Chapter 1 - Introduction

1.1 STUDY PURPOSE

The purpose of this study was to evaluate multi-modal transportation and associated land use issues, develop potential solutions, and to recommend improvements along the Route 6 corridor between County Street in the City of New Bedford and Adams Street in the Town of Fairhaven (Figure 1.1). Specific focus was given to options and impacts associated with replacement of the middle bridge portion of the New Bedford-Fairhaven Bridge (Figure 1.2). It was important that the study was conducted utilizing an open and inclusive public-participatory approach that takes into account needs of the Massachusetts Department of Transportation (MassDOT), members of the Study Advisory Group (SAG), and other stakeholders.

Figure 1.1 Route 6 Study Corridor

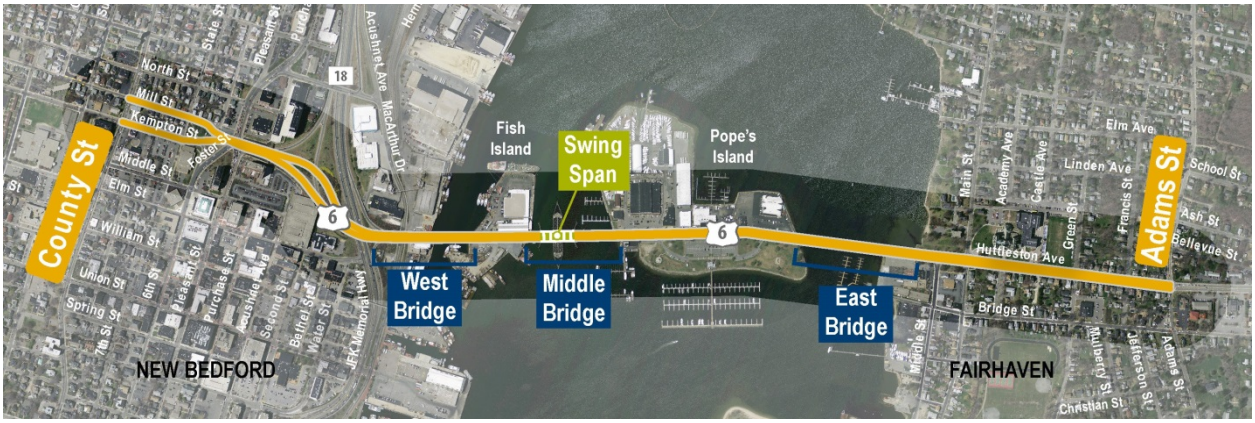


Figure 1.2 New Bedford-Fairhaven Bridge – Middle Bridge Swing Span

1.2 STUDY BACKGROUND

1.2.1 Study Area

The existing New Bedford-Fairhaven Bridge was completed in 1903 and is currently classified as functionally obsolete. The bridge is actually a system of three bridges that connect the mainland across two mid-harbor islands (Fish Island and Pope's Island). The central bridge includes a moveable swing-span that allows boats to pass through into the northern harbor area while the east and west spans are fixed.

As shown in Figure 1.3, two study areas were defined to help identify and analyze the existing conditions and impacts of a potential project:

- A Regional Study Area was defined to help assess regional impacts such as traffic diversions. As indicated on Figure 1.3, the Regional Study Area is generally defined as Route 140 to the west, Route 240 to the east, Allen Street and Route 6 to the south, and Coggeshall Street/Howland Road to the north.
- A Local Study Area was designated that includes the area in which most of the study analysis will occur. As shown in Figure 1.4, the Local Study Area generally includes the area between Route 6 to the south, Coggeshall Street/Howland Road to the north, Adams Street to the east, and County Street and Pleasant Street to the west. This Local Study Area encompasses the area generally surrounding the northern half of the New Bedford Harbor.

Figure 1.3 Regional Study Area Map

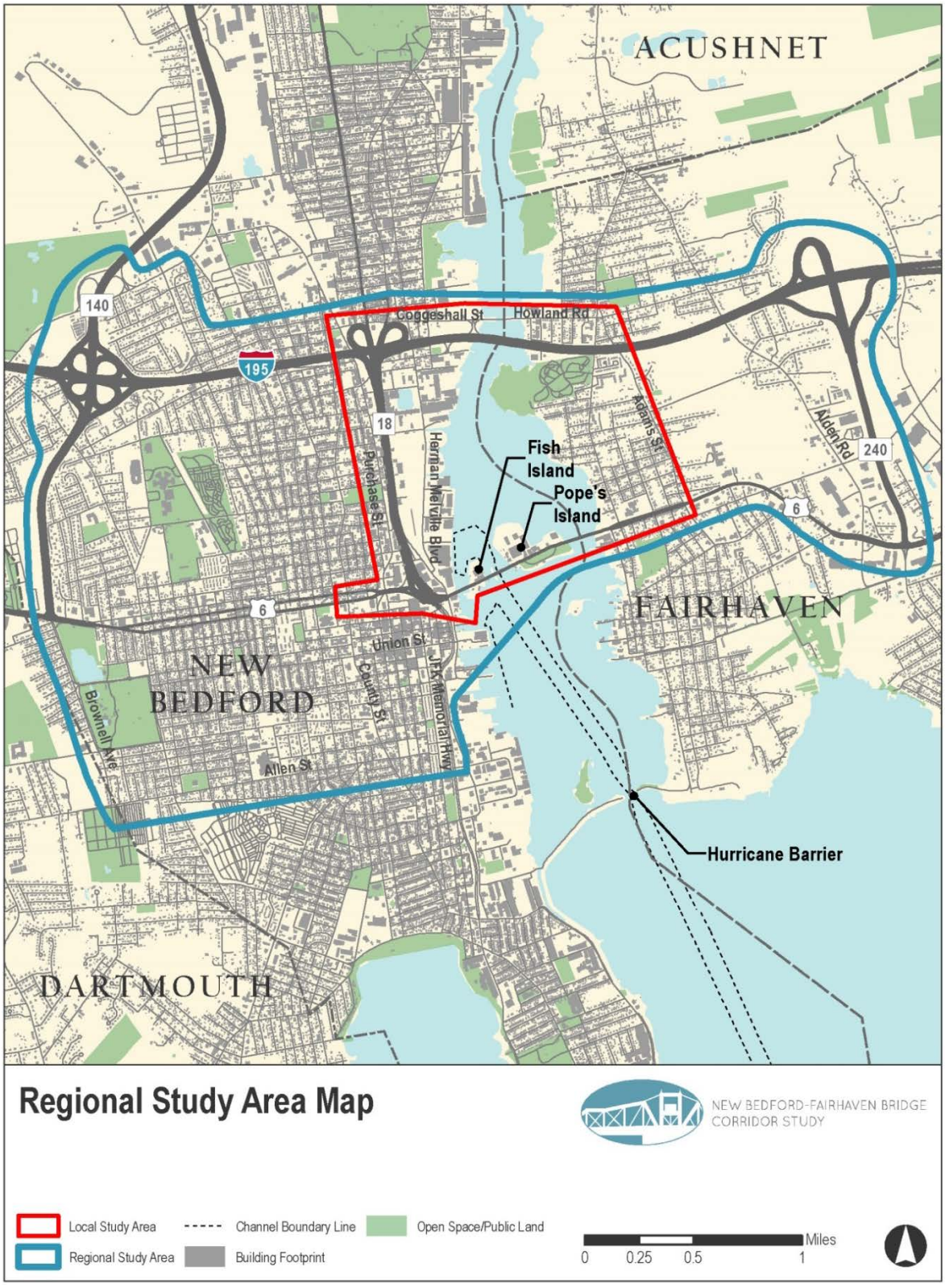
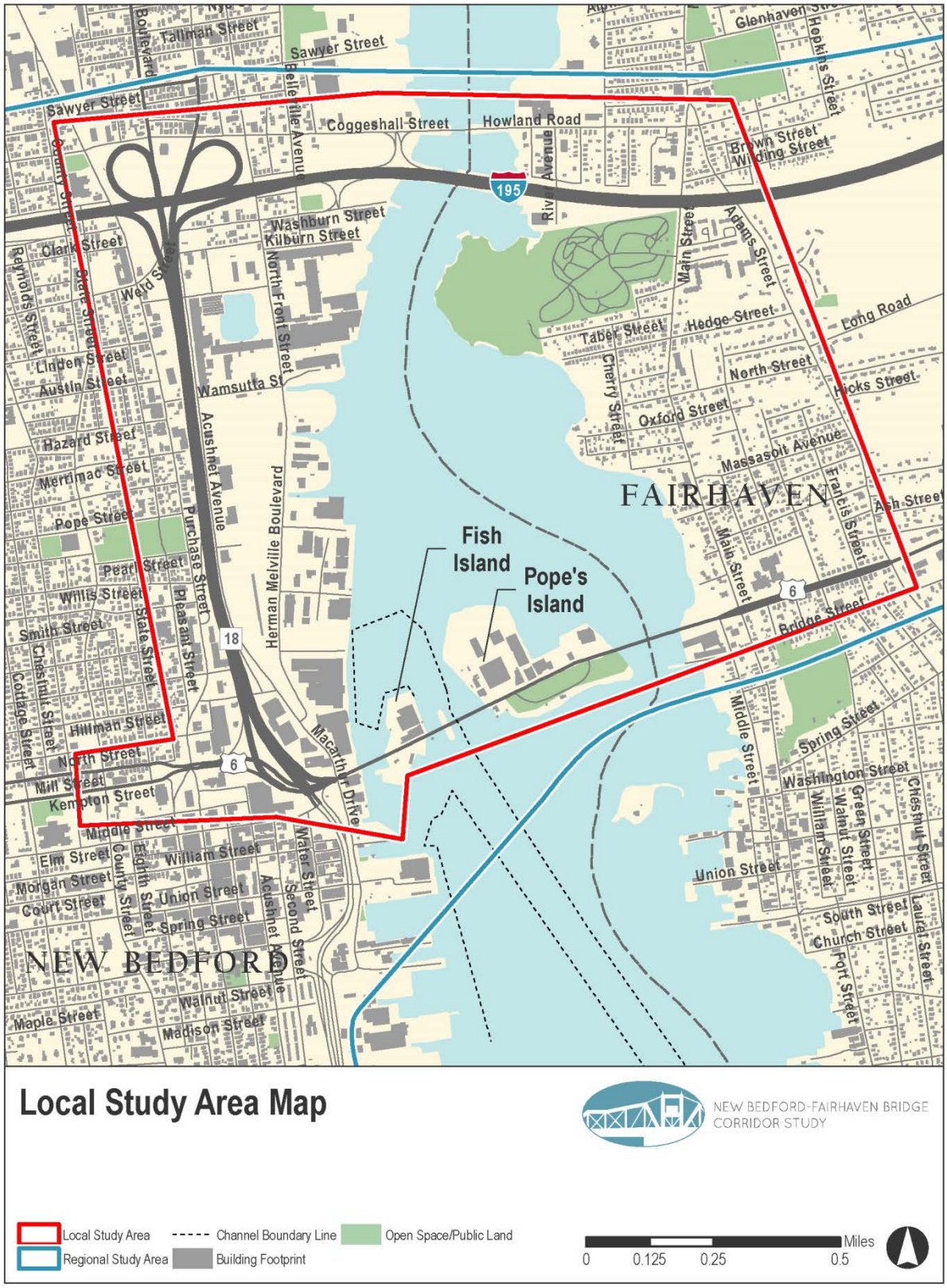


Figure 1.4 Local Study Area Map



1.2.2 Issues with Existing Bridge

The New Bedford-Fairhaven Bridge consists of highway segments on Fish Island and Pope's Island and three separate bridge structures. The middle bridge is the segment that contains the swing span or movable bridge section. This segment has one fixed span approach to the west of the swing span and four to the east, all of the original steel girder construction. The swing span is a 289-foot long rim-bearing truss bridge that rests on a central granite masonry pier. When in the closed position (closed to marine traffic), the swing span is supported by the center pier and the end abutments. When the bridge is open, the bridge structure is supported by the center pier alone and vessels are able to pass in two channels (94 and 95 feet wide) on either side of the pier.

On average, it takes between 12.5 and 22.5 minutes to fully open and return the swing span to a closed position.[1] The minimum time to open and close the bridge is 7.5 minutes. The increased time to open and close is due to the time it takes for pedestrians or vehicles to clear the bridge and vessels to pass through the bridge. The bridge is scheduled to open hourly between 6:00 a.m. and 6:15 p.m. During the evening and overnight, the bridge is opened on-demand. Per federal regulations established in Title 33 (Navigation and Navigable Waters), Part 117 (Drawbridge Operation Regulations), Sections 117.1 to 117.59 (General Regulations and Specific Regulations) and 117.585 (New Bedford Harbor), marine traffic has priority over vehicular traffic, so the bridge stays open to accommodate all waiting marine vessels. This results in a varying, but often extensive delay period for vehicles, pedestrians, and bicyclists trying to cross the bridge.

Additionally, the moveable span suffers from long-term deterioration despite extensive maintenance repairs. According to the 2013 National Bridge Inspection Standards (NBIS) inspection report, the machinery and operating systems are in poor condition and require continued corrective maintenance and replacement of critical parts.

The existing moveable bridge is also a barrier for larger ships accessing the northern waterfront land within the designated harbor areas of New Bedford Harbor. Vessels are limited by the bridge's 92-foot swing span navigational width. According to the 2010 New Bedford-Fairhaven Municipal Harbor Plan, the future development of harbor activities north of Route 6 (including expansion of refrigerated cargo operations, short sea shipping operations, ferry, cruise ship and excursion/shuttle boat operations, etc.) is constrained by the horizontal clearances of the existing swing-span bridge.

1.2.3 Past Studies and Plans

Numerous studies and plans have been completed over the past half century to evaluate the condition and function of the bridge. A description of the key plans and studies over the last fifty years is provided below:

[1] Average opening time based on time surveys conducted during Spring 2014.

- **1966: Southeastern Massachusetts Comprehensive Transportation and Arterial Study (Department of Public Works, Tippets-Abbet-McCarthy-Stratton, 1966).** This study stated, "the replacement of the existing structure by providing greater vertical and horizontal clearance may be justified on the basis of forecasted vehicular and vessel traffic, trends in ship construction, and bridge construction and operating costs."
- **1965-1967: Legislative Special Commission Study for Bridge Replacement. Report of the Special Commission Authorized to Make an Investigation and Study of the Advisability and Feasibility of Replacing the Present Drawbridge Known as the New Bedford-Fairhaven Bridge with a Bascule Bridge of a High-Level Bridge) (Special Commission of the Mass. House of Representatives, 1967)** Proposal to undertake an engineering study of the bridge.
- **1969: Feasibility Study on the Replacement of the New Bedford-Fairhaven Bridge (Mass. Department of Public Works, Sverdrup, and Parcel, 1969).** Study concluded that replacement will probably be required before 1990 due to age of bridge and increased shipping traffic.
- **1977: New Bedford-Fairhaven Route 6 Bridge Corridor Planning Study Report (Mass Department of Public Works, Southeastern Regional Planning and Economic Development District, 1977).** This report recommended the replacement of the bridge with a new double bascule bridge with a 150-foot horizontal clearance to match the channel width.
- **1978: New Bedford-Fairhaven Bridge, A Review of the Facts Favoring Timely Replacement, New Bedford-Fairhaven Harbor Master Plan (New Bedford-Fairhaven Harbor Master Planning Commission, May 1978).** Plan developed for new bridge to spur oil crisis induced maritime development.
- **1979: New Bedford-Fairhaven Bridge, Route 6 Over New Bedford Harbor: Draft Engineering Study Report (Massachusetts Department of Public Works, Sverdrup, Parcel and Associates, September 1979).**
- **1985: Environmental Assessment: Replacement of the New Bedford-Fairhaven Bridge (USDOT, FHA, Mass DPW, May 1985).** The Preferred Alternative (out of 19) was new bridge construction along an alignment nearly identical to the existing bridge that provides a vertical clearance at the bascule span of approximately 10 feet, which is slightly higher than the existing bridge. The preferred alternative involved roadway construction on the approaches and a four-lane bridge with a moveable span of the double bascule type and fixed approaches on either side. The cost was approximated at $35 million.
- **1987: Swing-Span Bridge for Route 6 across Acushnet River (A.G. Lictenstein and Associates, October 1987).** This study evaluated the rehabilitation of the bridge for the New Bedford Department of Public Works. Repair was preferred at this time likely due to concerns about environmental issues in the harbor and the cost of replacement.
- **2002: New Bedford/Fairhaven Harbor Plan (City of New Bedford, Town of Fairhaven, VHB, August 2002).** This plan envisioned the "wholesale relocation of the Route 6 crossing" to the north. The proposed bridge would connect to Wamsutta Street in New Bedford and open up opportunities for the north terminal and expansion of a new harbor terminal on Pope's Island.

- **2004: Draft Conceptual Alternative Study for the Relocation of the Route 6 Bridge Over New Bedford Harbor. (City of New Bedford, STV Incorporated, VHB, Inc. December 2004)** Initiated in 2000 by the New Bedford Redevelopment Authority but delayed until 2003, this study builds upon the 2002 harbor plan that called for the relocation of the bridge to the north. Funded through the Federal Highway Administration's Transportation and Community System Preservation (TCSP) grant program, the study evaluated three conceptual alternative bridge structure types, all relocated to the north to connect directly to the planned intermodal facility near Wamsutta Street in New Bedford. The recommended alternative was a high-level movable bridge option with a 22-foot vertical clearance at an estimated cost of $73.4 million. A federal delegation request for $3 million was submitted in 2003 to complete an Environmental Impact Statement (EIS) to further develop the bridge relocation project. A $1.4 million federal earmark from the 109th Congress was awarded, but never used to complete an EIS. The plan did not consider replacement of the bridge in its current location and did not fully address how the new bridge alignment would connect with the Route 18 and the rest of the existing road network in New Bedford. The proposed alignment now conflicts with the location of the CAD cells used as part of the ongoing harbor dredging and cleanup project.
- **2006: Fairhaven the Route 6 Corridor Safety Study (SRPEDD, September 2006).** This study evaluated crash data on the Route 6 corridor in Fairhaven and offered recommendations including changes to signalization, vehicle speed, signage, and police enforcement. In 2013, signal and intersection improvements were completed on Route 6 (Huttleston Avenue) at four locations: Middle Street, Main Street, Green Street, and Adams Street.
- **2010: New Bedford/Fairhaven Municipal Harbor Plan (May 2010).** This updated harbor plan includes the ongoing dredging process established through the State Enhanced Remedy (SER) and the location of the CAD disposal sites. The plan differs from the 2002 harbor plan by supporting the replacement of the New Bedford-Fairhaven Bridge in its current alignment and not relocation to the north. The plan proposes a double bascule bridge to increase the bridge opening from the current effective width of 90 feet to a new width of 150 feet.
- **2014:** MassDOT begins current bridge/corridor study.

1.2.4 Ongoing Bridge Maintenance

Since completion over 100 years ago, the bridge has undergone numerous closures and repairs. MassDOT is currently in the process of a $60 million project to increase the lifespan of the east and west spans of the bridge through improvements that include replacing joints and bearings, cleaning and repairing steel, and repairing the concrete and granite piers and abutments. Initially, the ongoing reconstruction project did not include any work on the middle bridge moveable span, but the project was modified during the planning process to include bridge restoration.

Based on a review of numerous studies and reports, a brief history of the bridge repairs and modifications is provided below:[2]

- **1903:** Bridge construction completed at final cost of $1.387 million. Planning and design began in 1883 and the middle bridge (swing span) was completed between 1897 and 1899.
- **1920:** The first significant repairs were made to the bridge.
- **1931:** The bridge underwent its first major overhaul after Massachusetts Department of Public Works assumed operational responsibility from Bristol County in 1930.
- **1932-1960:** Additional repairs were made at least eight times during these three decades.
- **1961:** The deck and deck framing of the fixed spans were replaced and the abutments were altered and repaired.
- **1972:** The western end of bridge was completely replaced in conjunction with ramp construction for newly constructed Route 18.
- **1984:** A major repair was completed in 1984.
- **1989:** The bridge closed for six weeks for repair in 1989.
- **1995:** The bridge closed again for 11 months in 1995 at a repair cost of $16 million. After just three weeks open, the bridge broke down again and was closed for an additional three weeks.
- **March 2012:** The bridge closed for three weeks to make critical repairs and electrical upgrades, including transformer and motor repairs.
- **April 2014:** Most recently, the middle bridge was closed for two weeks to perform structural steel repairs to the bridge's floor beams. This closure is part of the larger bridge reconstruction project currently ongoing.

1.3 STUDY GOALS/OBJECTIVES

During the study's initial months, a set of goals, objectives, and evaluation criteria were developed and refined in conjunction with the SAG. Goals define the general intentions and purposes for conducting the study based on the issues that have to be addressed. Objectives describe ways that the goals could be accomplished. The evaluation criteria are used to qualitatively and quantitatively measure how well each alternative meets the defined objectives.

The **Goals** of the study include the following:

- Improve vehicular, marine, bicycle, and pedestrian mobility, connectivity, and safety within the study area and region;

[2] New Bedford-Fairhaven Middle Bridge, Historic American Engineering Record (HAER) No. MA -101 (National Park Service, August 1990). Environmental Assessment: Replacement of the New Bedford-Fairhaven Bridge (USDOT, FHA, Mass DPW, May 1985). Draft Conceptual Alternative Study for the Relocation of the Route 6 Bridge Over New Bedford Harbor. (City of New Bedford, STV Incoroporated, VHB, Inc. December 2004)

- Maximize economic development through replacement or repair of the New Bedford/Fairhaven Bridge; and
- Identify feasible alternatives for short-, medium- and long-term improvements in the corridor.

The **Objectives** of the study include the following:

- Facilitate economic opportunities for water-dependent industries in the New Bedford Harbor upper basin that may result from project alternatives;
- Improve operational speed and reliability of bridge to reduce delay and travel time for vehicular and marine traffic;
- Reduce impacts to local roadway traffic due to bridge span openings;
- Mitigate impacts to marine traffic due to bridge span closings;
- Improve pedestrian and bicycle mobility and connectivity in the corridor and region;
- Minimize potential impacts to the community and environment from selected improvements;
- Support and ensure consistency with established local goals and regional plans; and
- Develop feasible short-, medium- and long-term implementation plans for selected improvements.

1.4 EVALUATION CRITERIA

Evaluation criteria are specific considerations, or measures of effectiveness, used to assess benefits and impacts of alternatives developed during the study. The study's Evaluation Criteria included in Table 1.1 are tied directly to the defined Goals and Objectives.

The Evaluation Criteria listed below include both qualitative and quantitative measures. When possible, qualitative measures will be monetized for comparison across transportation modes and to assess the overall performance of alternatives. All evaluation criteria – containing both quantifiable or more subjective, qualitative measures of effectiveness – will be used to determine the best solutions for the defined goals and objectives.

Table 1.1 Evaluation Criteria

Evaluation Category	Evaluation Criteria
Bridge Operations	
Bridge opening times	Minutes per bridge closure (shortest)
Vertical clearances	Feet of vertical clearance (height for vessels)
Horizontal clearances	Feet of horizontal clearance (width for vessels)
Estimated number of daily bridge openings	Number per day
Long-term reliability risk	Long-term reliability risk

Evaluation Category	Evaluation Criteria
Transportation Impacts & Mobility	
Operational functionality	Corridor intersections level of service (LOS)
Operational functionality	Corridor volume to capacity ratios
Operational functionality	Change in 50th and 95th percentile queues
Travel time	Average roadway travel time along corridor
Travel time	Average roadway delay (regional)
Travel time	Average roadway delay (Route 6)
Travel time	Average transit service delay
Travel time	Average vessel delay
Pedestrian and bicycle mobility and connectivity	Compliance with ADA requirements
Pedestrian and bicycle mobility and connectivity	Bicycle/pedestrian delay
Pedestrian and bicycle mobility and connectivity	Provision of bicycle facilities
Pedestrian and bicycle mobility and connectivity	Provision of pedestrian facilities
Safety	
Vehicular safety	Conformance with AASHTO and MassDOT standards
Vehicular safety	Delay to emergency vehicle access
Pedestrian and bicycle safety	Impact to high volume bicycle and pedestrian locations
Marine safety	Impact to safe navigation
Marine safety	Delay to emergency marine access
Environment	
Environmental impacts	Impact to coastal resources (square feet)
Environmental impacts	Impact to wetland resources (square feet)
Environmental impacts	Impact to natural resources
Environmental impacts	Impact to air quality and greenhouse gases from idling vehicles
Land Use & Economic Development	
Business impact from bridge	Number of businesses impacted
Business impact from bridge	Value of businesses impacted
Business impact from bridge	Number of jobs lost from businesses impacted
Economic benefits from bridge	Shipper cost savings
Community	
Community impacts	Impact to protected and recreational open space
Community impacts	Impact to historical/archeological resources
Community impacts	Impact to cultural resources
Community impacts	Impact to business access
Community impacts	Impact to environmental justice populations

Evaluation Category	Evaluation Criteria
Visual impacts	Visual impacts
Alternative Feasibility	
Cost	Capital costs
Cost	Annual operating and maintenance costs
Construction phase impacts	Construction duration
Construction phase impacts	Impacts to vehicular traffic
Construction phase impacts	Impacts to Marine traffic
Construction phase impacts	Direct impact to abutting land owners/businesses
Construction phase impacts	Indirect impacts to abutting land owners/businesses
Right-of-way impacts	Permanent and temporary right-of-way impacts

1.5 PUBLIC INVOLVEMENT

A Public Involvement Plan was developed at the onset of the project to provide a framework for the study's public outreach activities. The plan is consistent with MassDOT's Accessible Meeting Policy Directive and established public outreach principles and policies. It describes the various communications tools and networks utilized during the study, which includes a Study Advisory Group (SAG), public informational meetings, a project website, and newsletters that are described in more detail below.

1.5.1 Study Advisory Group (SAG)

To guide the study process, a SAG was formed to allow for early and continued involvement from stakeholders at key points in the study process. SAG members represent diverse stakeholder and interest groups, including study area neighborhood associations, bicycling advocates, regional planning and transit agencies, environmental/water resources interests, recreational users, port development interests, and municipal, state and federal government (elected officials and staff). The SAG assisted in the study effort by providing advice and insight on all the study tasks including, but not limited to, knowledge of local issues, identifying deficiencies in the network, and assessing improvement alternatives.

Six SAG meetings were held during the duration of the study process. An initial meeting allowed SAG members to review the study area, goals and objectives, and evaluation criteria. The following two meetings were to review existing conditions and identify issues and constraints. At the fourth meeting, the three identified alternatives were reviewed. The results of the alternatives analysis process was presented and reviewed at the fifth meeting. The draft report including the recommended alternative was discussed at the final SAG meeting.

1.5.2 Public Informational Meetings

In addition to the SAG meetings, three public informational meetings were held at key study milestones. The first meeting was held to review the study area, goals and objectives, and evaluation criteria, as well as the preliminary existing conditions and issues/constraints. The three developed and analyzed alternatives were presented at the second public meeting. The third public meeting was held to present and solicit comments on the draft recommendations.

1.5.3 Project Website

An interactive project website was created to support the other public participation efforts. The website allowed members of the public to follow the progress of the study, obtain meeting dates and materials, and submit comments or questions. The website was updated on a regular basis throughout the study process.

1.5.4 Newsletters/Fact Sheets

Two newsletters were released during the project to provide project updates. The newsletters were distributed electronically to the SAG, members of local boards and commissions, neighbors and abutters, local college communication networks, and the press. The first was released midway through the planning process and the second was distributed at the completion of the draft recommendations.

1.5.5 Media Coordination/Other Communication Networks

Notices for the public informational meetings were distributed via press releases through the MassDOT Office of Public Affairs. Numerous news and media outlets, neighborhood associations, and other groups or locations were included to maximize notification. Additionally, the study team coordinated with the City of New Bedford and Town of Fairhaven's communication networks.

1.5.6 Limited English Proficiency Outreach

To ensure that the study information was available to study area populations with limited English proficiency an analysis was conducted at the initiation of the study to identify non-English languages that are frequently spoken in the study area. An analysis of census data, identified that the largest non-white ethnic group in the the study areas is Hispanic or Latino. Additionally an analysis conducted by SRPEDD in 2013 found that the predominant language spoken by limited English proficient populations in the study area was Portuguese or Portuguese Creole. As such, Portuguese and Spanish language translation were provided at public meetings and for outreach materials for this study.