2021 RAISE GRANT

U.S. Department of Transportation

Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program for FY 2021

Submitted by New Hampshire Department of Transportation

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New Hampshire DOT
Department of Transportation

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TS&L Report, Environmental Assessment, and other Project related materials are available at https://www.nh.gov/dot/projects/seabrookhampton15904/index.htm

1.0 Project Description

The New Hampshire Department of Transportation (NHDOT) requests $20 million in Rebuilding American Infrastructure with Sustainability and Equity (RAISE) funds to support the Hampton Harbor Bridge Replacement Project, which includes reconstructing the Hampton Harbor Bridge, also known as the Neil R. Underwood Bridge, and associated access roadways. The total project cost is estimated at $58 million with an estimated $55.9 million needed to complete design and construction the project. This bascule bridge reconstruction will result in a fixed bridge structure that improves vehicular, pedestrian, bicycle and marine traffic efficiency and safety, while reducing lifecycle operations and maintenance (O&M) costs. Specifically, the Hampton Harbor Bridge Replacement Project will replace the Hampton Harbor Bridge and reconstruct associated access roadways and sidewalks.

This bridge has been on NHDOT's Red List of deficient bridges since 1999 due to the poor condition of the superstructure. It is considered New Hampshire's number one priority Red-Listed bridge. It is a steel and concrete structure and located on Route 1A along the New Hampshire Seacoast. It spans the Hampton River near Hampton Beach, New Hampshire, and is a vital connection between the Village of Hampton Beach and Seabrook Village.

The bridge itself is approximately 1,199 feet long and approximately 33 feet wide (53 feet wide at the barrier gates). It includes a 24-foot-wide roadway, a one-foot-wide shoulder on either side, and a four-and-a-half-foot-wide sidewalk on the east side. The bridge carries up to 18,000 vehicles per day during peak summer traffic. This segment of NH Route 1A is also the on-road route for the East Coast Greenway in NH and, as such, the roadway handles vehicular, bicycle, and pedestrian traffic. Preserving access for multiple modes of transportation is a high priority for this proposed bridge replacement.

Figure 1: Hampton Harbor Bridge Replacement Project Area

Transportation Challenges and Statewide Context

The Hampton Harbor Bridge is the only connection between Hampton Beach Village and the Village of Seabrook for vehicles, pedestrians, and cyclists. In the absence of this bridge, these

travelers would need to detour nearly ten miles. Based on 2017 data, the bridge supports 9,466 vehicles per day (VPD) of average annual daily traffic (AADT), which increases to over 18,000 VPD during peak summer traffic and special events. If traffic was required to use an alternate route, more than 121,000 vehicle miles traveled (VMT) per day would be added to the state's transportation network. This would increase roadway wear and tear, emissions, vehicle operating costs associated with the diversion, and the potential for crashes associated with more VMT.

In addition to bridge traffic, approximately 100 vessels require a lift to allow them to travel underneath the structure each month. If the moveable bridge fails to open, it generally takes 6 hours for bridge operations to be restored. This means vessel traffic would also need to divert or wait for the bridge operations to be restored before entering the harbor. Replacing this bascule bridge with a fixed structure would eliminate this operational situation, and the associated delays, for vessels needing a lift to travel under the bridge.

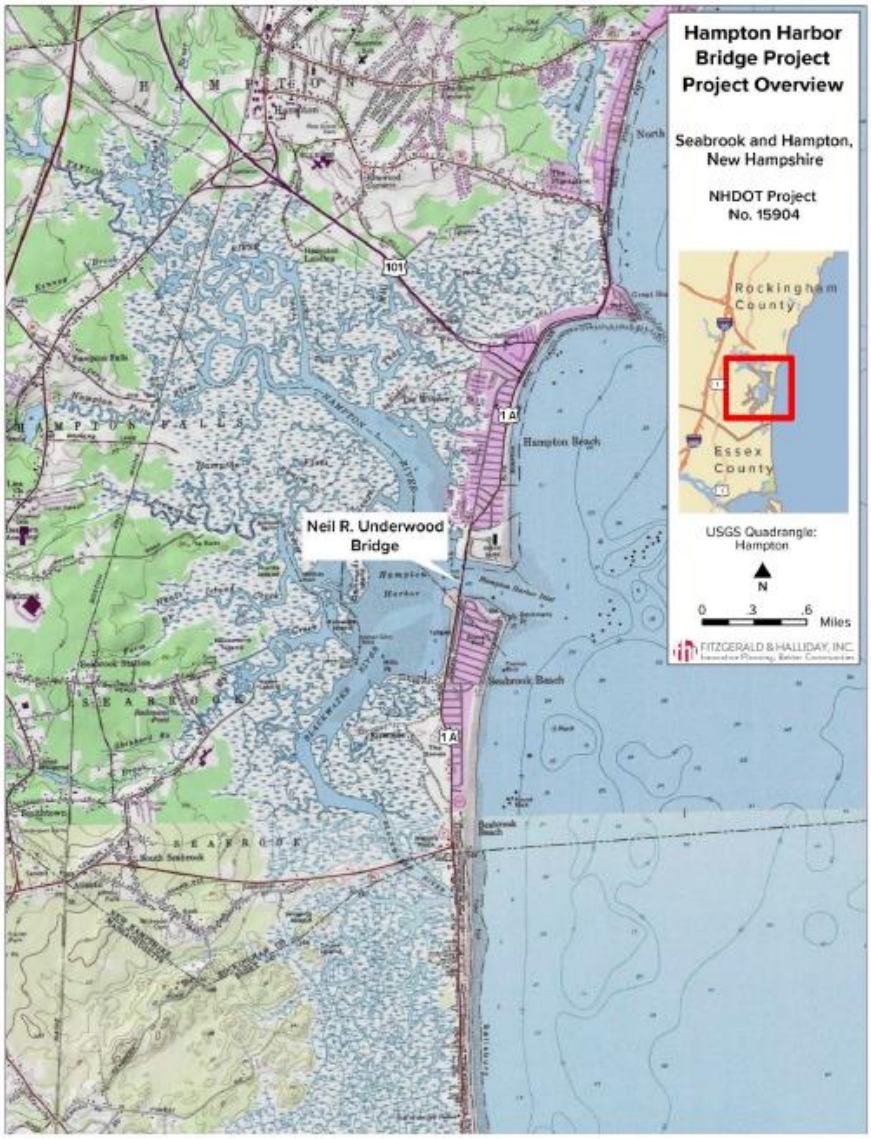

Figure 2: Hampton Harbor Bridge Project Overview

Project History

The Hampton Harbor Bridge was built in 1949 and crosses the Hampton Harbor Inlet, connecting the Towns of Seabrook and Hampton along NH Route 1A. Hampton and Seabrook Harbors lie west of the bridge and are formed by the confluence of the Blackwater River, which flows from the south, and the Hampton

River, which flows from the northwest. The Atlantic Ocean and a breakwater lie to the east of the bridge.

The bridge has been rehabilitated multiple times since its construction, including in 1963, 1978, 1983, 1990, and 2002. The deck was replaced in 2010, and emergency repairs to the bascule span mechanical system were required in 2018.[1] The bridge is beyond its useful service life and is considered both scour and fracture critical. It has been on the NHDOT Red List of deficient bridges since 1999 due to the poor condition of the superstructure. It is considered the state's number one priority Red-Listed bridge. The Hampton Harbor Bridge Project will address the long-term needs of the state and region by assessing, designing, and constructing a fixed bridge and roadway approaches.

Recognizing that this bridge must be rehabilitated or replaced, NHDOT completed a Type, Size, and Location (TS&L) report, which identified Replacement with Fixed Bridge as the Preferred Alternative because it:

- accommodates widening the navigational channel under the bridge,
- allows vertical clearance for all vessels documented to have entered the harbor,
- accommodates potential sea level rise,
- accommodates the Currituck (US Army Corps of Engineers dredge vessel),
- avoids impacts to the navigational channel within Hampton Harbor,
- eliminates roadway traffic delays,
- accommodates future utilities on the bridge,
- provides the shortest construction duration of the four alternatives evaluated,
- has the lowest life cycle cost of the four alternatives evaluated.

Because the current Hampton Harbor Bridge is a bascule bridge and includes mechanical and electrical equipment, bridge repairs are generally expected to occur more frequently and at a higher cost than fixed structures. Once a bridge is listed as structurally deficient or functionally obsolete—which this bridge is—inspections, repairs, and rehabilitation efforts are increased to preserve and extend the life of the bridge. This project will address the long-term needs of the state and region by assessing, designing, and constructing a replacement bridge and roadway approaches.

[1] https://www.nh.gov/dot/projects/seabrookhampton15904/index.htm[1] https://seabrooknh.info/about-seabrook/business-industry/

2.0 Project Location

Within the study area, NH Route 1A is classified as a NH Tier 2, Urban Minor Arterial road and provides a critical economic link to the seacoast communities. The roadway begins in Seabrook at the New Hampshire-Massachusetts state line and extends north approximately 18.4 miles through the towns of Hampton, North Hampton, and Rye to the intersection with US Route 1 in Portsmouth. The Hampton Harbor Bridge is located at mile marker 1.6, near the town line between Seabrook and Hampton.

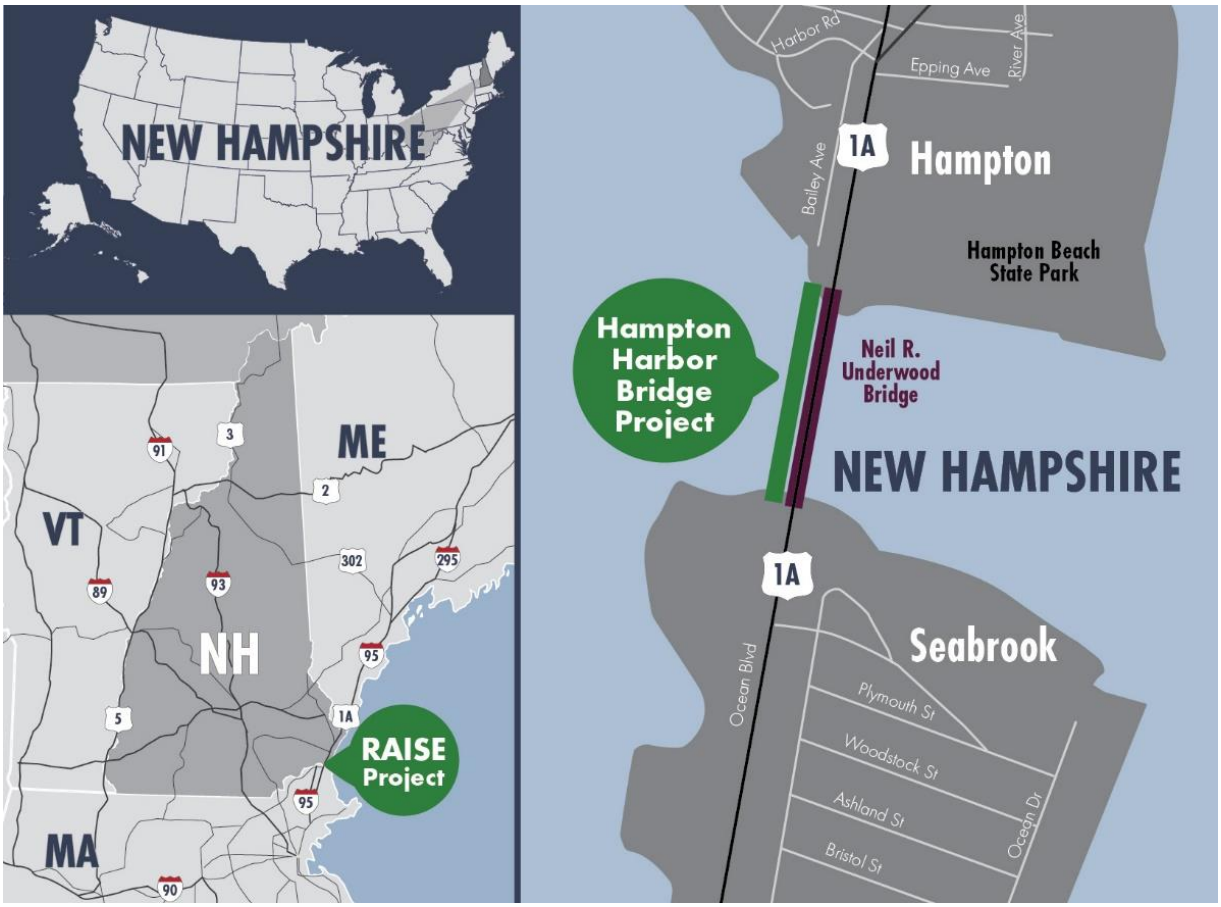

Figure 3: Project Location

Residential, recreational, and tourism-based development are located north and south of the project area, including Hampton Beach State Park and Hampton State Pier facility. The Hampton-Seabrook Dunes Wildlife Management Area (Dunes WMA) is located southwest of the bridge. The Hampton portion is managed by the NH Fish and Game Department (NHFG) and the Seabrook portion is managed by the NH Department of Natural and Cultural Resources

(DNCR). Sun Valley Beach borders the inlet immediately southeast of the bridge. The Sun Valley residential neighborhood extends south from the beach between Eisenhower Street in the west and the Atlantic Ocean in the east.

The project is not located in an Area of Persistent Poverty. Hampton, Hampton Beach, and Seabrook, New Hampshire, are all identified as Census-Designated Places by the United States Bureau of the Census. These towns, and this project, are part of Rockingham County, which is a part of the Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area and the greater Boston-Worcester-Providence, MA-RI-NH-CT Combined Statistical Area.

3.0 Grant Funds, Sources, and Uses of Project Funding

NHDOT is seeking RAISE funding to support construction of the Hampton Harbor Bridge, which includes vehicle lanes and active transportation facilities. The total Year-of-Expenditure (YOE) project cost to complete the project is $55.9 million, as presented in Table 1. NHDOT is requesting $20 million in RAISE grant funds and will utilize $6.2 million in toll credits and $24.7 million from the state's regular federal apportionment. A $5 million state match will round out the funding plan. There are no restrictions on the use of these funds.

Table 1: Source of Funds

Source	Amount
RAISE Grant Request	$20,000,000
NHDOT Federal Apportionment	24,690,309
Toll Credits	$6,172,577
State/Local	$5,000,000
TOTAL	**$55,862,886**

Source: NHDOT.

Previously Incurred Expenses

Preliminary design, environmental coordination, and public outreach activities have already been completed, and NHDOT incurred the associated expenses to bring the project to this point in design development. These expenses total $2.1 million.

Funding Commitments for Non-Federal Fund Sources

NHDOT has provided a $5 million match toward this project. These General Fund dollars were authorized by the New Hampshire State Legislature and signed by the Governor on June 25, 2021 (Chapter 91:392 Laws of 2021).

Detailed Project Budget

The table below presents the project budget. The total cost to complete the project in YOE dollars is $55.9 million.

Table 2: RAISE Project Costs

Cost Element	Amount
Bridge	$34,818,000
Roadway	$1,414,000
Drainage & Utilities	$1,000,000
Contingencies	$7,446,400
Mobilization	$3,574,272
Construction Engineering	$3,860,214
CONSTRUCTION TOTAL	**$52,112,886**
Right of Way	$550,000
Final Design Engineering	$3,200,000
TOTAL COST TO COMPLETE	**$55,862,886**
Previously Incurred Design Costs	$2,100,000
TOTAL PROJECT COST	**$57,962,886**

Source: NHDOT.

The budgeted contingency amount is assumed to be 20 percent of the bridge, roadway, drainage, and utilities expenditures and is included in the estimate above.

4.0 Selection Criteria

The US Department of Transportation (USDOT) has primary and secondary selection criteria that they use to evaluate a project and determine whether it should be awarded RAISE funding. The following section explains how the Hampton Harbor Bridge Replacement Project meets each of these criteria.

Primary Selection Criteria

The primary selection criteria used by USDOT are safety, environmental sustainability, quality of life, economic competitiveness, and state of good repair.

Safety

This project is expected to improve safety in several ways. To begin, replacing the bridge minimizes the likelihood of vehicle diversions due to operational issues or load restrictions on the bridge. This avoided VMT means the likelihood of crashes is reduced as less roadway traffic generally supports fewer crashes.

Next, the transition from a bascule to a fixed bridge structure may also impact bridge traffic safety. With no bridge lifts to accommodate maritime traffic underneath the bridge, rear-end and other crashes are likely to be reduced.

In addition, active transportation facilities are improved with the bridge replacement. Specifically, pedestrian and bicycle circulation will be improved with the addition of sidewalks and widened shoulders on both sides of the bridge. This will provide additional space between vehicular and active transportation travelers on the bridge, which will reduce the likelihood of vehicular and pedestrian and cyclist interaction and the associated potential for crashes.

The crosscurrents beneath the bridge are very strong, and there have been numerous bridge strikes by marine vessels traveling through the channel. With this project, the navigational channel will be widened, allowing easier access under the bridge for recreational and commercial vessels. This increased width is expected to support safety and help to minimize the number of bridge strikes incurred.

Finally, the bridge replacement will support continued mutual aid between Hampton and Seabrook by connecting the two communities and avoiding a lengthier detour required in the absence of the bridge or a bridge that can support the weight of emergency vehicles. The benefit-cost analysis completed as part of this grant application estimates more than $300,000 in safety benefits will be generated by the Hampton Harbor Bridge Replacement Project.

Environmental Sustainability

If the project is built, traffic diversions due to bridge restrictions will not occur. Avoiding increased VMT has an impact on emissions as fewer miles traveled means fewer emissions associated with vehicular traffic. The number of idling maritime vessels is also likely to be reduced, because a fixed structure will not require vessels to "wait" for the bridge to open. The benefit-cost analysis (BCA) estimates that more than $6 million in environmental benefits are generated by the Hampton Harbor Bridge Reconstruction Project.

Quality of Life

The Hampton Harbor Replacement Project will result in the construction of a new fixed bridge structure, but also improvements on the bridge surface to better accommodate multimodal transportation as shown in the figure below. Vehicles, bicycles, and pedestrians will be separated, which will improve the flow of traffic across the bridge. Because the structure will be fixed, delays associated with bridge lifts will also be eliminated.

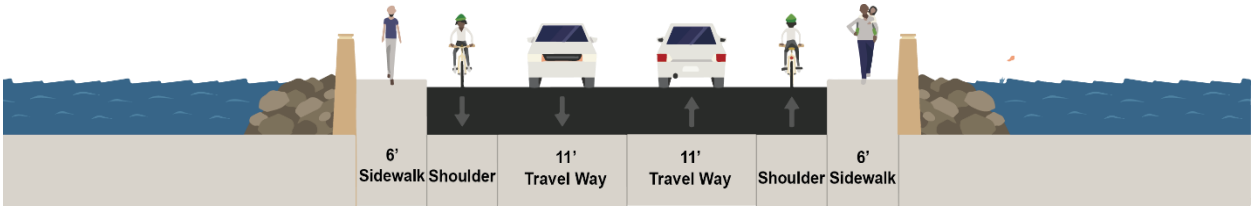

Figure 4: Proposed Section

Extensive outreach has occurred with residents of Seabrook and Hampton throughout project development, and project impacts will not cause disproportionately high and adverse effects on minority or low-income populations in accordance with the provisions of Executive Order (EO) 12898 and FHWA Order 6640.23. In addition, the improved active transportation facilities may benefit these populations, some of whom may not own a vehicle.

Economic Competitiveness

The existing bridge is the only connection between Hampton and Seabrook. Alternate routes require a nearly 10-mile diversion west of the coastal area. As a result, the bridge provides a vital link between the communities. Seabrook is home to an estimated 250 industrial, commercial, and retail companies,[2] and the bridge connects employees in Hampton and other seacoast towns to these employers. Hampton is also home to numerous employers, including businesses that tailor to tourism. Maintaining this connection supports the region's employment picture

[2] https://seabrooknh.info/about-seabrook/business-industry/

and minimizes commute times for those individuals who live in one community but work in the other.

In addition to connecting the towns and avoiding lengthy diversions, the bridge directly connects Hampton Beach State Park and the Hampton State Pier to the Hampton-Seabrook Dunes Wildlife Management Area, as well as Sun Valley Beach. As a result, it provides an important connection for visitors of the seacoast area who take advantage of the businesses in the area that cater to tourists.

The project itself is also expected to generate jobs. The Executive Office of the President, Council of Economic Advisers (CEA), issued a memorandum in May 2009 on "Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009." This memorandum was updated in September 2011.[3] The CEA determined that a job-year is created by every $76,923 in transportation infrastructure spending (or 13,000 job-years per billion dollars of transportation infrastructure spending). For our $$58 million Hampton Harbor Beach Replacement Project, this equates to 635 job-years, with 406 associated with direct and indirect spending and the remaining 228 induced.

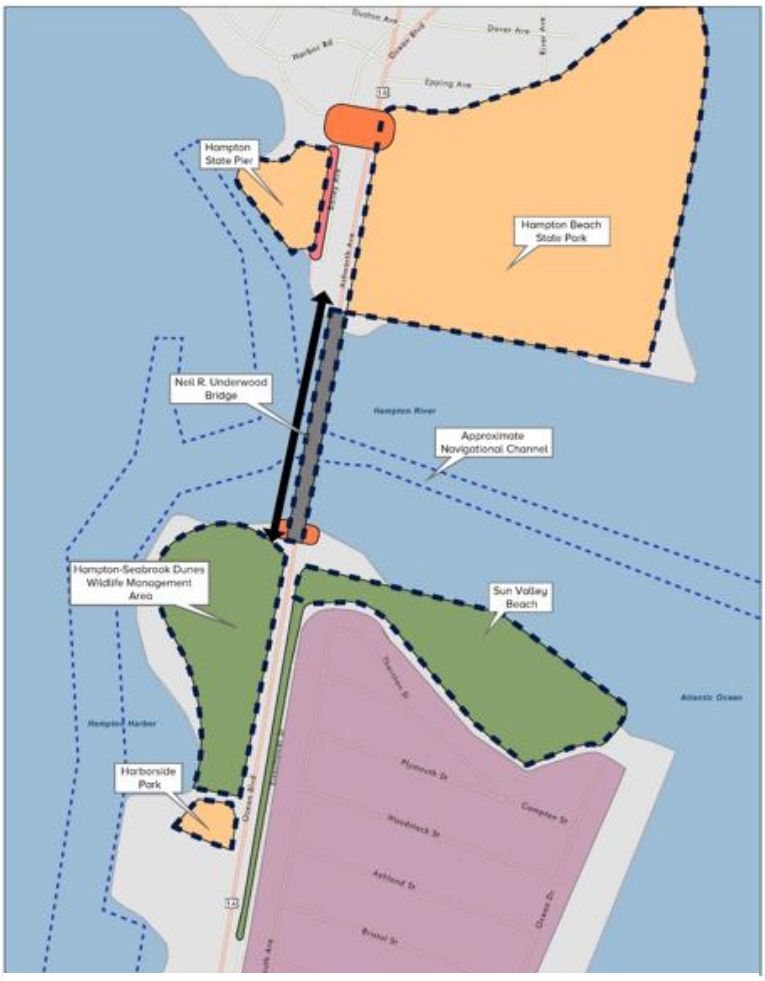

Figure 5: Seabrook and Hampton Connectivity

State of Good Repair

This bridge has been on NHDOT's Red List of deficient bridges since 1999 due to the poor condition of the superstructure. It is considered ***New Hampshire's number one priority Red Listed bridge***, and completion of the reconstruction will contribute to a state of good repair. The existing bridge is also a bascule structure, which generally requires more frequent and more costly O&M expenditures to maintain.

[3] https://www.govinfo.gov/content/pkg/FR-2012-01-31/html/2012-1996.htm

Typical fixed bridge costs include snow plowing and other roadway work, pavement repairs (20-year cycles), and biennial inspection. Minor steel or concrete repairs are required after approximately 25 years. Movable bridges require these activities, as well as operators to be available, monthly maintenance, and additional annual maintenance work. From a life cycle cost perspective, approximately 45 percent of the lifecycle costs for a moveable bridge are associated with O&M, compared to five percent for typical fixed bridges.[4] Replacing the existing bascule bridge with a fixed structure will contribute to lower lifecycle costs.

The benefit-cost analysis estimates that there will be more than $767,000 in O&M costs saved, as a result of the fixed bridge structure. In addition, residual value benefits of $3.6 million are expected.

Secondary Selection Criteria

The secondary selection criteria are partnership and innovation.

Partnership

As part of the project development, NHDOT partnered with the United States Coast Guard (USCG) and the United States Army Corps of Engineers (USACE) to support emergency repairs and avoid channel access limitations by USACE for dredging and other maritime functions. This partnership will continue throughout design and construction of the Hampton Harbor Bridge Replacement project.

In addition to the partnership with the agencies who manage the waterways in this area, significant public outreach activities have occurred and will continue. Section 5.0 includes details on these activities.

Innovation

The bridge project includes added infrastructure to the west to allow traffic to remain on the existing bridge, which reduces construction disruption to existing traffic and generates cost savings.

In addition, the Geotechnical Site Characterization for this project will be improved by the addition of the implementation of Measurement While Drilling (MWD). As an identified technology under FHWA EDC-5 Innovations: A-GaME. MWD is a proven yet underutilized technology in the way geotechnical site characterization will be completed. MWD technology is proven to reduce the risk of uncertainties in subsurface conditions and improve the quality and

[4] HDR expertise.

confidence in the site characterization. As a result, this will reduce unnecessary conservatism in design, and accelerate delivery as a number of construction delays can be attributed to inadequate knowledge of the subsurface site conditions. A well scoped investigation program improves decision-making and constructability proving time and cost savings to the agency. NHDOT is one of the first DOT's in the nation to implement this technology as a recipient of a FHWA grant and is further supported in this effort through the SPR research project ID 42372F.

5.0 Environmental Risk Review

The following section describes the potential project risks, which could impact the project schedule. In addition to identifying the risks, the impacts and potential mitigation strategies are provided.

Technical Feasibility

The project is currently at a preliminary level of design, as the TS&L report was completed in March of 2020 and updated in May of 2020. Multiple alternatives were screened during the process and a fixed bridge was identified as the Preferred Alternative. As a part of the evaluation process, alternatives were analyzed for traffic performance, safety performance, community and environmental resource impacts, cost, and degree to which it is implementable. The TS&L report describes the three levels of evaluation criteria, methodology, and results in detail. The project has also included extensive engagement with stakeholders and the public, including resource agencies.

Project Schedule

This project is expected to receive National Environmental Policy Act (NEPA) approval prior to the expected construction start date of January 2024. Design and property acquisitions will be completed prior to the start of construction. Construction is expected to be completed by June of 2027. The entire construction process is anticipated to span 36 months.

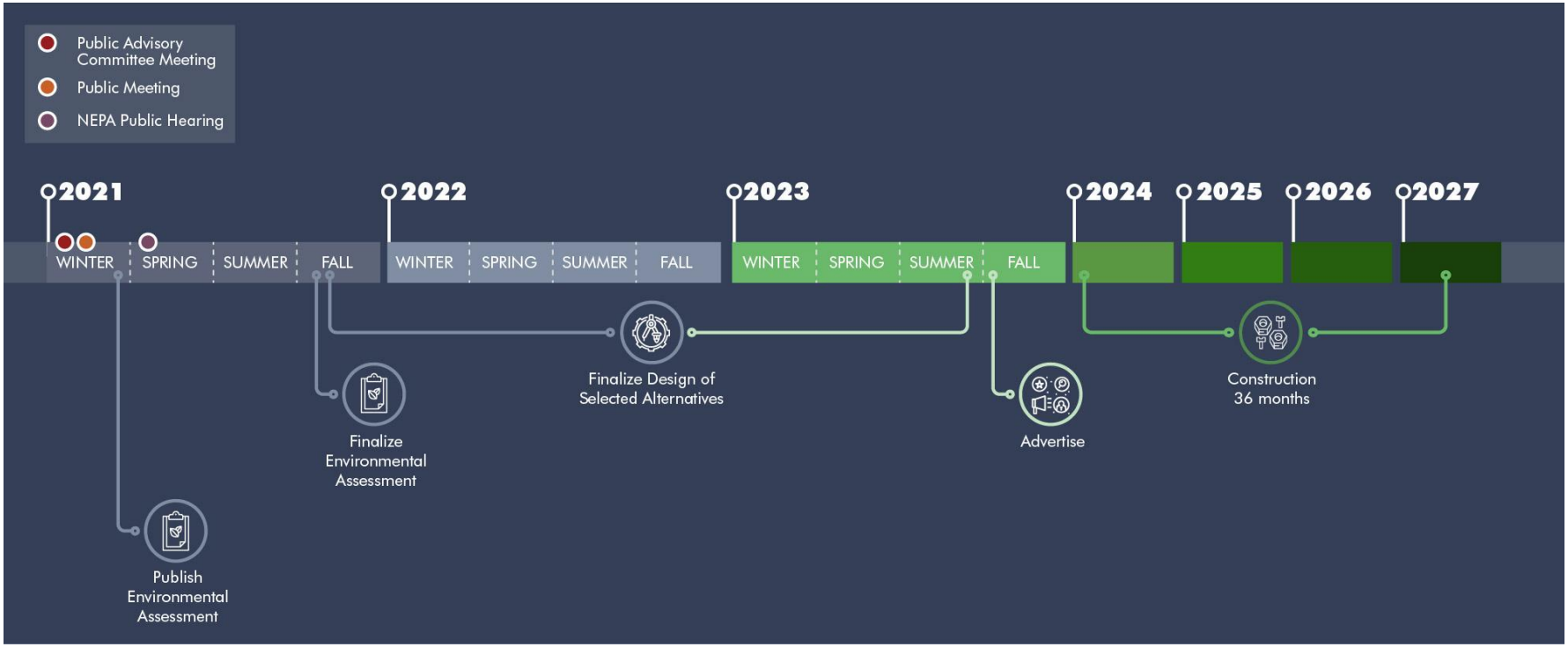

Figure 6: Hampton Harbor Bridge Replacement Project Schedule

Required Approvals

NHDOT and FHWA have prepared an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as amended (42 USC 4332(2)(c)); the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508); FHWA guidance regarding Environmental Impact and Related Procedures (23 CFR 771.119); the National Historic Preservation Act of 1966, as amended; and Section 4(f) of the U.S. Department of Transportation Act (23 CFR 774). The EA evaluates two build alternatives—Replacement with Fixed Bridge and Replacement with Bascule Bridge—and a No-Build scenario, as required by the Council on Environmental Quality (CEQ). The Replacement with Fixed Bridge alternative was identified as the preferred alternative. The EA was released for public review in March 2021. NHDOT and FHWA anticipate concluding the NEPA process in the Fall of 2021.

NHDOT and FHWA have also coordinated with federal and state agencies throughout the planning process. NHDOT initially notified federal and state agencies of the project and their intent to prepare an EA through coordination letters sent in the summer of 2018. These agencies included USACE, the National Oceanic and Atmospheric Administration (NOAA), the US Fish and Wildlife Services (USFWS), USCG, and NHFG. In addition, coordination letters were sent to the Hampton and Seabrook Harbormasters, a DataCheck was submitted to the NH Natural Heritage Bureau (NHNHB), and a Request for Project Review form (RPR) was submitted to the New Hampshire Division of Historical Resources (NHDHR). An additional letter was sent to USFWS in January 2019 and an updated DataCheck was submitted to NHNHB in December 2020 to reconfirm State-listed plant species potentially occurring in the Project Site. Coordination letters were also submitted to the NH Office of Energy and Planning, Conservation Land Stewardship Program regarding Land Conservation Investment Program properties, and the NH Land and Community Heritage Investment Program (LCHIP) regarding LCHIP properties.

State and Local Approvals

State and local approvals are anticipated, as noted above, but may be altered by the project's final design. This project is included in the State Transportation Improvement Plan (STIP)[5], and NHDOT anticipates obtaining the following state permits and approvals in advance of the expected construction start date:

- Standard Dredge and Fill Wetland permit (NHDES)
- Shoreland permit (NHDES)

[5] monthly-stip-project-list-website.pdf (nh.gov); https://www.nh.gov/dot/org/projectdevelopment/planning/stip/documents/stip-update-full-report-may-11-website.pdf

- Alteration of Terrain (NHDES)
- Hazardous materials management approvals (NHDES)

Federal Transportation

This project is anticipated to meet the planning requirements spelled out by the Federal-Aid Highway Program. All required federal approvals and permits are listed below:

- National Environmental Policy Act Environmental Assessment (FHWA as sponsor)
- Section 4(f) Evaluation in accordance with the US Department of Transportation Act (FHWA)
- Section 6(f) Evaluation in accordance with the Land and Water Conservation Fund Act (NPS)
- Section 106 of the National Historic Preservation Act (ACHP)
- Endangered Species Act Section 7 Biological Assessments (NOAA and USFWS)
- Endangered Species Act Section 7 "Range-wide Programmatic Informal Consultation for Indiana Bat and Northern Long-eared Bat" for NLEB (USFWS)
- Essential Fish Habitat Assessment Worksheet (NOAA)
- US Coast Guard Bridge Permit and Section 401 Water Quality Certification (USCG)
- Clean Water Act Section 401 Water Quality Certification approval (NHDES)
- Section 404/Section 10 Permit (USACE)
- Section 408 Approval (USACE)
- Federal Coastal Zone Consistency Determination (NHDES)
- 2017 Construction General Permit for Stormwater Discharges (as modified in 2019) (USEPA)
- Municipal Separate Stormwater Sewer Systems Permits (MS4) compliance (USEPA)
- Clean Air Act General Conformity Rule compliance (USEPA)
- Hazardous materials management approvals (USEPA)

Consistency with Regional, State and Local Plans

The Hampton Harbor Bridge study area falls within four successively larger planning regions, namely the Hampton Beach Area Commission, the Towns of Hampton and Seabrook; the Rockingham Planning Commission region; and the State of New Hampshire. The plans formulated at each level (local, regional, and state) articulate the vision, goals, and objectives for future land use and/or the transportation system. This project is consistent with many of the plans recently completed by these regions, including:

1. Hampton Beach Area Master Plan
2. Hampton Beach Master Plan Transportation Update completed in 2018

3. Town of Hampton's Master Plan Update Draft Vision Statement as of September 14, 2020
4. Coastal Hazards and Adaptation chapter of the Master Plan for the Town of Seabrook, adopted in 2016
5. Rockingham Planning Commission's Regional Master Plan, updated through March 2015
6. Regional Long-Range Transportation Plan
7. NHDOT Long Range Transportation Plan 2010-2030

Assessment of Project Risks and Mitigation Strategies

The EA included an assessment of project risks that could be associated with the bridge and presented strategies for mitigating them. The following is a summary of the risks considered and the proposed solutions.

Land Use and Public Policy

The Hampton Harbor Bridge Project will not alter land uses in the area surrounding the Project Site. However, due to the Fixed Bridge Alternative's more westerly alignment, the ROW land use would extend further westward into the State Pier and Dunes WMA. While the bridge would move to the west, the overall use and access to the State Pier and Dunes WMA would remain. A transfer of land ownership will be required between State agencies (Division of Ports and Harbors to NHDOT) at the State Pier for a small portion of the property along the eastern edge of the State Pier between the parking lot and the existing bridge. A formal ownership transfer will not be required at the Dunes WMA for the southern approach of the bridge's alignment, as the land would automatically revert to NHDOT jurisdiction based on the original transfer requirements.

Economic Conditions

The Hampton Harbor Bridge Replacement Project will maintain vehicular circulation across the Hampton Harbor, and it will improve pedestrian and bicycle circulation with the addition of sidewalks and widened shoulders on both sides of the bridge, thereby improving access to area businesses. It will not permanently displace any businesses, housing units, or jobs; require private land acquisitions; or affect median incomes or demographics.

The project will also provide continued navigation of the Hampton Harbor Channel, with an increased navigational channel width (from 40 to 150 feet) and a vertical underclearance of 48 feet to accommodate channel users. This includes an allowance for potential sea-level rise. It is not anticipated that the replacement of the movable bridge with a fixed span will directly affect access for commercial vessels that travel through Hampton Harbor. Based on studies done as part of the project's Navigational Impact Report and through coordination with USACE

and USCG, the project will clear all known channel users and USACE dredging equipment. While the increased channel width and increased navigational clearance without a lift is expected to improve conditions for maritime business interests that come into and out of the harbor, the replacement of the bridge with a fixed bridge is unlikely to increase the number of maritime businesses or the size of vessels they use, as the waterfront is well developed and the size of vessels are limited by the draft of the navigational channels.

Environmental Justice

Potential project impacts include those related to short-term construction and long-term multi-modal circulation. There is the potential for minor short-term construction-period impacts due to noise and increased truck traffic; however, these impacts would be mitigated through best management practices (BMP). There will be long-term beneficial impacts to vehicular circulation due to the reduction or elimination of delays due to bridge lifts. There will also be long-term beneficial impacts to bicycle and pedestrian circulation because of the project.

There would be no significant adverse short- or long-term impacts resulting from this project, and extensive outreach has been undertaken to residents of the Town of Seabrook and the Town of Hampton as a part of the project. Overall, project impacts will not cause disproportionately high and adverse effects on minority or low-income populations in accordance with the provisions of Executive Order (EO) 12898 and FHWA Order 6640.23.

Marine Transportation

The changes to horizontal and vertical navigational clearances constitutes a change to a federal navigation project and will require authorization from USACE through the Section 408 permitting process and would also require a USCG Bridge Permit. NHDOT prepared a Navigation Impact Report and has received a Preliminary Navigation Determination for the USCG confirming that the proposed clearances would meet the current and prospective needs of navigation. Both the report and letter are posted on the project website.

The navigational channels will be maintained throughout the estimated 36-month construction period, with only brief outages that are unlikely to exceed several hours. These outages will be communicated to mariners through USCG Local Notices to Mariners. Fixed navigational lights will also be installed on the new fixed bridge to indicate channel perimeters. Additionally, navigational information relative to the new bridge will be included in the US Coast Pilot and in notices to mariners and other standard boater information methods.

Air Quality

To minimize fugitive dust emissions from construction activities, mitigation measures such as a robust watering program, stabilization of all work areas, cleaning paved roadways, and scheduling construction to minimize the amount and duration of exposed earth should be implemented throughout the duration of construction. Ultra-Low Sulphur Diesel fuel should also be used for all diesel engines throughout the construction site (with the potential exception of some older marine engines), and this fueling requirement will be included in the contract under the NHDOT Standard Specifications for Road and Bridge Construction.

The Environmental Protection Agency's (EPA) Tier 1 through 4 standards for non-road engines regulate the emission of criteria pollutants from new engines, including Particulate Matter (PM), Carbon Monoxide (CO), Nitrogen Oxides (NOx), and hydrocarbons (HC). All non-road construction equipment with a power rating of 50 horsepower (hp) or greater should meet the Tier 4-final emissions standard.

Water Resources and Water Quality

Incorporating low-impact, in-water construction methods will minimize temporary water quality impacts during construction. Cofferdams will be installed at each of the pier locations, prior to the installation of drilled shafts and pier caps, to help contain suspended sediment from construction and keep it from reaching the water column outside of the project site area. Additional measures will be taken to protect the quality of water resources, including separation and removal of sediment-laden water and the preparation of a detailed Stormwater Pollution Prevention Plan (SWPPP). The project will be designed in accordance with the 2008 New Hampshire Stormwater Manual and will comply with all federal and state water quality permitting requirements.

Wetlands

During the final design phase of the project, NHDOT will coordinate with USACE and the NH Department of Environmental Services (NHDES) to determine potential mitigation needs for the project. It is currently anticipated that all impacts to wetland resources because of this project will be fully mitigated through utilization of the New Hampshire Aquatic Resource Mitigation (ARM) Fund In-lieu Fee Program and no additional mitigation will be necessary.

Wildlife Aquatic Habitat

Construction induced turbidity will be reduced substantially by installing the piers within an outer sheet pile containment system, thereby minimizing the potential for wastewater and sediment to reach the water column. Wastewater will be pumped out of the system onto a

barge where it will be treated in a settling basin, or equivalent, before being discharged back into the harbor. The containment system will be removed upon completion of pier installation. In-water construction, specifically sheet pile containment and temporary pile installation, will take place between November 15th and March 15th, as directed by the NOAA National Marine Fisheries Service (NMFS), when most fisheries resources are not likely to be in the project site area and when shellfish metabolism is greatly reduced. Potentially adverse underwater sound and vibration impacts generated during drilled shaft and column installation will also be minimized by the containment system. A detailed SWPPP will be prepared to minimize water quality impacts during construction.

It is anticipated the NHDES Aquatic Resource Mitigation Fund will be utilized as mitigation for the net loss of channel bottom habitat. Additional coordination will take place with regulatory agencies during the final design and permitting phase of the project to establish final mitigation needs. No mitigation is proposed for non-listed vegetation, avian, or mammalian impacts since these impacts are expected to be negligible.

Threatened and Endangered Species

As a result of the impacts to NH-listed plant species located in the footprint of the proposed roadway alignment, a comprehensive compensatory mitigation plan will be developed during the permitting and final design phase of the project. Based on coordination with regulatory agencies to date, it is likely that mitigation will consist of relocating the listed plant individuals located within the impact area to a predetermined transplant area within the dune habitat to the southwest of the proposed bridge approach.

To minimize potential impacts to listed plant species, NHDOT will not establish its typical turf grass along the roadway within most portions of this project. Disturbed soils within the southern approach area will be re-graded as part of construction, but no topsoil or grass will be planted to avoid impeding reestablishment by native dune vegetation, including listed plant species. NHDOT may plant beach grass for graded soils stabilization in some areas if it is deemed appropriate by regulators, and the field conditions will support it, but this will be determined during the permitting phase of the project. No landscaping trees or shrubs are proposed in areas where listed species are present.

Although no specific mitigation is proposed for potential impacts to Piping Plovers, NHDOT is proposing several conservation measures that are expected to minimize potential impacts to this species. To minimize some of the potential stressors, the following conservation measures may be employed to avoid or reduce the risk of adverse impacts to the target organisms should they occur in the project site area:

- Contractor education to inform construction workers on the potential presence of Piping Plovers in the work area and whom to call should they discover one
- The use of silt fencing, or other protective fencing, to prevent young Piping Plovers from wandering into the construction area
- Requiring the contractor to establish strict "housekeeping" requirements to keep the work site area clean and not contain food wastes from the construction workers to avoid attracting scavenging animals that may prey upon Piping Plover adults, eggs, or young, should they be nesting in the area, or foraging Red Knots should they occur during migratory stopovers
- Requiring the contractor to impose a speed limit on construction vessels to prevent or control wake to avoid eroding Piping Plover nesting sites on the beach, inundate a nest, or inundate foraging Piping Plover chicks
- Requiring the contractor to implement light shielding during construction and incorporate shielding in the final design to prevent the beach from being lighted at night outside of the Project Site, to avoid impacting the diurnal rhythms of nesting Piping Plover and aid visual predators from potentially preying on Piping Plover eggs and chicks
- The implementation of slope stabilization measures adjacent to the bridge and roadway on the southwest side of the roadway to prevent erosion
- Conducting slow starts when driving casings for drilled shafts during the Piping Plover breeding season, or Red Knot migration period, to avoid startling or flush Piping Plovers or Red Knots from their habitats
- Using stone chinking within the riprap to prevent void spaces from attracting rodents and other mammals that may prey upon the receptor organisms

Public Utilities and Service

Coordination with utility providers will be undertaken to plan any required utility relocation before other project construction commences to ensure that construction activities will not disturb existing lines. If there are any outages required related to the work, the end users will be notified of the timing and duration.

Public Engagement

It should be noted that at the outset of the project, NHDOT established a Project Advisory Committee (PAC) comprised of NH State Representatives and a State Senator, town officials from Seabrook and Hampton, a representative from the DNCR Division of Parks and Recreation (DPR), a representative from the Hampton Historical Society, project abutters, and other stakeholders. The PAC's role was to disseminate information to the public and to provide input in the overall planning process throughout the life of the project. The public has also been

informed through three public informational meetings held in September 2018, January 2019, and January 2021, and a Public Hearing in March 2021. The September 2018 and January 2019 meetings were held in person and were broadcast by a local cable television channel. The January and March 2021 meetings were held virtually via the Zoom meeting platform. Abutters were notified by mail of their opportunity to participate in each of the public informational meetings. Stakeholder meetings were also held with abutters and members of the maritime community. Input received from the PAC, from stakeholder meetings, and through the public informational meetings drove decisions made in the development of alternatives by the Design Team and informed the assessment of potential impacts.

6.0 Benefit-Cost Analysis

From a public benefits perspective, the Hampton Harbor Bridge Replacement Project is anticipated to improve bridge approaches, associated roadway infrastructure, and the bridge itself. This is expected to generate $62.8 million in discounted benefits, as shown below.

Table 3: Benefit-Cost Analysis Results (Millions 2019 Dollars)

RAISE Merit Criteria	Discounted Benefits (7%)
Safety	$0.3
Environmental Sustainability	$6.0
Quality of Life	$0.4
Economic Competitiveness	$51.7
State of Good Repair	$4.4
Total	**$62.8**

The largest share of benefits is associated with travel time savings due to averted diversions, $31.1 million when discounted by 7 percent, which is included in Economic Competitiveness above. Vehicle operating cost savings are also expected to be significant, $20.6 million when discounted by 7 percent. Other benefits are associated with: crash reduction ($0.3M); emissions cost savings ($6M); as well as journey quality improvements for active transportation users ($0.4M); O&M cost savings ($0.8M) due to replacement of a bascule structure to a fixed structure; and residual value ($3.6M).

The period of analysis used in the estimation of benefits and costs begins in 2019 and ends in 2047. Twenty years of benefits are included in the analysis, once the bridge is complete and operational. The total (undiscounted) project costs used in the benefit-cost analysis are $57.3

million for continuation of this project, along with previously incurred costs of $2.1 million, all in 2019 dollars. A summary of the relevant data and calculations used to derive the benefits and costs of the project are provided in the BCA model and supplementary documentation that accompanies this application.

Based on the economic analysis conducted, the project is expected to generate $62.8 million in discounted net benefits and $39.0 million in discounted costs, using a 7 percent real discount rate (for all but CO2 which is discounted at 3 percent per USDOT BCA guidance). The project is expected to generate a Net Present Value of $23.8 million and a benefit-cost ratio (BCR) of 1.61.

Table 4: Overall BCA Results, (Millions 2019 Dollars)

	7% Discount Rate
Total Discounted Benefits	$62.8
Total Discounted Costs	$39.0
Net Present Value	$23.8
Benefit-Cost Ratio	1.61
Internal Rate of Return	12%
Discounted Payback Period	16 years

In addition to the benefits that have been readily quantified and monetized, the Hampton Harbor Bridge Replacement Project will further benefit the regional and national economies in the following ways.

Travel Time Reliability: Reconfiguring the intersections along this critical area of Route 1A will lead to a more reliable trip throughout the corridor, allowing motorists and truck drivers to reach their destination on time more consistently. The current bridge lifts cause significant delays and uncertainty in trip duration. The travel time savings estimated in the BCA do include time savings from reduced delays, but the BCA does not consider the additional benefit of increased reliability beyond that of its incremental time value. In other words, many travelers intrinsically value a lower chance of experiencing a delay during a particular trip. Travel time reliability is important for firms that depend on just-in-time deliveries as well as for individuals who need to be on time for work or other appointments. Improved reliability allows drivers to reduce the amount of "buffer" time they need to budget in order to account for unexpected delays.

Vehicle Operating Cost Savings: Improvements that lead to fewer travel delays will allow vehicles to travel at more consistent speeds with less braking and less time spent idling in traffic. This will reduce wear-and-tear on vehicles. Were these benefits readily quantified and monetized, the overall benefit-cost ratio and cost-effectiveness would increase.