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