

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 Irrecoverable 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 existing 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 socioeconomic 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.