerns, on November 30, 2006, Gary Kassof of the USCG sent a letter to Marc G. Laurin, NHDOT Senior Environmental Manager, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 project. The USCG advised NHDOT that the GSB should be removed if it no longer served a transportation purpose, and that a clear and reasonable rationale must be presented for retaining or rebuilding the structure. The letter also stipulated that the bridge permit application to be submitted for construction of the new LBB must address the need to retain or rebuild the GSB and, if the old bridge is to be removed, should include complete removal of all parts not utilized in the new structure.

Alternative 1

As shown in the **Figure 3.15-2**, Alternative 1 would maintain the existing vertical navigational clearance of the 100-foot and 200-foot navigation channels, at 47.9 feet and 34.7 feet, respectively. There would be no permanent beneficial or negative impacts to navigation. Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 1 during rehabilitation work on the center spans and bridge deck of the GSB. Alternative 1 would have an approximate construction duration of 3 years, which is the longest construction duration of all Action Alternatives.

Alternative 3

As with Alternative 1, Alternative 3 would maintain the existing vertical navigational clearance of the 100-foot and 200-foot navigation channels, at 47.9 feet and 34.7 feet, respectively (see **Figure 3.15-2**.) There would be no permanent beneficial or negative impacts to navigation. Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 3 during rehabilitation work on the center spans of the GSB. Alternative 3 would have an approximate construction duration of 2 years, which is less than the construction duration of Alternative 1, but 6 months greater than the construction durations of Alternatives 6, 7, and 9.

Alternative 6

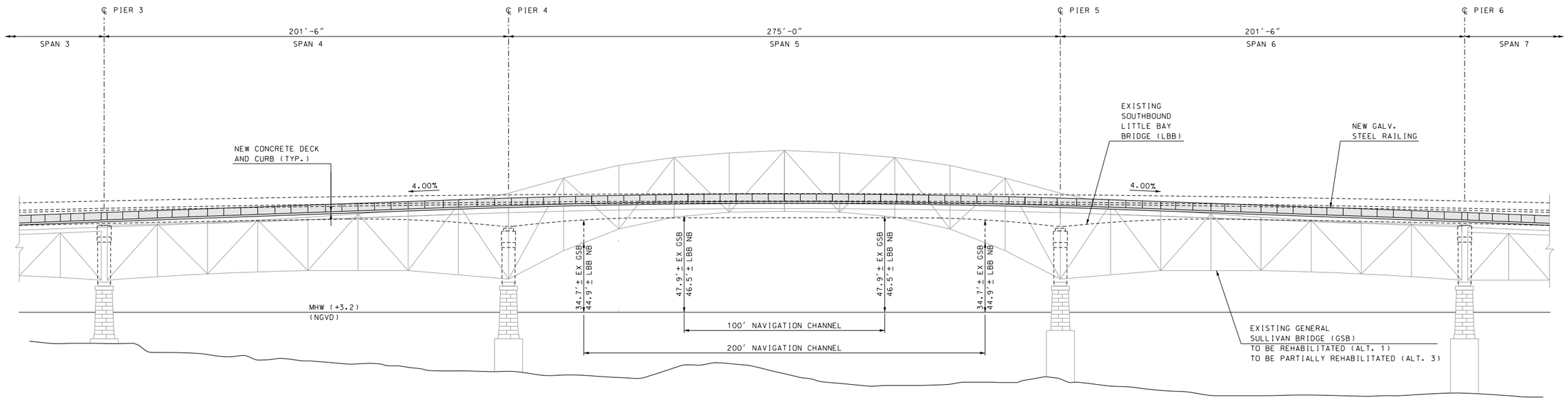
In contrast to Alternatives 1, 3, and 9, Alternative 6 would decrease the navigational clearance of the 100-foot navigation channel. As shown in **Figure 3.15-3**, Alternative 6 would decrease the existing vertical clearance of the 100-foot navigation channel by 1.3 feet, for a total vertical navigational clearance of 45.2 feet compared to the existing 46.5-foot vertical clearance of the northbound LBB and the 47.9-foot vertical clearance of the GSB. The decrease in vertical navigational clearance of the 100-foot navigation channel would result in a negative, permanent, direct impact to marine traffic. When compared to Alternatives 1, 3, and 9, Alternative 6 would result in the greatest permanent, negative impacts to the 100-foot navigation channel.

Alternative 6 would benefit marine traffic due to improvements to the width of navigational clearance within the 200-foot navigation channel. Alternative 6 would not provide greater overall accommodation for taller marine vessels; however, shorter marine vessels would have more room pass through the 200-foot navigation channel. Although Alternative 6 would increase the vertical clearance of the 200-foot navigation channel from 34.7 feet to 45.0 feet, the vertical navigational clearance of the 200-foot navigation channel is restricted by the northbound LBB (note that the existing LBB clearance within the 200-foot navigation channel is 44.9 feet, only 0.1 foot shorter than the vertical navigational clearance of Alternative 6).

In summary, the 100-foot navigation channel vertical clearance would be limited to 45.2 feet due to Alternative 6, which is a decrease in vertical navigational clearance. The 200-foot navigation channel vertical clearance would be limited to 44.9 feet due to the LBB; however, Alternative 6 would permanently benefit shorter marine vessels by providing additional room within the 200-foot navigation channel.

---

[58] Section 14 of the Rivers and Harbors Act of 1899 mandates that any use or alteration of a Civil Works project by another party is subject to the approval of ACOE. This requirement is codified in 33 USC 408 (Section 408). However, NHDOT believes that the GSB Project would not trigger Section 408 review due to the distance between the GSB project and the Portsmouth Harbor and Piscataqua River Navigation Project. See letter from Keith Cota, NHDOT to Michael Hicks, ACOE dated July 29, 2019.



NAVIGATIONAL CLEARANCES
ELEVATION: ALTERNATIVES 1 & 3—SPANS 4, 5, & 6
NOT TO SCALE

NOTE
1. VERTICAL NAVIGATIONAL CLEARANCE DIMENSIONS FOR THE NORTHBOUND LITTLE BAY BRIDGE CONTROL OVER THE SOUTHBOUND LITTLE BAY BRIDGE AND ARE DESCRIBED ON THIS SHEET ACCORDINGLY.

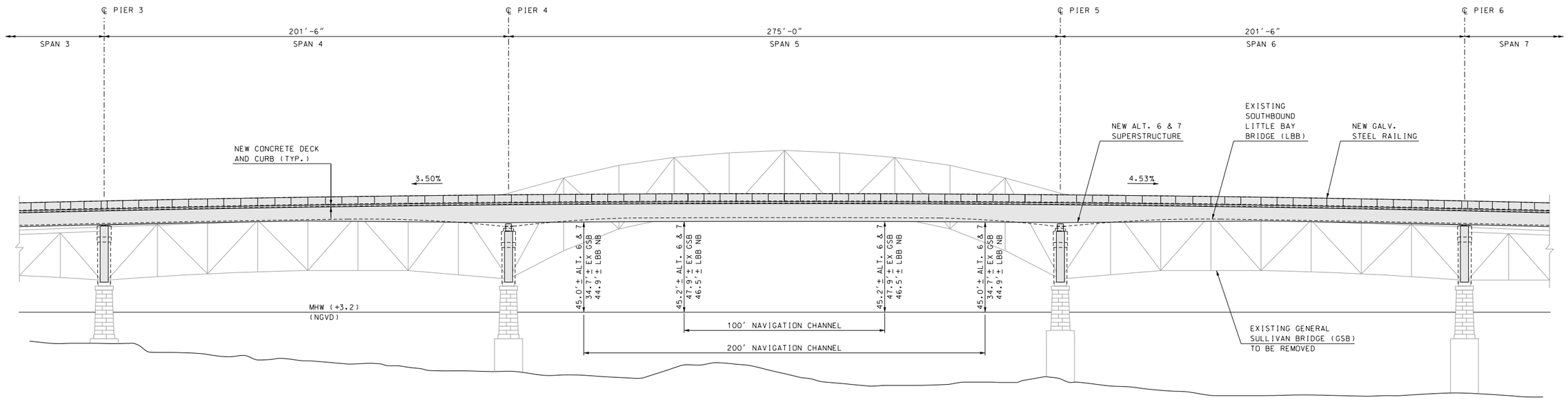
Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Navigational Clearances, Alternatives 1 and 3

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT Department of Transportation



NAVIGATIONAL CLEARANCES
ELEVATION: ALTERNATIVES 6 & 7—SPANS 4, 5, & 6
NOT TO SCALE

NOTE
1. VERTICAL NAVIGATIONAL CLEARANCE DIMENSIONS FOR THE NORTHBOUND LITTLE BAY BRIDGE CONTROL OVER THE SOUTHBOUND LITTLE BAY BRIDGE AND ARE DESCRIBED ON THIS SHEET ACCORDINGLY.

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Navigational Clearances, Alternatives 6 and 7

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 6 during removal of the GSB superstructure and construction of the new superstructure. Alternative 6 would have an approximate construction duration of 1.5 years, equivalent to the construction duration of Alternatives 7 and 9.

Alternative 7

The permanent and temporary direct impacts to navigation under Alternative 7 are the same as described under Alternative 6.

Alternative 9 (Preferred Alternative)

Alternative 9 would neither benefit nor negatively impact the vertical navigational clearance of the 100-foot navigation channel because the restriction is the northbound LBB, which is lower than both the existing GSB and Alternative 9. Within the 100-foot navigation channel, the existing LBB clearance is 46.5 feet. The existing vertical clearance of the GSB is 47.9 feet and the vertical navigational clearance of Alternative 9 would be 48.0 feet.

Within the 200-foot navigation channel, Alternative 9 would benefit marine traffic due to the improvements to the width of navigational clearances, as compared to the No-Action Alternative or Alternatives 1 and 3. As shown in **Figure 3.15-4**, Alternative 9 would benefit the 200-foot navigation channel through increasing the existing 34.7-foot vertical navigational clearance beneath the GSB. Alternative 9 would not provide greater overall accommodation for taller marine vessels; however, shorter marine vessels would have more room pass through the 200-foot navigation channel, resulting in a permanent benefit. Under the "V-Frame" design option, the vertical navigational clearance would increase by 9.6 feet, for a new total clearance of 44.3 feet. Similarly, the "Super Haunch" design option would benefit the 200-foot navigation channel through increasing the vertical navigational clearance beneath the GSB by 10.2 feet, for a new total clearance of 44.9 feet.

In summary, the 100-foot navigation channel vertical clearance would remain limited to 46.5 feet due to the LBB. Under Alternative 9 "Super Haunch" design option, the 200-foot navigation channel vertical clearance would remain limited to 44.9 feet due to the LBB; however, Alternative 9 "Super Haunch" design option would permanently benefit shorter marine vessels by providing additional room within the 200-foot navigation channel. Under Alternative 9 "V-Frame" design option, the 200-foot navigation channel vertical clearance would be limited to 44.3 feet due to the "V-Frame" design; however, Alternative 9 "V-Frame" design option would permanently benefit shorter marine vessels by providing additional room within the 200-foot navigation channel.

Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 9 during removal of the GSB superstructure and construction of the new superstructure. Alternative 9 would have an approximate construction duration of 1.5 years, equivalent to the construction duration of Alternatives 6 and 7.

3.15.2.2 Indirect Impacts

Indirect impacts occur at some future time other than a direct impact. All Action Alternatives would improve navigation safety for marine traffic, maintenance crews, and emergency responders, as each Action Alternative would address the structural deficiencies of the GSB. In addition, Alternatives 6, 7, and 9 would indirectly benefit marine transportation in the Great Bay and Piscataqua Region by permanently increasing the vertical clearance within the 200-foot navigational channel beneath the GSB and LBBs. Alternatives 6 and 7 would increase the navigational clearance by 10.2 feet; Alternative 9 would increase the navigational clearance by 9.6 feet under the "V-Frame" option, or 12.8 feet under the "Super Haunch" design option. This would allow for larger marine vessels to pass through a wider navigational channel, which currently are restricted to the 100-foot channel due to existing height restrictions of the 200-foot channel.

3.15.3 Mitigation

Potential periodic closures of the navigational channel during construction will be closely coordinated with the USCG, the NH Port Authority, and the NH Marine Patrol to minimize impacts to marine traffic. To facilitate early coordination with the USCG, a Bridge Project Initiation Request as outlined in Section 2 of the Bridge Permit Application Guide (Commandant Publication P16591.3D), published by the USCG in July 2016, was provided by NHDOT to the USCG on November 12, 2019 (included in **Appendix J**). On November 19, 2019, the USCG confirmed that NHDOT's Bridge Project Initiation Request met all requirements of the Bridge Permit Application Guide. NHDOT was given permission to submit draft bridge permit

application materials as described in the Application Guide, including more detailed information as the existing site conditions and limitations are investigated.[59]

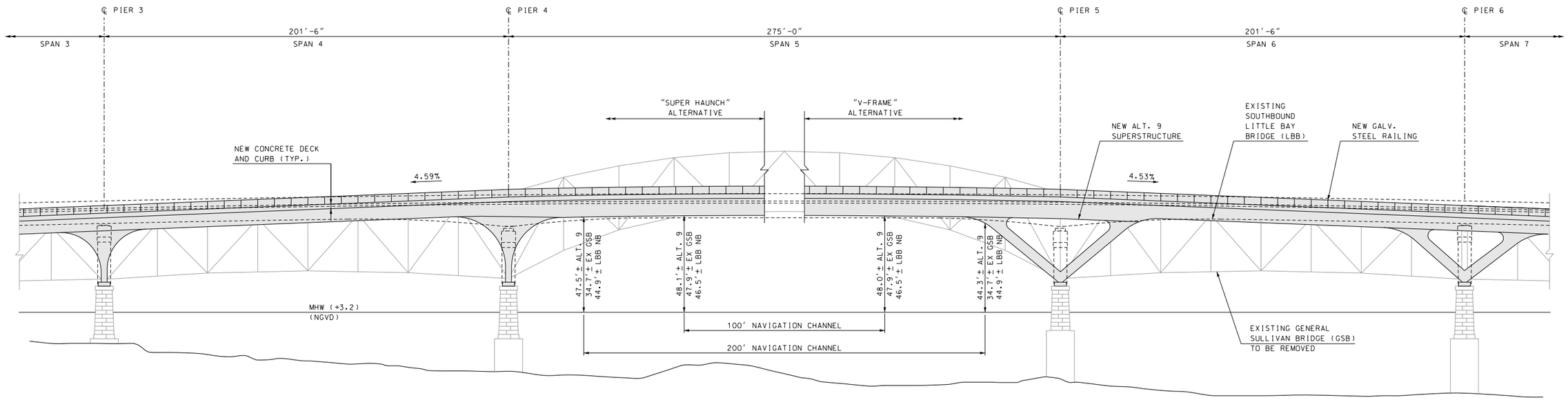
3.16 Relationship of Local Short-term Uses vs. Long-term Productivity

This section assesses and compares the potential short-term uses of the environment to the maintenance and enhancement of long-term productivity. Short-term impacts and uses of the environment are generally associated with the construction period. For example, a short-term, localized impact could be an increase in noise during construction, which could result in inconvenience to local residents. An example of long-term productivity could be long term economic benefits by enhancing travel connection points for both motorists, pedestrians, and bicyclists.

Other sections within **Chapter 3**, *Affected Environment and Environmental Consequences*, describe specific impacts to resource areas.

The relationship between short-term uses and long-term productivity would be similar for all Action Alternatives. Short-term impacts during construction would be offset through mitigation measures as well as the long-term benefits associated with the Project.

[59] A USCG permit review would require a Coastal Zone Management Consistency Determination and may require a Water Quality Certificate.



NAVIGATIONAL CLEARANCES
ELEVATION: ALTERNATIVE 9—SPANS 4, 5, & 6
NOT TO SCALE

NOTE
1. VERTICAL NAVIGATIONAL CLEARANCE DIMENSIONS FOR THE NORTHBOUND LITTLE BAY BRIDGE CONTROL OVER THE SOUTHBOUND LITTLE BAY BRIDGE AND ARE DESCRIBED ON THIS SHEET ACCORDINGLY.

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Navigational Clearances, Alternative 9

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Short-Term Impacts

The No-Action Alternative would result in the fewest short-term uses of resources, as no construction would occur. However, the No-Action Alternative results in greater adverse impacts to long-term productivity, as further explained below.

Short-term impacts of the Action Alternatives would be associated with construction: noise, water quality, occupancy of land, visual impacts, hydrodynamics, marine traffic, and temporary impacts to air quality. **Sections 3.1** to **3.15** of **Chapter 3**, *Affected Environment and Environmental Consequences* identify specific mitigation strategies and BMPs to offset temporary, short-term impacts due to construction. Short-term uses associated with the Action Alternatives include:

- **Temporary noise impacts due to construction**. The types of construction activities that would generate noise include pile driving, and other construction-related activities. The anticipated intensity and duration of construction varies for each of the Action Alternatives, ranging from 1.5 years to 3 years.
- **Temporary impacts to water quality are possible during earthwork activities**. Erosion and sedimentation would be minimized during construction through the use of BMPs to avoid impacts to aquatic communities.
- **Temporary occupancy of land**. Approximately 1.6 acres total (0.5 acre of State land in Newington and 1.1 acres of State land in Dover) would be temporarily occupied and fenced off for construction access, laydown, and staging (**Appendix D**). The timeframe of the temporary occupancy corresponds with the construction timeframe, which varies among the Action Alternatives from 1.5 to 3 years. Hilton Park users could utilize other parks in Dover, in addition to the entire east side of Hilton Park in response to the short-term impact to Hilton Park. As discussed in **Section 3.9**, *Parks, Recreation, and Conservation Lands*, the Action Alternatives vary in the potential to restrict movement between the west and east sides of Hilton Park.
- **Temporary visual impacts associated with construction staging**. Fencing or barriers around construction staging areas are necessary to ensure public safety during construction and the protection of equipment and materials.
- **Temporary impacts to floodplain and hydrodynamics**. During construction, impacts would occur due to the placement of the temporary stone causeways and trestles in the Little Bay. The placement of these structures would have minor impacts on floodwaters.
- **Temporary impacts to marine traffic due to periodic closure of the main navigational channel**. For public safety reasons, removal of, or work on, the center spans and other construction activities may require brief, temporary closure of the navigational channel; closure would be planned in close coordination with the USCG.
- **Temporary air quality impacts due to increase of emissions during construction**. Construction of the Project would temporarily result in increased pollutant emissions associated with construction equipment and earth moving activities. Emissions from the operation of construction equipment would include nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter.

These and other temporary impacts (identified in **Sections 3.1** through **3.15**) would cease after construction. In comparison, short-term benefits of construction would include additional employment and an additional source of revenue to the local service industry. Increased local spending during construction would also benefit the economy of the communities in the corridor.

Long-Term Impacts

No-Action Alternative

The No-Action Alternative would result in greater impacts to long-term productivity than the Action Alternatives. Impacts on long-term productivity include negative impacts to pedestrian and bicyclist mobility and accessibility. The No-Action Alternative would not resolve the barrier to connectivity between Dover and Newington. Without a connection across Little Bay, pedestrian and bicycle routes would be limited between Durham or Dover and Newington or Portsmouth. In addition, the existing structural deficiencies of the GSB would remain unaddressed, causing safety concerns and potential long-term impacts to marine traffic.[60]

Action Alternatives

All Action Alternatives assist in the long-term productivity of the area as each alternative would address the structural deficiencies of the GSB and current lack of a permanent non-motorized connection across Little Bay. The Action Alternatives would improve public safety for pedestrians and bicyclists, marine traffic, maintenance crews, and emergency responders. Providing safe, non-motorized access across Little Bay would result in a long-term beneficial effect that would outweigh the short-term impacts resulting from construction.

All Action Alternatives would support long-term economic benefits due to the maintenance and enhancement of bicycle connectivity in the local area. The March 2015 white paper produced by FHWA on the economic benefits of nonmotorized transportation concluded, "*…the economic impact of bicycling and walking includes avoided societal costs related to a mode shift from automobile travel to bicycling and walking (e.g., reduction of greenhouse gas and other emissions, traffic enforcement, noise impacts, and safety)*."[61] Additionally, according to the 2015 white paper, there are a variety of potential economic benefits of bicycle and pedestrian infrastructure, including: commute cost savings for bicyclists and pedestrians, direct benefits to bicycle and tourism-related businesses, indirect economic benefits due to changing consumer behavior, and individual and societal cost savings associated with health and environmental benefits.

The State of New Hampshire offers over 470 miles of trails and greenways. The NHDOT, in partnership with others, is developing New Hampshire's first Statewide Pedestrian and Bicycle Transportation Plan. The website developed for the Plan states the need to improve pedestrian and bicycle safety and encourage walking and cycling for both recreation and transportation in New Hampshire. The Action Alternatives are consistent with and would support these goals

[60] Note, however, that the USCG would likely require removal of the GSB if it no longer serves a transportation purpose. See November 30, 2006 letter from Gary Kassof, USCG, to Marc G. Laurin, NHDOT, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 Project.

[61] Federal Highway Administration. 2015. *White Paper: Evaluating the Economic Benefits of Nonmotorized Transportation.* US Department of Transportation. FHWA-HEP-15-027.

through reestablishing access between Dover and Newington and enhancing the larger bicycle route network in the seacoast area. The final *New Hampshire Statewide Pedestrian and Bicycle Transportation Plan* is anticipated to be completed in November 2019.

As described in **Section 3.3**, *Floodplain and Hydrodynamics*, Alternatives 6 and 7 would remove and replace the GSB's Pier 1, causing a permanent change within the Little Bay and Great Bay Estuary system. The permanent new pier may result in changes to the hydrodynamic conditions, for example, tidal maxima, currents, and wave patterns in the intertidal zone and other areas surrounding the new pier. However, the size of this area would be small in relation to the overall floodplain area and would not affect the long-term productivity of the Little Bay and Great Bay Estuary. Alternatives 1, 3, and 9 do not propose permanent changes to structures in the intertidal zone; therefore, these three alternatives would not affect the long-term productivity of the Little Bay and Great Bay Estuary.

Alternatives 6, 7, and 9 would benefit long-term productivity for marine traffic due to the improvements to navigational clearances of the 200 foot channel, as compared to the No-Action Alternative or Alternatives 1 and 3. The increase in the vertical clearance above the water surface would provide larger marine vessels with more maneuverability through the bridge crossing. This long-term beneficial effect of improvements to navigational clearances under Alternatives 6, 7, and 9 would outweigh the short-term impacts to marine traffic resulting from periodic temporary closure of the navigational channel during construction.

With regards to long-term impacts on historic structures, Alternatives 3, 6, 7, and 9 would result in a permanent loss of, or adverse effects to, the GSB. Appropriate mitigation to resolve adverse effects will be established in a new Section 106 MOA, which would be signed by FHWA, NHDHR, NHDOT and anticipated to be signed by the Consulting Parties.

3.17 Irreversible and Irretrievable Commitment of Resources

Implementation of the Project would involve a commitment of a range of natural, physical, human, and fiscal resources. Fossil fuels, labor, and construction materials such as cement, steel, timber decking, aggregate, and bituminous material would be expended. Additionally, labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds, which are not retrievable.

The decision to commit these resources is based on the concept that residents in the immediate area, region, and state, as well as visitors or tourists, would benefit from the reestablished pedestrian and bicyclist access between Dover and Newington. This benefit is expected to outweigh the commitment of these resources.

3.18 Cumulative Impacts

Cumulative impacts are defined as "impacts that result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, without regard to the agency (Federal or non- Federal) or individual who undertakes such other actions." (40 CFR 1508.7) Cumulative impact analyses capture the effects resulting from the proposed action in combination with the effects of other actions completed or future actions in the same geographic area. Cumulative impacts can result from individually small or minor impacts but collectively equal more significant adverse impacts over time.

The analysis of cumulative impacts includes projects within the Study Area that are were completed in the past, are currently under construction, or are reasonably foreseeable—in other words, projects that are planned or programmed for construction within the time frame of this analysis or which are likely to occur. Reasonably foreseeable actions do not include those actions that are highly speculative or indefinite. (43 CFR 46.30)

Cumulative impacts can include both direct and indirect effects. Direct effects occur at the same time and place as when a Proposed Action is being implemented. (40 CFR 1508.8) These effects are discussed in previous section of this chapter, and may include noise impacts from construction equipment, traffic disruptions or detours, impacts to natural resources, or property impacts. Indirect effects are caused by the action and are later in time or further removed in distance (from the Project) but are still reasonably foreseeable, and are also discussed above. Indirect effects can also include growth-inducing impacts, changes in land use patterns, increased population density or growth rates, and impacts on natural resources. (40 CFR 1508.7)

Because this section evaluates the cumulative impacts for multiple resources, the structure of this section differs from the previous sections of **Chapter 3** that focused on impacts on a single resource area.

The 2007 FEIS evaluated the cumulative impacts of the Spaulding Turnpike Improvements, which have the potential to cause more cumulative impacts from the construction of additional lanes through the Seacoast Region of New Hampshire. As the Project does not pose any changes to roadway or highway infrastructure, the potential for cumulative impacts is far less.

3.18.1 Affected Environment

The evaluation of cumulative effects encompasses the geographic area affected by the Project because cumulative effects are focused on those areas where the impacts of the Project overlap with impacts of other past, present, and reasonably foreseeable future projects. These impacts are evaluated within the Study Area used for all resources evaluated in the DSEIS.

3.18.1.1 Historical Development Context

The larger Newington-Dover, Spaulding Turnpike Improvements Project has been under construction since 2010. The purpose of the Spaulding Turnpike Transportation Improvements Project is to improve long-term mobility and safety along the Spaulding Turnpike between Exit 1 and the Dover toll plaza, just north of Exit 6, which was designed to be accomplished through

five contracts, or phases of construction.[62]

- Contract L – New Little Bay Bridge and Wentworth Terrace
- Contract O – Rehabilitate Little Bay Bridge
- Contract M – Newington Exits 3 and 4
- Contract Q – Dover and Exit 6
- Contract S – Rehabilitate General Sullivan Bridge (Note that this DSEIS is reevaluating this contract.)

Past development in Strafford and Rockingham Counties were key drivers in the need for the Spaulding Turnpike Improvements. The Rockingham Planning Commission's 2015 Regional Master Plan states, "… *[the Spaulding Turnpike] carries commuter and tourist traffic, and serves as a gateway from the Seacoast to the Lakes Region and the east side of the White Mountains. This facility is currently being improved between Exits 3 and 6 by widening the bridges and roadway to 4 lanes in each direction and reconfiguring the interchanges. Additional work will occur on connecting roadways to improve traffic flow on and off of the highway*." The larger Newington-Dover, Spaulding Turnpike Improvements Project presented a major change in roadway infrastructure in this region of New Hampshire, and with these changes was the potential for growth impacts. Therefore, the 2007 FEIS included an in-depth cumulative impacts assessment.

In the 2007 FEIS, anticipated impacts from induced growth were evaluated in Strafford, Rockingham and Carroll Counties, spanning 33 municipalities. The time period considered for the analysis was 35 years prior (1970 to 2005) and 20 years into the future (2005 to 2025). The past, present and future actions outlined in the 2007 FEIS analysis are summarized below for two reasons: 1) the replacement of the GSB under Alternative 9 is anticipated to start before 2025, which is within the time period analyzed in the 2007 FEIS, and 2) the GSB Project would not induce population or development growth because the bridge would solely function for pedestrian and non-motorized use. Increased development is strongly related to economic expansion, but because the bridge would only serve non-motorized transportation, it is not anticipated that the GSB Project would directly cause development or urbanization. Any increased development in the area would likely occur with or without the GSB Project.

As part of the NEPA process for the larger Newington-Dover, Spaulding Turnpike Improvements Project, the 2008 ROD stipulated a number of mitigation measures to avoid, lessen, remedy, or compensate for impacts. The mitigation measures outlined in the 2008 ROD were identified to address the Spaulding Turnpike Improvements Project's direct and indirect effects, which in turn, minimized, rectified, or compensated for negative cumulative impacts. These mitigation measures and commitments were determined through coordination with Federal and state agencies with jurisdiction over the resources in question. For the GSB Project, final mitigation measures and environmental commitments will be memorialized in the Supplemental Record of Decision.[63]

[62] Refer to the project website (http://www.newington-dover.com/index.html) for further information on the contract phases of the Spaulding Turnpike Transportation Improvements Project.

[63] NHDOT and FHWA may complete the NEPA environmental review process by issuing a single document that consists of the Final SEIS and SROD unless FHWA determines that statutory criteria or practicability considerations preclude issuance of such a combined document.

3.18.1.2 Present and Future Development Context

The cumulative impacts analysis considered other projects within the Study Area that are currently under construction or are reasonably foreseeable to be constructed in the future. The impact analysis accounts for changes from other projects within the time frame that the Project would contribute to cumulative effects on other resources. The analysis considered other transportation projects, other major non-transportation development proposals, and population and employment growth forecasts.

According to Newington's *Town Planner Report – Spring 2019*, several projects are planned within Newington.[64] However, none of the listed projects are within the GSB Project's Study Area. The City of Dover's Master Plan does not indicate any proposed development or projects within the Study Area limits in Dover. Hilton Park is included in the Recreation Chapter of the Master Plan, and a few public survey responses recorded in the Recreation Chapter indicate a desire for improvements to Hilton Park; however, the Recreation Chapter does not present proposed work to be done within Hilton Park. As stated above, any increased development in the surrounding area of Dover and Newington would likely occur with or without the GSB Project, and not as a result of the pedestrian bridge improvements.

Based on the current trends in population growth and employment opportunities, it can be anticipated that the Seacoast Region of New Hampshire would continue to see development or changes in land use. The cumulative impacts analysis in the 2007 FEIS examined the future land consumption (in acres) from the No Build and Build Alternatives (the Spaulding Turnpike Improvements). This analysis indicated that more than 21,000 acres of land within the regional study area would be expected to be converted from undeveloped to developed land by the year 2025, even without the completion of the Spaulding Turnpike Improvements.

The growth of the Portsmouth-Rochester metropolitan area has driven past, present and future developments. Key developments in the area include, the closure of Pease Air Force Base and its redevelopment as the Pease International Tradeport in Portsmouth/Newington, regional retail expansion in Rockingham County, Spaulding Turnpike Improvements: Exits 11-16 (in Rochester), and Spaulding Turnpike Improvements: Exit 10 (Dover). The integration of communities and development in the Seacoast Region is evident in the commuting patterns of residents; over three quarters of people living in the metropolitan study area also work within the area.

3.18.2 Environmental Consequences of Cumulative Impacts

As part of the cumulative impacts analysis, NEPA and CEQ require that the impact results from a project be compared to past, present, and reasonably foreseeable future actions. AASHTO interprets reasonably foreseeable in the following manner: "*Impacts that are merely possible, or*

[64] Town of Newington Planning Department. 2019. *Town Planner Report Spring 2019*. Accessed from https://www.newington.nh.us/sites/newingtonnh/files/uploads/town_planner_report_spring_2019.pdf. Accessed on July 29, 2019.

that are considered 'speculative', are not reasonably foreseeable."[65] The following sections describe the contribution of the GSB Project to the overall permanent cumulative impacts on resources from other past, present, and reasonably foreseeable future actions. The methods and data sources used for determining potential cumulative impacts are resource-specific.

Cumulative impacts are most commonly associated with the change in land use from induced growth impacts (*e.g.*, undeveloped land to residential or commercial properties). The addition of lanes or expansion of highway infrastructure can result in the conversion of land, new development, and economic growth outside the immediate project area. Induced growth impacts are not anticipated to occur in Newington and Dover, as the Project proposes to provide pedestrian and bicycle access between Newington and Dover. Improvements to the pedestrian and bicycle infrastructure in Newington and Dover would not result in land use changes, or future growth impacts outside the scope of the 2007 FEIS analysis.

If the GSB Project does not have the potential to have a direct or indirect impact on a resource, the potential for cumulative impacts on that resource does not exist. A majority of the impacts identified are short-term and associated with the construction period, as described in the resource sections of **Chapter 3**. Additionally, the implementation of mitigation measures and BMPs during construction would reduce any anticipated short-term impacts. None of the Action Alternatives would result in permanent impacts to several resources analyzed in this DSEIS. Therefore, there would be no potential for the GSB Project to contribute to cumulative impacts on the following resource areas:

- Wetlands and Surface Waters
- Floodplains and Hydrodynamics
- Farmlands
- Noise
- Hazardous Materials
- Social and Economic Resources
- Water Quality and Pollutant Loading
- Threatened and Endangered Species
- Air Quality
- Parks, Recreation and Conservation Lands
- Construction Impacts

The Project may contribute to cumulative impacts where permanent impacts to resources are anticipated to occur. Given the analyses presented in **Chapter 3**, the cumulative impact analysis considered the potential cumulative impacts on the following specific resources: marine resources, cultural resources, and visual resources. Each resource was evaluated for the effects (adverse and beneficial) of the Project, plus the effects of other past, present, and reasonably foreseeable actions. The direct and indirect effects on marine resources, cultural resources, and visual resources are included in other sections of **Chapter 3** but are also summarized here in **Section 3.17**, *Cumulative Impacts*, to clarify the total impact of the Project in context of all other actions. See **Section 3.4**, *Wildlife and Fisheries*, **Section 3.12**, *Visual Resources*, and **Section 3.10**, *Cultural Resources* for the additional discussions on the Project's impacts to these resource areas.

[65] American Association of State Highway and Transportation Officials. 2016. *Practitioner's Handbook #12: Assessing Indirect Effects and Cumulative Impacts under NEPA*. Accessed from https://environment.transportation.org/center/products_programs /practitioners_handbooks.aspx. Accessed on July 30, 2019.

3.18.2.1 Natural Resources

Reasonably Foreseeable Future Impacts (without the Project)

No foreseeable future projects involve development or construction within the limits of the Study Area in Little Bay. Therefore, effects to natural resources are not anticipated to occur as a result of any foreseeable future projects.

Cumulative Impacts

Inter- and subtidal habitat is present within the Study Area, including a 2.8-acre blue mussel shellfish bed. The mussel bed was identified by the NHDES Shellfish Program in 2013.[66] Cumulative impacts to these habitat features would result from the construction of Alternatives 6 and 7, from the permanent changes to marine habitats from the removal and replacement of GSB Pier 1. Although these changes are permanent, it is likely that the blue mussel beds impacted would rebound to existing conditions overtime, however the changes to marine habitat from Alternatives 6 and 7 have the potential to impact shellfish growth in the immediate area. Cumulative impacts are not anticipated to occur from Alternatives 1, 3 and 9, since these alternatives do not propose permanent changes in Little Bay.

The causeways and trestles would be in place throughout the duration of construction for all Action Alternatives, which is anticipated to take approximately 3 to 1.5 years. The causeway and trestle system in Dover would impact approximately 0.2 acre of the blue mussel bed. Standard marine construction BMPs would be implemented wherever feasible to mitigate the potential for the suspension of sediments and consequent siltation. Post-construction the areas temporarily impacted by the causeways and trestles will be restored. These temporary impacts would not result in permanent or future impacts to blue mussel habitat or growth.

3.18.2.2 Cultural Resources

Reasonably Foreseeable Future Impacts (without the Project)

As determined in **Section 3.10**, *Cultural Resources*, the No-Action Alternative and Alternatives 1, 3, 6, 7, and 9 all result in no effect to the National Register-eligible Ira F. Pinkham House/Wentworth Summer Residence or to the National Register-listed Newington Railroad Depot and Toll House property. Therefore, the cultural resource of concern for this cumulative impact evaluation is the GSB.

No foreseeable future projects involve development within the limits of the Study Area; the geographically closest planned project is approximately 0.4 mile south of the GSB abutment where Doloma Investment of Portsmouth, Inc. proposes construction of a four-story, 83-room hotel at 141 Shattuck Way in Newington. Therefore, adverse effects to the GSB are not anticipated to occur as a result of any foreseeable future projects.

[66] Morrissey, E., and C. Nash. 2013. *Identifying Blue Mussel* (Mytilus edulis) *Resource in Coastal New Hampshire*. NH Department of Environmental Services' Shellfish Program. Accessed from https://www.des.nh.gov/organization/divisions/water/ wmb/shellfish/redtide/aquaculture.htm. Accessed on January 14, 2019.

Any potential impacts that a future project undertaken within the Study Area may have on cultural resources would be minimized through compliance with historic preservation regulations. Federally-assisted projects would be subject to review under Section 106 of the NHPA and New Hampshire's historic preservation laws and regulations. A privately funded development may be reviewed if the development was located within a local historic district or applied to a locally designated property. Privately funded developments are not typically regulated under federal regulations.

The GSB is historically significant on a national level. There are additional pending projects that may impact other examples of continuous truss highway bridge designs in the United States. The USACE recently completed a Major Rehabilitation Evaluation Report for the Sagamore Bridge carrying MA Route 6 over the Cape Cod Canal in Sagamore, MA, and the Bourne Bridge carrying MA Route 28 across the Cape Cod Canal in Bourne, MA, often referred to as the "Cape Cod Canal bridges." Based upon recommendations of the report, the USACE proposed to replace the Cape Cod Canal bridges. In 1930, the Strauss Engineering Company completed the Quincy Memorial Bridge, carrying US 24 over the Mississippi River in Quincy, Illinois. An evaluation is underway for the potential replacement of this bridge.

Cumulative Impacts

As discussed in **Section 3.10**, *Cultural Resources*, Alternative 1 would not result in adverse effects to the GSB. The rehabilitation of the GSB would include the replacement of the bridge deck and repairs to the substructure and truss superstructure to support loading requirements. In-kind replacement of braces and other structural and substructure elements would not be considered adverse effects, and would have an overall beneficial effect of saving the bridge. The new pedestrian railing would be designed to have minor physical and visual impact, so as not to diminish the historic materials and aesthetic of the GSB. Alternative 1, when considered with other past, present, and reasonably foreseeable projects, would not result in cumulative impacts to the GSB.

Under Alternatives 3, 6, 7, and 9, the Project would result in adverse, direct, and permanent effects to the GSB because of the alteration or removal of the superstructure. The adverse effects of Alternatives 3, 6, 7, and 9, when considered with other past, present, and reasonably foreseeable projects, would result in a cumulative impact to historic resources in the area, since the removal of the GSB represents a loss of an important historic property in the region. The replacement of the historic bridge would result in the physical loss of an early, nationally-significant example of its engineering design; dwindling of the bridge type in New Hampshire and nationally; and the loss of this major link in the transportation network of the region, whose evolution is intertwined with the history of the region itself.

The GSB retains its historic significance, and this significance has been enhanced by the subsequent loss of comparable bridges, namely the Lake Champlain Bridge (Crown Point, NY and Chimney Point, VT), the Sarah Mildred Long Bridge (Portsmouth, NH and Kittery, ME), the Sellwood Bridge (Portland, OR), the US 36 Missouri River Bridge (St. Joseph, MO and Elmwood, KS), and the potential replacement of the Quincy Memorial Bridge (Quincy, IL) and the replacement of the Cape Cod Canal bridges

3.18.2.3 Visual Resources

Reasonably Foreseeable Future Impacts (without the Project)

Section 3.12, *Visual Resources*, identifies the visual resources that define the project area, which include the GSB, LBBs, Hilton Park, Piscataqua River, Little Bay, marine vessels and marinas, as well as the coastal shorelines of Newington and Dover. Future development proposed by others could diminish the quality of the aforementioned visual resources in the Newington and Dover area if the development created visual intrusions or other such changes to visual resources. However, no foreseeable future projects involve development within the limits of the GSB Project Study Area.

As stated above, the geographically closest planned project is approximately 0.4 mile south of the GSB abutment at 141 Shattuck Way in Newington. Due to its location, the potential development at 141 Shattuck Way is unlikely to impact the visual resources that exist within or can be seen from the GSB Project Study Area (*e.g.*, Hilton Park, the Piscataqua River, or coastal shoreline views). The GSB Project is unlikely to encourage further development within or adjacent to the Study Area because the bridge would only serve pedestrians and bicyclists, not vehicular traffic.

Cumulative Impacts

All Action Alternatives would conserve the natural landscape setting of the Piscataqua River and the Little Bay. None of the Action Alternatives would permanently reduce visibility or aesthetics of natural resources in the area. There would be no removal of trees or other established vegetation. Similarly, none of the Action Alternatives would degrade scenic views of the Piscataqua River and the Little Bay from areas of recreational activities (*e.g.*, boaters on the Piscataqua River or viewers in Hilton Park looking south to Little Bay or the Piscataqua River). Natural terrain features adjacent to and within the Study Area would not be altered or changed by the Project.

As discussed in **Section 3.12**, *Visual Resources*, Alternatives 1 and 3 would cause the least changes to the visual environment because the bridge would be rehabilitated. The notable truss design would be retained; therefore, under Alternatives 1 and 3, visual impacts would be negligible. It is anticipated that Alternatives 1 and 3, in combination with other reasonably foreseeable future actions, would result in negligible cumulative impacts on visual resources within the Study Area because the bridge's appearance would be fully retained. Views to the Piscataqua River, Little Bay, and Hilton Park from the GSB would also be retained.

Alternatives 6, 7, and 9 propose a new bridge structure to replace the GSB superstructure. Given the developed nature of the Study Area, specifically the immediate area surrounding the LBBs, a new bridge structure would be visually consistent with the recently constructed LBBs. However, as discussed in **Section 3.12**, *Visual Resources*, Alternatives 6, 7, and 9 would cause the most changes to the visual environment due to the addition of a new bridge design which would not be in the form of a truss. Therefore, Alternatives 6, 7, and 9 would cause adverse impacts due to the removal of the existing GSB and its replacement with a bridge of a different appearance. At the same time, removal of the exiting truss would open up views to the Piscataqua River, Little Bay, and Hilton Park, thereby benefiting pedestrians and bicyclists.

As discussed in **Section 3.12**, *Visual Resources*, Alternative 6 would cause the most adverse direct impacts on visual resources due to the different appearance of the new bridge, and the installation of chain link fencing which would limit pedestrian's and bicyclists' views of the Piscataqua River, Little Bay, and Hilton Park. Alternative 6 would result in moderate cumulative impacts on visual resources within the Study Area.

Alternatives 7 and 9 would result in minor cumulative impacts on visual resources within the Study Area. As with Alternative 6, Alternatives 7 and 9 would introduce a new, prominent structure into the viewshed that would be visually inconsistent with the GSB truss, but visually consistent with the new LBB structures. However, Alternatives 7 and 9 would cause minor beneficial direct impacts on views to the Piscataqua River, Little Bay, and Hilton Park.

3.18.3 Conclusion

This Project is intended to provide long-term pedestrian and bicycle access over Little Bay. The Project would not result in induced growth that was not previously analyzed in the 2007 FEIS. Any future or proposed developments discussed in this document or the 2007 FEIS are still dictated by broader market demand and supply characteristics, financial feasibility and developer capacities.

It is anticipated that overtime the improvements to the pedestrian bridge would benefit residents and visitors in the Newington and Dover areas. Minor beneficial impacts on public health, parks and recreation access, and socioeconomics resources would result from the Project. The beneficial impacts of the Project include, but are not limited to, increased active and passive recreational opportunities, improved safety, increased connectivity of parks and open space, beneficial impacts on persons with disabilities because the pedestrian bridge would meet current accessibility standards, and alternative commuting or transportation options. These beneficial impacts are minor and more difficult to quantify, (*i.e.,* more qualitative in nature).

Cumulative effects to the environment can be managed through the application of existing environmental and planning regulations or the adoption of new public policies to ensure sustained environmental quality for current and future residents of Newington and Dover and the surrounding areas.