# Cape Cod Bridges Program

## Bourne, Massachusetts

## Final Environmental Impact Statement, Executive Summary

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Submitted June 2026

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## Acronyms and Abbreviations

| Acronym/Abbreviation | Definition |
|---|---|
| DEIS | Draft Environmental Impact Statement |
| EIS | Environmental Impact Statement |
| FEIS | Final Environmental Impact Statement |
| FHWA | Federal Highway Administration |
| MassDOT | Massachusetts Department of Transportation |
| MRER/EA | Major Rehabilitation Evaluation Report/Environmental Assessment |
| NEPA | National Environmental Policy Act |
| NOA | Notice of Availability |
| NOI | Notice of Intent |
| Program | Cape Cod Bridges Program |
| ROD | Record of Decision |
| USACE | U.S. Army Corps of Engineers |

# 1 Introduction

This Executive Summary provides an overview of the Final Environmental Impact Statement (FEIS) for the Cape Cod Bridges Program (Program). The FEIS constitutes Volume 1 of a combined FEIS and Record of Decision (ROD); the ROD is included as Volume 2. The FEIS addresses the comments received on the Draft Environmental Impact Statement (DEIS) and provides a summary of the comprehensive analysis of the Program's anticipated social, economic, and environmental effects, along with a summary of the mitigation measures proposed to avoid or minimize adverse effects under the National Environmental Policy Act (NEPA). The Executive Summary is not intended to be a substitute for the FEIS. Refer to the FEIS and its appendices for additional information.

# 2 What is the Cape Cod Bridges Program?

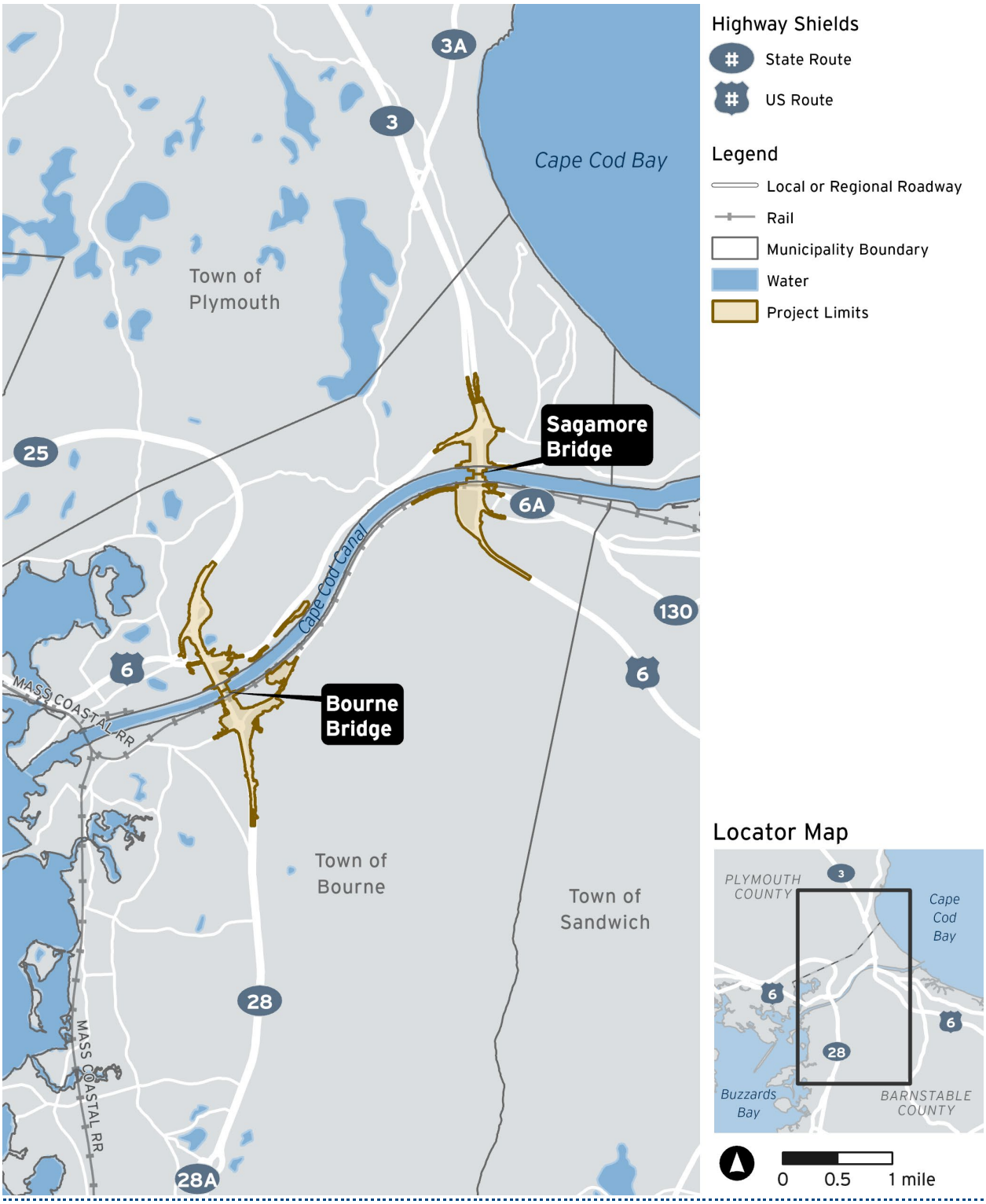
The Cape Cod Bridges Program, proposed by Massachusetts Department of Transportation (MassDOT) and Federal Highway Administration (FHWA), in partnership with U.S. Army Corps of Engineers (USACE), would replace the Sagamore and Bourne Bridges in the town of Bourne, Barnstable County, Massachusetts. Sagamore Bridge carries U.S. Route 6 across Cape Cod Canal, the Massachusetts Coastal Railroad, and Sandwich Road. Bourne Bridge, approximately 3.5 miles west of Sagamore Bridge, carries State Route 28 across Cape Cod Canal, Sandwich Road, and the Massachusetts Coastal Railroad.

Sagamore and Bourne Bridges are owned by the United States and are operated and maintained by USACE as part of the Cape Cod Canal Federal Navigation Project. Cape Cod Canal separates Cape Cod from mainland Massachusetts, with the Sagamore and Bourne Bridges serving as the only roadway connections for vehicular travel on and off Cape Cod. As the only roadway connections between Cape Cod and the mainland, the bridges are critical assets for the economy of the Cape Cod region and serve as essential routes for daily commuting, truck freight distribution, tourism, and hurricane evacuation off Cape Cod and the Islands (including Martha's Vineyard, Nantucket, and Elizabeth Islands). Both bridges, built between 1933 and 1935, are in deteriorated condition and functionally obsolete as they do not meet current design standards.

**Sagamore and Bourne Bridges are the only roadway connections between the mainland and the Cape Cod peninsula, serving 230,000 year-round residents of Barnstable County and millions of annual visitors to the Cape Cod region.**

The Program proposes replacing the existing Sagamore and Bourne Bridges with new bridges built to modern design standards, constructing separated pedestrian and bicycle accommodations along the replacement bridges with connections to the local roadway network, and reconfiguring the highway approach networks north and south of Cape Cod Canal to align with the replacement bridges. The Program will be delivered in two phases, with the Sagamore Bridge Project as Phase 1 and the Bourne Bridge Project as Phase 2. **Figure ES-1** depicts the Program Limits at Sagamore and Bourne Bridges.

Figure ES-1. Bridge Locations and Program Limits




Source: Massachusetts Department of Transportation, 2025

# 3 Who is leading the NEPA review for the Program?

FHWA is the Lead Federal Agency for the Program under NEPA based on funding participation through the U.S. Department of Transportation. NEPA requires federal agencies to consider the environmental effects of their proposed actions on the human and natural environment, document these analyses, and make the information available to the public for review and comment before implementing those actions. FHWA determined that the Program is an action that is likely to have a significant impact on the environment, thereby requiring preparation of an Environmental Impact Statement (EIS) under NEPA. An EIS is a full disclosure document that details the process through which a transportation project was developed, includes consideration of a reasonable range of alternatives, analyzes the potential impacts resulting from the alternatives, and demonstrates compliance with other applicable environmental laws and executive orders.

FHWA is the Lead Federal Agency and MassDOT is the local Project Sponsor and Joint Lead Agency under NEPA.

U.S. Department of Transportation Federal Highway Administration

massDOT Massachusetts Department of Transportation

MassDOT, as the recipient of federal funds through the U.S. Department of Transportation, is the local Project Sponsor and Joint Lead Agency with FHWA under NEPA. FHWA, in coordination with MassDOT, issued a Notice of Intent (NOI) to prepare an EIS for the Program in the *Federal Register* on February 29, 2024. The Draft Environmental Impact Statement (DEIS) Notice of Availability (NOA) was published in the *Federal Register* on November 21, 2025. As Lead Agencies, FHWA and MassDOT share responsibility for managing the NEPA process, including public involvement, agency coordination, and EIS preparation.

# 4 How have the public and agencies been involved?

FHWA and MassDOT developed a Public Involvement Plan and an Agency Coordination Plan to guide public and agency outreach and involvement throughout the Program's ongoing NEPA and design development process.

FHWA and MassDOT have received a range of input from agencies and the public throughout the development of the Program. Public and agency feedback has informed key aspects of the Build Alternative's design and mitigation, including bridge aesthetics; refinements to interchange configurations; extension of the Program Limits to include roadway upgrades and additional multimodal connections; and park and recreation amenities. Public input received throughout the NEPA process has been considered and incorporated into design of the Build Alternative. A more detailed summary of public and agency feedback is provided in **Chapter 6**.

## Public Outreach and Engagement

MassDOT uses multiple communication tools and resources to inform the public about the Program and to gather feedback, including (but not limited to) a Program website, a stakeholder database managed through the Public Involvement Management Application (PIMA), and social media. Since January 1, 2026, the website has been visited over 85,000 times by more than 55,000 different users. The database includes over 6,200 stakeholders. Additionally, as of January 1, 2026, over 2,000 comments and responses have been logged through PIMA.

MassDOT held nine rounds of public information meetings between June 2021 and December 2025 to present Program updates, highlight key milestones, and offer the public the opportunity to provide input and feedback on various aspects of the Program, including the preliminary purpose and need; draft measures of effectiveness criteria; analysis of bridge types, deck configurations, mainline alignment locations; and highway interchange approach options under consideration for the replacement bridges.

FHWA initiated the formal NEPA public scoping process for the Program upon publication of an NOI to prepare an EIS in the *Federal Register* on February 29, 2024. The NOI was accompanied by a Supplementary NOI document, which provided additional information on the Program's purpose and need; alternatives the EIS will consider; expected impacts on the human, natural, and built environments; and a proposed high-level schedule for the decision-making process. The NOI requested public and agency comments regarding the Program's purpose and need, study alternatives and impacts, and the identification of any relevant information, studies, or analyses of any kind concerning impacts to the quality of the human and natural environment.

MassDOT hosted a virtual public meeting and an in-person open house in the town of Bourne, prior to completing the EIS scoping on May 31, 2024. The virtual public meeting was held on April 25, 2024, where MassDOT provided information on the Program status, funding, scoping of the EIS, and next steps in the NEPA process. Additionally, the virtual public meeting included an opportunity for public comments, questions, and responses. The Open House was held on May 13, 2024, where MassDOT provided an opportunity for the public to review and discuss the design plans developed to date and provide oral and written comments. MassDOT presented its recommended Build Alternative, including the preferred interchange approach options at each replacement bridge crossing, during an in-person open house event in the town of Bourne on November 18, 2024. A total of 89 individuals provided comments on the NOI. **Appendix 6.2** provides the EIS Scoping comments and responses.

The DEIS NOA was published in the *Federal Register* on November 21, 2025, and the document, in PDF format, was posted on MassDOT's Cape Cod Bridges Program website the same day. MassDOT also published the DEIS online as an interactive summary site, which allowed the public to review and explore highlights and key findings of the DEIS, and submit comments in an interactive format. MassDOT notified its 6,200 stakeholders by email of the availability of the DEIS. Additionally, hard copies of the DEIS were provided at three locations, including MassDOT's Boston headquarters and the Bourne and Sandwich public libraries.

Publication of the NOA initiated a 45-day public comment period, which closed on January 5, 2026.

During this period, comments were accepted in multiple ways: at an in-person public hearing on December 16, 2025; by mail to the contacts listed in the NOA; and electronically through MassDOT's Cape Cod Bridges Program website. The DEIS interactive summary site received 2,232 views and the webpage hosting the PDFs received 1,374 views during the public comment period. In summary, a total of 207 comments were received on the DEIS, consisting of letters, emails, PIMA and website postings, and verbal testimony at the public hearing. **Appendix 6.3** provides the DEIS comments and responses; Attachment 1 of Appendix 6.3 provides the DEIS public hearing transcript.

## Cooperating Agencies

FHWA invited federal and state agencies having jurisdiction by law (via permitting or other regulatory authority) to be Cooperating Agencies in the development of the EIS for the Program. The Cooperating Agencies include:

- U.S Army Corps of Engineers
- U.S. Coast Guard
- U.S. Environmental Protection Agency
- National Oceanic and Atmospheric Administration/National Marine Fisheries Service (NOAA Fisheries)
- U.S. Fish and Wildlife Service
- State Historic Preservation Officer (SHPO) of the Massachusetts Historical Commission (MHC)
- Massachusetts Executive Office of Energy and Environmental Affairs
- Massachusetts Department of Environmental Protection
- Massachusetts Department of Fish and Game
- Massachusetts Office of Coastal Zone Management

To date, FHWA and MassDOT have hosted seven meetings with the Cooperating Agencies. These meetings were to ensure timely participation and agreement from the Cooperating Agencies at important steps or checkpoints in the EIS process, including the Program's purpose and need, alternatives to be carried forward, permitting schedule, impact assessment methodologies, Preferred Alternative, and preliminary mitigation. At each checkpoint, the Cooperating Agencies provided their reviews. FHWA and MassDOT incorporated their comments before proceeding to the next step of the EIS process.

## Section 106 Consulting Parties

Section 106 of the National Historic Preservation Act (Section 106) (54 Unites States Code [USC] 306108) requires a federal agency with direct or indirect jurisdiction over a proposed federal or federally assisted undertaking (project) or with licensing or permitting authority to take into account the effects of the project on historic properties, including (but not limited to) archaeological resources and historic districts, buildings, and structures that are listed in or eligible for listing in the National Register of Historic Places. Section 106 regulations prescribe a consultation process that FHWA, as the

lead federal agency, must follow to "avoid, minimize, or mitigate" adverse effects to historic properties that could be caused by the Program.

FHWA initiated the Section 106 process with SHPO/MHC in March 2023. In addition to SHPO/MHC, FHWA and MassDOT identified the following Consulting Parties to provide advice and guidance to during the Section 106 process regarding the identification of historic properties and assessment of effects to those properties:

- Tribal Historic Preservation Officer (THPO) of the Wampanoag Tribe of Gay Head (Aquinnah)
- THPO of the Mashpee Wampanoag Tribe
- THPO of the Narragansett Indian Tribe
- Chairperson of the Herring Pond Wampanoag Tribe
- Executive Director of the Massachusetts Commission on Indian Affairs
- Massachusetts Board of Underwater Archaeological Resources
- Massachusetts Executive Office of Energy and Environmental Affairs
- Bourne Historical Commission
- Sandwich Historical Commission
- Cape Cod Commission
- U.S. Army Corps of Engineers
- National Trust for Historic Preservation
- Advisory Council on Historic Preservation

FHWA and MassDOT held two meetings with the Section 106 Consulting Parties to identify properties within the Program's Areas of Potential Effect, review and confirm the assessments of potential effects to those properties, and resolve adverse effects through the development of a Programmatic Agreement. Refer to **Section 4.16, Cultural Resources**, for a detailed discussion of the Section 106 process and effects determination.

## Advisory Group

As part of its agency and public outreach process, MassDOT assembled an Advisory Group that comprises elected officials, local and regional organizations, and other stakeholder interest groups. The Advisory Group provides a platform for MassDOT to communicate with key stakeholders and gather community feedback during the Program development process. As of April 15, 2026, MassDOT has hosted nine meetings with the Advisory Group. Input and concerns provided by the Advisory Group have been used to inform MassDOT's decisions throughout Program development.

# 5 What is the format of the FEIS?

The FEIS format follows that of the DEIS and is organized into nine chapters, which are supplemented by technical reports and materials. Overall, there were few substantive changes to the impact assessment as provided in the DEIS. For the FEIS, new or revised text is generally blue with a dotted underline; however, in some cases, such as for section headers and table headers, new text is identified only by a dotted underline.

The chapters included in this FEIS are as follows:

- **Chapter 1, Introduction**, provides background information and context for the Program, including the history of Cape Cod Canal and its bridge crossings, past planning studies and decisions that were foundational to Program development and the EIS, and descriptions of the existing Sagamore and Bourne Bridges and their supporting roadway network. **Chapter 1** is supplemented by **Appendix 1, National Environmental Policy Act Actions**.
- **Chapter 2, Program Purpose and Need**, explains why the Program is being undertaken and what problems or unsatisfactory conditions it intends to address or improve.
- **Chapter 3, Proposed Action and Alternatives**, describes the alternatives retained for detailed study, including identification of the Preferred Alternative. It also identifies other alternatives that were considered but dismissed from further evaluation, including reasons for dismissal. **Chapter 3** is supplemented by the following:
  - **Appendix 3.1, Alternatives Assessments Technical Report, including Attachment 1, Cape Cod Bridges Program Alternatives Analysis Report; and Attachment 2, Highway Interchange Approach Alternatives Assessment Report**
  - **Appendix 3.2, Construction Approach Technical Report, including Attachment 1, Existing Conditions Plans; Attachment 2, Proposed Conditions Plans; Attachment 3, Tree Clearing Plans; Attachment 4, Construction Schematics; Attachment 5, Landscaping Plans.**
- **Chapter 4, Affected Environment, Environmental Consequences, and Mitigation**, describes elements of the natural, social, and economic environments that may be affected by the alternatives; the anticipated effects of the alternatives on these environments; and measures to avoid, minimize, and mitigate adverse effects, where applicable. Chapter 4 is supplemented by technical reports for individual sections, as appropriate, which are listed in **Section 4.1, Introduction**.
- **Chapter 5, Final Section 4(f) Evaluation**, discusses the potential effects of the Build Alternative on significant public parks, recreational areas, and historic properties in compliance with Section 4(f) of the U.S. Department of Transportation Act of 1966. **Chapter 5** is supplemented by the following appendices, each of which includes attachments:
  - **Appendix 5.1, Sagamore Bridge: Section 4(f) Programmatic Evaluation for a Historic Bridge**
  - **Appendix 5.2, Bourne Bridge: Section 4(f) Programmatic Evaluation for a Historic Bridge**
  - **Appendix 5.3, *De Minimis* Determination for Use of Cape Cod Canal Historic District**

  - **Appendix 5.4, *De Minimis* Determination for Use of South Sagamore Area**
  - **Appendix 5.5, Section 4(f) Parks and Recreation *De Minimis* Determination Support Documentation**
- **Chapter 6, Agency Coordination and Public Involvement**, summarizes agency coordination and public involvement activities conducted by FHWA and MassDOT leading up to and during the NEPA review process. **Chapter 6** is supplemented by the following:
  - **Appendix 6.1, Agency Coordination and Public Involvement Technical Report**
  - **Appendix 6.2, Responses to Environmental Impact Statement Scoping Comments**
  - **Appendix 6.3, Responses to Draft Environmental Impact Statement Comments**
- **Chapter 7, Authorizations, Permits, and Approvals**, identifies federal authorizations and state permits and approvals that are required for the Program prior to construction.
- **Chapter 8, Distribution List**, identifies the agencies, organizations, Consulting Parties, and individuals to whom the FEIS has been distributed.
- **Chapter 9, List of Preparers**, identifies the organizations and individuals responsible for preparing the EIS.

# 6 What is a Combined FEIS/ROD?

A Combined FEIS/ROD integrates the FEIS and ROD into a single document. A ROD is a formal written document in which a federal agency announces its decision on a proposed action that has been evaluated as an EIS under the NEPA environmental review process. The ROD identifies the alternative selected for implementation, summarizes the environmental impacts of the selected alternative, describes the measures that will be implemented to avoid or minimize those impacts, and explains the basis for, in this case, FHWA's decision.

The Program has been reviewed under the One Federal Decision framework as established in 23 USC 139, *Efficient Environmental Reviews for Project Decisionmaking and One Federal Decision*, which stipulates that federal agencies combine the FEIS and ROD into a single document to streamline the environmental review and approval process. Accordingly, pursuant to 23 Code of Federal Regulations (CFR) 771.124, FHWA's regulations implementing NEPA, FHWA is issuing a combined FEIS/ROD for the Program. This Executive Summary is part of the FEIS (Volume 1). The ROD is included as Volume 2 of the combined FEIS/ROD.

# 7 What prior studies were used to inform the planning and development of the EIS?

The EIS for the Program builds upon two foundational studies, including USACE's Cape Cod Canal Highway Bridges Major Rehabilitation Evaluation and MassDOT's Cape Cod Canal Transportation Study.

Based on extensive interagency collaboration throughout the development of these foundational studies, USACE and MassDOT developed and refined a Memorandum of Understanding regarding the Sagamore and Bourne Bridges and their highway approaches infrastructure. An overview of these studies and the Memorandum is provided in the following sections.

## USACE Cape Cod Canal Highway Bridges Major Rehabilitation Evaluation

In 2016, USACE began a multi-year study to assess the existing condition of the Sagamore and Bourne highway bridges and determine whether major rehabilitation or replacement of either or both bridges would provide the most reliable, financially responsible solution for future access across Cape Cod Canal.

USACE considered different alternatives during the early stages of the study to address the deteriorating condition of the bridges. These alternatives included:

- Maintenance and repair of both bridges (No Action)
- Major rehabilitation for both bridges
- Replacement of one or both bridges with four lanes each
- Replacement of one or both bridges with four through-travel lanes and two acceleration/ deceleration lanes each
- Replacement of both bridges with a single bridge
- Construction of a new third highway bridge by others
- Replacement of one or both bridges with a tunnel(s)
- Replacement of one or both bridges with low level draw spans or causeways
- Deauthorization and closure of the canal

The study led to the publication of a Major Rehabilitation Evaluation Report (MRER) and an Environmental Assessment (EA) under NEPA by USACE in March 2020. FHWA and MassDOT participated as Cooperating Agencies in the development of the reports. The MRER/EA concluded that replacement of the Sagamore and Bourne highway bridges with new bridges (each with four through-travel lanes and two auxiliary lanes), built to modern highway design standards, is the most reliable, financially responsible solution for the future. In March 2022, pursuant to NEPA, USACE formally issued a Finding of No Significant Impact for the MRER/EA to replace the Sagamore and Bourne highway bridges.

## MassDOT Cape Cod Canal Transportation Study

In 2015, MassDOT began a multi-year study to assess mobility needs in the Cape Cod Canal area. The study recommended:

- Targeted upgrades to local intersections and implementation of Transportation System Management measures

- Major roadway improvements at Belmont Circle, Bourne Rotary, and U.S. Route 6 Exit 1C (now Exit 55)
- Bicycle, pedestrian, and multimodal enhancements
- Reconstruction of approach roadways to the Sagamore and Bourne Bridges

The study also considered two public-private partnership (P3) alternatives for a new highway connection from State Route 25 to U.S. Route 6, including a new bridge crossing of the Cape Cod Canal and a new highway connection from State Route 25 to State Route 3. These alternatives were dismissed due to potential impacts on residential areas, environmental resources, and sensitive tribal lands. The final study was published by MassDOT in October 2019.

## Memorandum of Understanding between USACE and MassDOT regarding Sagamore and Bourne Bridges

USACE and MassDOT established a Memorandum of Understanding regarding Sagamore and Bourne Bridges and their highway approach infrastructure. Initially developed in June 2018, the Memorandum was updated in July 2020 and again in March 2024. It states that USACE will continue to operate and maintain the existing Sagamore and Bourne Bridges until MassDOT demolishes them. MassDOT will serve as the lead project delivery agency with responsibility to construct and subsequently own, operate, and maintain the completed bridges and approaches as part of the state highway network.

# 8 What is the purpose and need for the Program?

Based upon the analysis and findings of the foundational documents, and in coordination with FHWA, Cooperating Agencies, and the public, MassDOT developed the Program's Purpose and Need Statement. The "purpose" of the Program is to improve cross-canal mobility and accessibility between Cape Cod and mainland Massachusetts for all road users and to address the increasing maintenance needs and functional obsolescence of the aging Sagamore and Bourne Bridges.

The following "needs" summarize the transportation problems or unsatisfactory conditions the Program intends to address or improve:

**Address the deteriorating condition and escalating maintenance demands of the bridges.**

The Sagamore and Bourne Bridges, both serving traffic since 1935, have deteriorated over time and are now beyond their functional service lives. Both bridges require frequent and costly maintenance by USACE due to their age, heavy traffic demands, and setting within the corrosive saltwater environment of Cape Cod Canal. Routine maintenance activities require lane closures, which typically restrict traffic to one lane in each direction for extended periods of time. These lane closures result in heavy backups for travelers waiting to cross the bridges, with traffic queues extending for several miles along the highway approaches and local roadways.

**Address the substandard roadway design of the bridges and their immediate approaches.**

The 1930s-era Sagamore and Bourne Bridges do not meet current MassDOT bridge and highway design standards for key characteristics, such as travel lane widths, median barrier separation, shoulder widths, and roadway grades. The 10-foot-wide travel lanes on the bridges are narrower than the standard 12-foot-wide lanes typically used on highways. The bridges lack physical separation between opposing traffic lanes and shoulders to provide emergency vehicle access and refuge for vehicle breakdowns or crashes. The roadway grades along the approaches to the bridges, up to 6% in some sections, are steeper than the 4% to 5% maximum grade typical for limited access highways.

**Improve traffic operations.**

The Sagamore and Bourne Bridges were designed to handle considerably less traffic volumes than they do today. High traffic volumes and substandard features of the bridges (narrow travel lanes, lack of shoulders, and steep grades) result in poor traffic operations, congestion, and high crash rates. According to traffic analyses for the base year 2019 condition, the bridges and their highway approaches operate at unacceptable levels (traffic volumes are at or exceed the capacity of the roadway) in the morning and afternoon peak travel periods during the fall weekday off-peak tourist season. With projected growth in traffic volumes in future years, operating conditions are expected to worsen over time.

**Improve accommodations for pedestrians and bicyclists.**

The Sagamore and Bourne Bridges provide a single raised sidewalk with grades of up to 6%, which do not comply with current Americans with Disabilities Act (ADA) accessibility standards. There are no dedicated accommodations for bicycle travel on the bridges. The lack of shoulder or physical separation between the roadway and sidewalks along the bridges poses safety risks for non-motorized bridge users. Also, gaps exist in the current sidewalk and bicycle network surrounding the bridges.

# 9 What alternatives are evaluated in the EIS?

Using the Cape Cod Canal Transportation Study and USACE's MRER/EA as the foundational planning documents, FHWA and MassDOT screened the initial alternatives presented in the MRER/EA. This screening analysis confirmed USACE's recommendation to replace the highway bridges with new bridges built to modern highway design standards.

FHWA and MassDOT determined that replacing both existing highway bridges with new bridges (each with four through-travel lanes and two auxiliary lanes) that comply with modern highway design standards is the only reasonable Build Alternative for further consideration in the EIS. This determination is consistent with the USACE MRER/EA alternatives evaluation.

Two alternatives are evaluated in the EIS: a No Build Alternative and a Build Alternative. Although the No Build Alternative would not meet the Program's purpose and need, in accordance with NEPA requirements, it was retained as a baseline against which the effects and benefits of the Build Alternative can be compared.

## No Build Alternative

The No Build Alternative would leave the existing Sagamore and Bourne Bridges in their current alignment and roadway configuration of four 10-foot-wide travel lanes (two in each direction), with one 6-foot-wide sidewalk and a 2-foot-wide safety curb. USACE would continue operation and maintenance of each bridge and make any repairs needed to maintain safety (fix-as-fails). There would not be any major rehabilitation or replacement of major bridge components, nor any roadway improvements that are proposed for the Build Alternative. The No Build Alternative would include recently completed and proposed transportation improvement projects identified in the Federal Fiscal Year 2026-2030 Transportation Improvement Program for the Cape Cod Metropolitan Planning Organization.

## Build Alternative

To develop the Build Alternative for detailed study in the EIS, FHWA and MassDOT conducted engineering assessments on multiple bridge and highway design parameters. MassDOT's evaluations consisted of qualitative and quantitative analyses of Program design parameters relative to the

Program's purpose and need, engineering and design criteria, and other factors, including environmental effects, public safety, and cost.

**Table ES-1** summarizes the Build Alternative based on preferred bridge design parameters and highway interchange approach options for the Program quadrants.

Table ES-1. Cape Cod Bridges Program Build Alternative

| Program Element/ Program Design Parameter | Description of Program |
|---|---|
| Highway Bridges | Replacement of both highway bridges with new bridges with four through-traffic lanes and two auxiliary lanes (in-kind bridge replacement, updated to comply with federal and state highway and design safety standards). |
| Highway Bridge Cross-Section and Shared-Use Path | Each replacement highway bridge span would provide two 12-foot-wide through-travel lanes (one in each direction), one 12-foot-wide entrance/exit (auxiliary) lane, a 6-foot-wide median shoulder, and a 12-foot-wide exterior shoulder.<br>Each crossing location would include one bidirectional pedestrian and bicycle shared-use path, separated from vehicular traffic by the shoulder and barrier. The usable width of the shared-use path would be 14 feet wide on the bridge main spans, 20 feet wide on the interchange approaches, and 12 feet wide on the connecting roadways. |
| Bridge Vertical and Horizontal Clearances | The replacement bridges would maintain the existing vertical clearance of 135 feet above mean high water and account for 3.3 feet of fluctuations in relative sea level, thereby providing a vertical clearance of 138.3 feet above mean high water.<br>The replacement bridges would provide a minimum of 500 feet of horizontal channel width consistent with the authorized navigational channel width and existing conditions. |
| Main Span Length and Bridge Pier Location | The replacement bridges would have a main span length of 720 feet, which would locate the bridge piers at the waterline adjacent to the service road (shoreline piers) into the riprap slope but above the low tide line. |
| Bridge Deck Configuration | Each bridge (Sagamore and Bourne) would have two separate decks (twin structures). |
| Mainline Alignment | The mainline alignment locations at both bridges would be offline inboard. Both spans of the replacement highway bridges would be outside the footprint of the existing bridge, 7 feet apart and parallel to each other (offline), and on the side of Cape Cod Canal between the existing bridges (inboard). The replacement main spans at the Sagamore crossing would be west of the existing Sagamore Bridge toward Buzzards Bay. The replacement main spans at the Bourne crossing would be east of the existing Bourne Bridge toward Cape Cod Bay. |
| Bridge Type | The replacement bridges would be steel twin network tied-arch bridges, with delta frames supporting a720-foot mainline span. |

| Program Element/ Program Design Parameter | Description of Program |
|---|---|
| Interchange Approach Network | Interchange approach improvements at each bridge would be as follows:<br>• Sagamore Bridge Crossing: Direct connection to State Road in the Sagamore North quadrant and Westbound On-Ramp Under U.S. Route 6 with Sandwich Road Extension in the Sagamore South quadrant<br>• Bourne Bridge Crossing: Directional Interchange in the Bourne North quadrant and a Diamond Interchange in the Bourne South quadrant |
| Interchange Approach Network: Sagamore North Quadrant | The selected interchange approach option for the Sagamore North quadrant is: Direct Connection to State Road (Option SN-8A). Option SN-8A would provide a single exit point from a relocated U.S. Route 6/ State Route 3. It would remove the Sagamore Bridge northbound off-ramp connection to Scenic Highway/Meetinghouse Lane eastbound, and instead it would connect to State Road, north of Scenic Highway/Meetinghouse Lane. The remaining ramp connections would remain similar to existing conditions with geometric adjustments to meet the new mainline location. A double roundabout would replace the signalized intersection of Scenic Highway/Meetinghouse Lane/ State Road/Canal Street. Signalized intersections along Scenic Highway would be modified for new lane configurations. The intersection of State Road at the State Route 3 northbound on-ramp would be modified to accommodate the addition of the new State Route 3 northbound off-ramp and installation of a traffic signal.<br><br>Option SN-8A would provide a shared-use path on the U.S. Route 6 eastbound main span that would provide connections to the south side of Scenic Highway, Canal Street, and Canal Service Road. This option would provide shared-use paths along the southern side of Scenic Highway and Meetinghouse Lane, as well as along the eastern side of State Road to Homestead Avenue and Canal Street to Bourne Park and Ride. |

| Program Element/ Program Design Parameter | Description of Program |
|---|---|
| Interchange Approach Network: Sagamore South Quadrant | The selected interchange approach option for the Sagamore South quadrant is: Westbound On-Ramp Under U.S. Route 6 with Sandwich Road Extension (Option SS-3.1A).Option SS-3.1A would include Cranberry Highway Extension and would relocate the westbound on-ramp so it would share the same entrance point as the eastbound on-ramp off Mid-Cape Connector. Modifications to lane arrangements at the intersections of Mid-Cape Connector with Sandwich Road and Cranberry Highway Extension would accommodate the revised traffic patterns resulting from the extension of Cranberry Highway and the relocation of access to U.S. Route 6 (Scenic Highway) eastbound, including modifications to the existing traffic signals. There would be a connection from Cranberry Highway to Sandwich Road east of the new mainline bridge (Sandwich Road Connector).<br>A roundabout would be provided at the intersection of the U.S. Route 6 westbound off-ramp with Cranberry Highway. An additional roundabout would be provided along Cranberry Highway, providing access to Market Basket (Factory Outlet Road). There would be an access driveway to the former Christmas Tree Shops area.<br>Option SS-3.1A would include a shared-use path on the U.S. Route 6 eastbound main span that would provide connections to Factory Outlet Road, Sandwich Road, and Canal Service Road. Pedestrian and bicycle improvements would also be included on Cranberry Highway. This option would add a new connection through Cranberry Highway Extension to Mid-Cape Connector. |

| Program Element/ Program Design Parameter | Description of Program |
|---|---|
| Interchange Approach Network: Bourne North Quadrant | The selected interchange approach option for the Bourne North quadrant crossing is: Directional Interchange (BN-14.4b).<br>Option BN-14.4b would provide a combination of direct connection ramps between State Route 25 and U.S. Route 6 (Scenic Highway). The ramp connecting State Route 25 eastbound to Scenic Highway would be a flyover ramp passing over Nightingale Road and merging with the on-ramp from Belmont Circle before meeting up with the State Route 25 mainline. The ramp connecting Scenic Highway eastbound to State Route 25 eastbound would be a flyover ramp passing over Scenic Highway, allowing vehicles to bypass Belmont Circle and eliminating the need for an additional traffic signal. This ramp would use one of the travel lanes on Scenic Highway and be a free-flowing movement to reduce congestion.<br>The existing interchange ramp over the State Route 25 bridge would be relocated to widen the bridge and allow for this new southbound to eastbound ramp movement. The existing southbound off-ramp would be revised to be an option lane, improving the geometry and decision sight distance for drivers. The intersection control at Scenic Highway/Nightingale Road/Andy Oliva Drive would be a single-lane roundabout.<br>The new flyover ramp over Scenic Highway would provide a shared-use path and grade-separated crossing for pedestrians and bicyclists. The Scenic Highway Lane configuration would be reduced from four lanes to three lanes, which would provide additional space for multimodal accommodations. It would provide one continuous 12-foot-wide shared-use path along the south side of Scenic Highway connecting to Belmont Circle and a 6-foot-wide sidewalk along the north side of Scenic Highway. |
| Interchange Approach Network: Bourne South Quadrant | The selected interchange approach option for the Bourne South quadrant is: Diamond Interchange (BS-2).<br>Option BS-2 would eliminate Bourne Rotary and replace it with a grade-separated diamond interchange, which would allow through movements on State Route 28 to bypass intersections with the non-mainline roadways. The two intersections within the diamond interchange would be a single-lane dogbone roundabout. Changes to the Trowbridge Road and Sandwich Road underpass in this option would consist of a roundabout at a relocated Upper Cape Cod Regional Technical High School driveway entrance.<br>Option BS-2's shared-use path improvements would include providing connections to Trowbridge Road, Sandwich Road, Canal Service Road, and Bourne Recreation Area. |

# 10 What is the Preferred Alternative?

The Preferred Alternative for the Cape Cod Bridges Program is the Build Alternative: replacement of the Sagamore and Bourne Bridges with twin steel network tied-arch bridges built to modern highway design standards, together with reconfiguration of the highway interchange approach networks at both crossings.

The Build Alternative was identified as the Preferred Alternative in the DEIS. Following full consideration of environmental impacts and public and agency comments received on the DEIS, the FEIS confirms this identification in accordance with NEPA requirements.

Representative renderings of the proposed replacement bridges are presented in **Exhibit ES-1** and **Exhibit ES-2**. Maps of the preferred interchange approach options at each quadrant, including shared-use path connections, are provided as follows:

- **Figure ES-2.** Sagamore North Quadrant Crossing: Option SN-8A, Direct Connection to State Road
- **Figure ES-3.** Sagamore South Quadrant Crossing: Option SS-3.1A, Westbound On-Ramp Under U.S. Route 6 with Sandwich Road Extension
- **Figure ES-4.** Bourne North Quadrant Crossing: Option BN-14.4b, Directional Interchange
- **Figure ES-5. Bourne** South Quadrant Crossing: Option BS-2, Diamond Interchange

**Chapter 3** further discusses the Preferred Alternative. Proposed conditions plans are included in **Appendix 3.2, Attachment 2**.

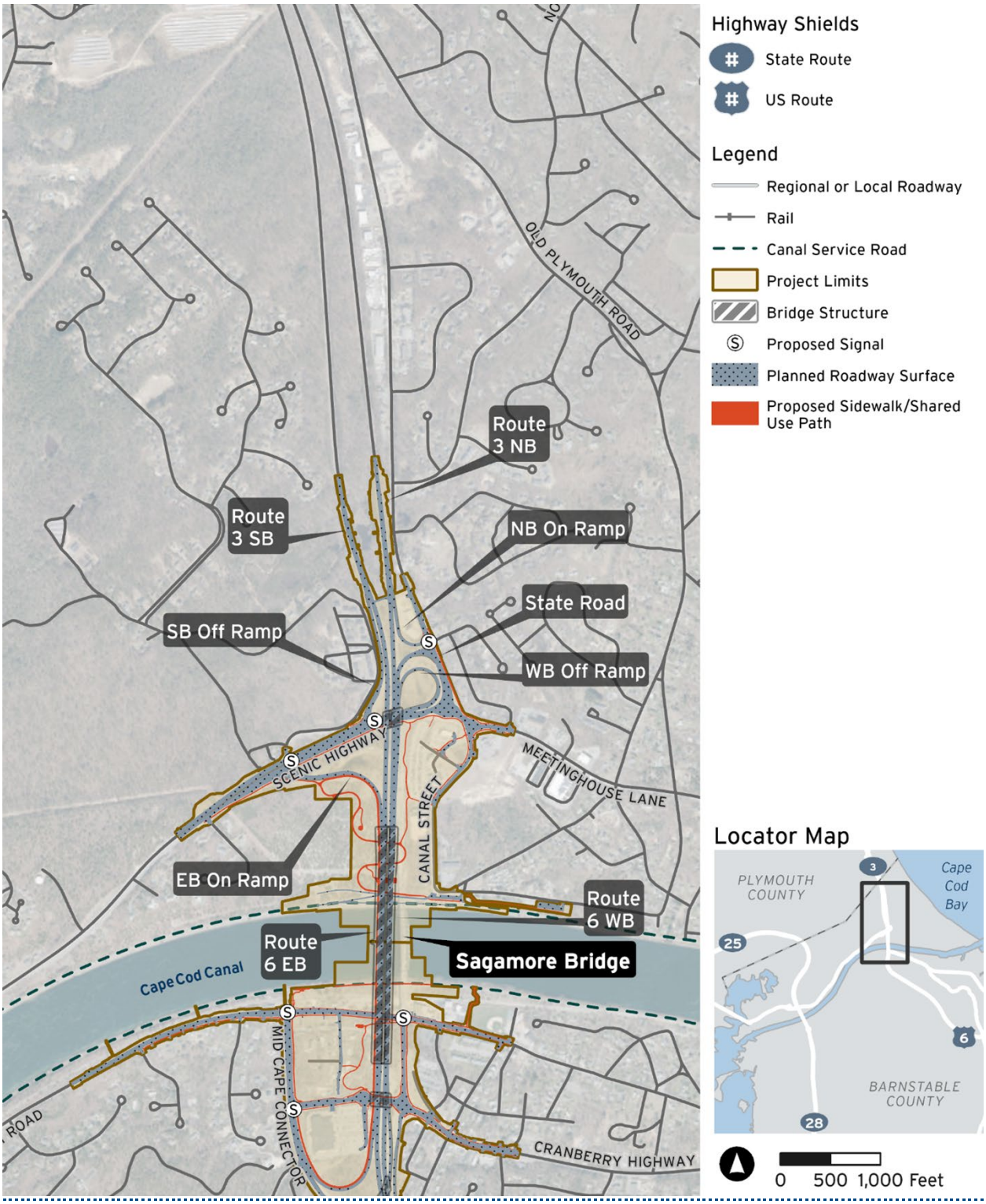
Exhibit ES-1. Proposed Replacement Bridge: Cape Cod Canal Viewpoint

Source: Massachusetts Department of Transportation, 2024

Exhibit ES-2. Proposed Replacement Bridge: Driver Viewpoint

Source: Massachusetts Department of Transportation, 2024

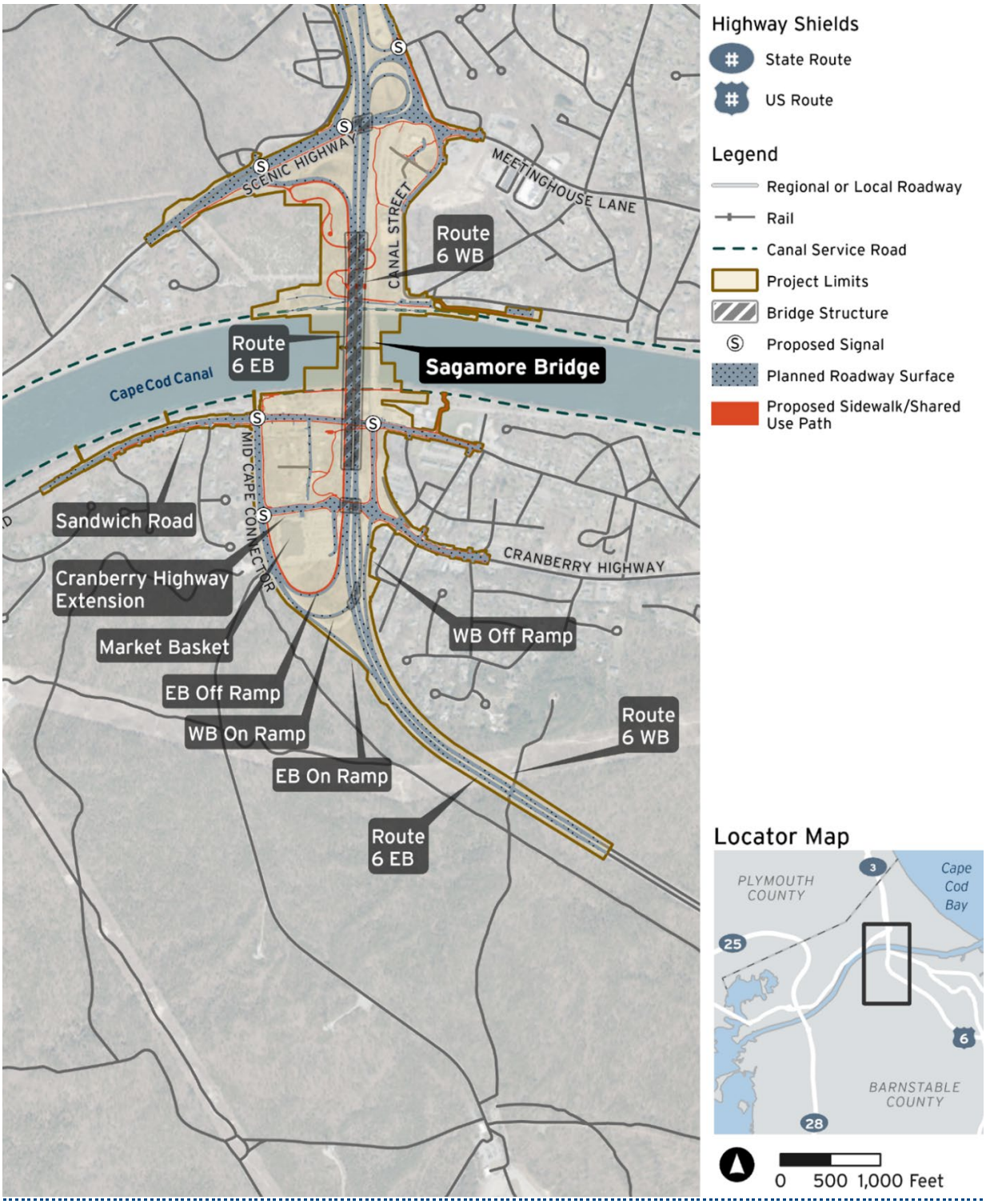
Figure ES-2. Sagamore North Quadrant Crossing: Option SN-8A, Direct Connection to State Road




Source: Massachusetts Department of Transportation, 2025

EB = eastbound, NB = northbound, SB = southbound, WB = westbound

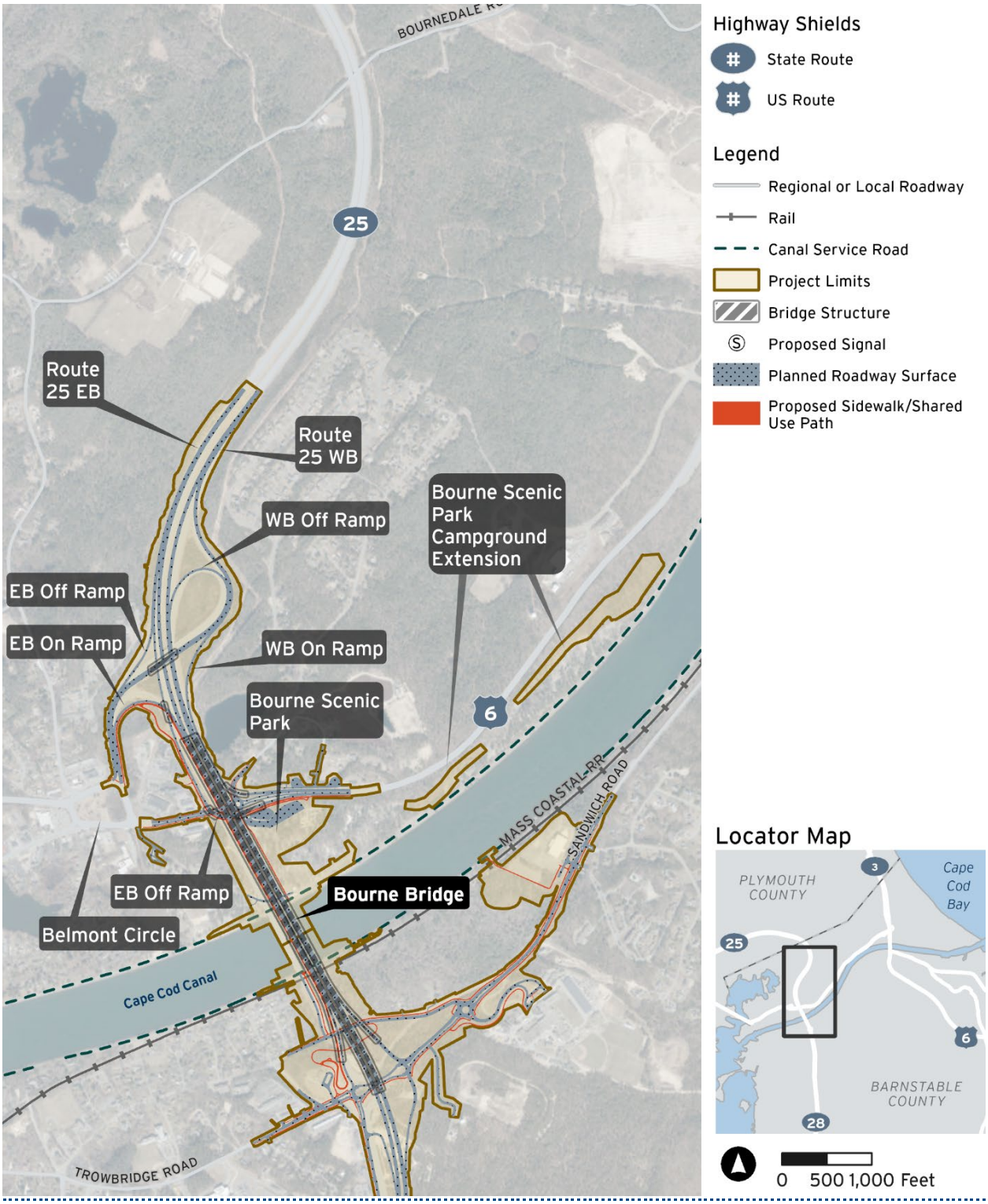
Figure ES-3. Sagamore South Quadrant Crossing: Option SS-3.1A, Westbound On-Ramp Under U.S. Route 6 with Sandwich Road Extension




Source: Massachusetts Department of Transportation, 2025

EB = eastbound, WB = westbound

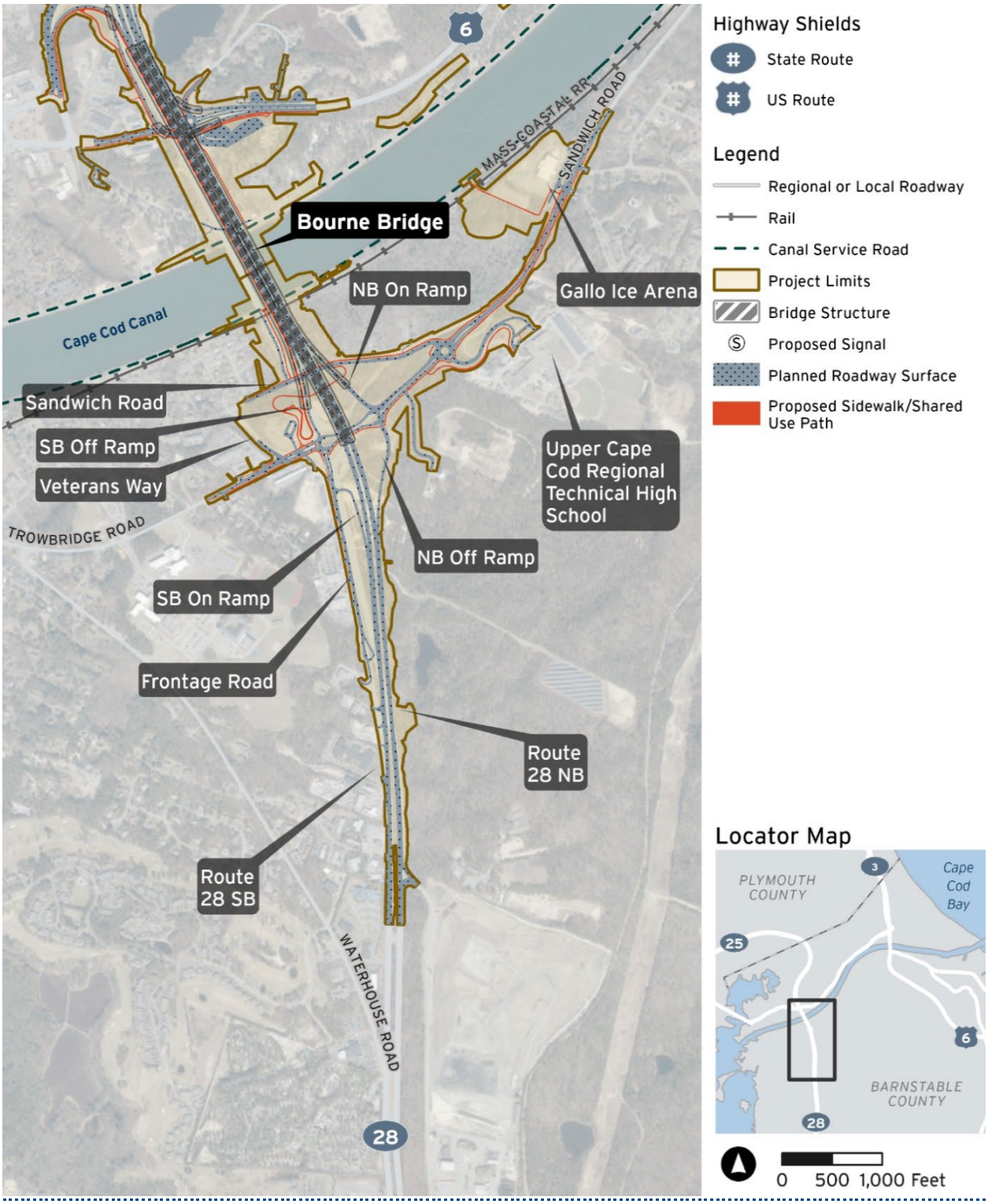
Figure ES-4. Bourne North Quadrant Crossing: Option BN-14.4b, Directional Interchange




Source: Massachusetts Department of Transportation, 2025

EB = eastbound, WB = westbound

Figure ES-5. Bourne South Quadrant Crossing: Option BS-2, Diamond Interchange




Source: Massachusetts Department of Transportation, 2025

NB = northbound, SB = southbound

MassDOT determined that the Preferred Alternative — incorporating the preferred bridge design options and the preferred highway interchange approach options — would fully meet the Program's needs. **Table ES-2.** lists the Program needs and identifies the operational benefits of the Preferred Alternative.

Table ES-2. Evaluation of the Preferred Alternative Relative to Program Needs

| Program Need | Evaluation of the Preferred Alternative |
|---|---|
| Address the deteriorating structural condition and escalating maintenance demands of the Cape Cod Canal highway bridges. | **This need would be met.**<br>The Preferred Alternative would replace the aging Sagamore and Bourne Bridges with new structures designed to modern engineering, safety, and resiliency standards. New bridges would provide long-term structural reliability, reduce unplanned closures and maintenance-related traffic disruptions, and ensure safe and dependable access to and from Cape Cod.<br>With both replacement highway bridges, MassDOT would implement the optimal construction sequence of removing all traffic from the existing bridge and discontinuing its use following construction of the first replacement main span, thereby minimizing the risk of disruptive maintenance and/or rehabilitation of the existing bridges.<br>**Additional operational benefits** would include compatible ramp framing and mainline framing systems at both crossings, allowing for the most efficient and simplest structural system to accommodate the interchange ramps. In particular, the preferred highway interchange network options in the Sagamore quadrants would accelerate the removal of traffic and discontinue use of the existing Sagamore Bridge, minimizing the potential for a disruptive maintenance program and/or rehabilitation of the existing bridge. |
| Address the substandard design elements of the Cape Cod Canal highway bridges, the immediate mainline approaches and their adjacent interchanges and intersections. | **This need would be met.**<br>The highway bridges and approaches would comply with American Association of State Highway and Transportation Officials (AASHTO) highway and bridge design specifications and MassDOT design standards.<br>**Additional operational benefits** would include geometric improvements and safety features. For example, the preferred highway interchange network would minimize weaving movements; improve merge/weave distances on the mainline; minimize deceleration speed variances between ramps and the mainline; and geometrically restrict the potential for wrong-way driving, such as through replacement of Bourne Rotary with a diamond interchange and a direct connection from State Route 25 to Scenic Highway eastbound. |

| Program Need | Evaluation of the Preferred Alternative |
|---|---|
| Improve vehicular traffic operations. | **This need would be met**.<br>The Preferred Alternative would improve vehicular traffic operations compared to the No Build Alternative, including reduced regional and local travel times and improved cross-canal mobility, measured by vehicle hours traveled.<br>**Additional operational benefits** would include interchange improvements designed to separate local and regional traffic. For example, with the preferred highway interchange network, Sagamore Bridge westbound traffic destined for State Road would be removed from the Meetinghouse Lane/Canal Street intersection, a new Cranberry Road extension and new connection between Sandwich Road and Cranberry Highway would improve local traffic conditions with more direct access between neighborhoods and Market Basket, and regional drivers traveling to and from mid-Cape via Scenic Highway could bypass Belmont Circle, thereby reducing traffic at Belmont Circle. |
| Improve accommodations for pedestrians and bicyclists. | **This need would be met**.<br>Each crossing location would include one bidirectional pedestrian and bicycle shared-use path.<br>**Additional operational benefits** would include improved pedestrian and bicycle access adjacent to local roads and existing trail facilities and at ramp terminals, resulting in an overall enhanced experience for pedestrians and bicyclists. For example, the preferred highway interchange network would provide grade separation for pedestrians and bicyclists over Scenic Highway, increase access and connectivity to neighborhoods through shared-use paths, and minimize the number of ramp and intersection crossings for pedestrians and bicyclists. |

# 11 How has the Preferred Alternative been refined since the DEIS?

Between the publication of the DEIS and FEIS, MassDOT refined the Preferred Alternative in response to public and agency comments, further development of preliminary design, and additional coordination with agencies and community stakeholders. The purpose of these refinements was to further avoid or minimize environmental impacts, enhance multimodal connectivity, improve constructability and traffic management during construction, and respond to issues raised during the DEIS comment period. MassDOT further developed the Program's aesthetic design features, with a focus on context-sensitive design, and landscaping plan to compensate for the disturbance and clearing required for the Program, including bridge replacements and connections to the local roadway networks on the mainland and Cape Cod. Additionally, MassDOT revised the Program Limits to

incorporate further development of preliminary design and mitigation measures for impacts to public parks and recreation areas (Section 4(f) resources).

**Table ES-3** presents a summary of the refinements that have been incorporated into the Preferred Alternative since the publication of the DEIS and evaluated in the FEIS.

Table ES-3. Summary of Preferred Alternative Refinements Evaluated in the FEIS

| Program Quadrant | Program Element | Type of Change | Summary of Change to Program Since the Draft Environmental Impact Statement |
|---|---|---|---|
| All | Riprap pier protection system | Design update | Expansion of existing/restored shoreline riprap and installation of riprap pier protection on the three waterward sides of the pier bases supporting the main arch span (Piers 4 and 5 at Sagamore Bridge and Piers 5 and 6 at Bourne Bridge). |
| | Intersection control type | Design update | Identification of preferred intersection control type at each program intersection. |
| | Bicycle signals at signalized crossings | Design update | Installation of bicycle signals at all signalized crossings within the Program Limits. |
| | Accessible pedestrian and bicycle wayfinding | Design update | Installation of trapezoidal delineators to define the boundary between the sidewalk and bicycle facilities along the Sagamore and Bourne Bridge structures and approaches. |
| | Shared-use path features and amenities | Design update | Development of coordinated features and amenities for pedestrian and bicycle zones and shared-use paths, including site furnishings and wayfinding signage and interpretive panels. |
| | Revised stormwater design | Design Update | Revisions to stormwater control measures. |
| | Landscaping Plan | Design Update | Development of landscaping plan to repair, restore, and enhance the landscape flanking the mainline highways, bridges, and local roads and connections. |
| Sagamore North | Sagamore Recreation Area expansion | Section 4(f) mitigation measure | Expansion of recreation area boundary by 0.63 acres and construction of a new parking lot to the east of existing parking lot within the U.S. Army Corps of Engineers' (USACE) property. |
| | Shared-use path at Bourne Park and Ride expansion | Design update | Reconfiguration of the shared-use path around the Bourne Park and Ride to provide a continuous 12-foot-wide path along the perimeter of the entire parcel. |

| Program Quadrant | Program Element | Type of Change | Summary of Change to Program Since the Draft Environmental Impact Statement |
|---|---|---|---|
| | Shared-use path approach alignments | Design update | Realignment of the shared-use path approaches east and west of Sagamore Bridge to improve transitions to local roadways and provide a more direct, linear path to the Sagamore Bridge walkway. |
| Sagamore South | New shared-use path connection to south Canal Service Road | Design update | Construction of a new at-grade shared-use path connection and railroad crossing to south Canal Service Road across from the Mid-Cape Connector and Sandwich Road intersection. MassDOT will continue coordination with federal, state, and local entities regarding the location and features of the shared-use path railroad crossing. |
| Bourne North | Bourne Scenic Park east side expansion | Section 4(f) mitigation measure | Expansion of the park boundary by 12 acres, to the east of the existing park within USACE's property, to provide new campsites, playground, and bathhouse. |
| | Bourne Scenic Park east side and entrance improvements | Section 4(f) mitigation measure | Reconstruction of the existing park entrance from U.S. Route 6, including vehicle queuing lanes, and construction of a new gatehouse, office building, and park amenities. |
| | Bourne Scenic Park new west side entrance | Section 4(f) mitigation measure | Construction of a new west side park entrance from U.S. Route 6 and gate house, and construction of park amenities. |
| Bourne South | Bourne Recreation Area relocation | Section 4(f) mitigation measure | Relocation of the 4.1-acre recreation area within USACE's property on and abutting the Gallo Ice Arena parcel and relocation of the Bourne Train Station platform. |
| | New shared-use path connection to south Canal Service Road | Design update | Construction of a new at-grade shared-use path connection and new access to south Canal Service Road at the relocated Bourne Recreation Area. MassDOT will continue coordination with federal, state, and local entities regarding the location and features of the shared-use path railroad crossing. |
| | New shared-use path connection to south Canal Service Road | Design update | Construction of a new at-grade shared-use path connection and railroad crossing to south Canal Service Road at Bourne Bridge. MassDOT will continue coordination with federal, state, and local entities regarding the location and features of the shared-use path railroad crossing. |

| Program Quadrant | Program Element | Type of Change | Summary of Change to Program Since the Draft Environmental Impact Statement |
|---|---|---|---|
| | Expansion of Gallo Ice Arena parcel | Section 4(f) mitigation measure | Redesignation of 3.14 acres within USACE's Cape Cod Canal Federal Navigation Project to the Bourne Recreation Authority-leased Gallo Ice Arena parcel. |
| | Expansion of the shared-use path from Upper Cape Cod Regional Technical High School to Gallo Ice Arena | Design update | Construction of two 12-foot-wide shared-use paths along both sides of Sandwich Road connecting Upper Cape Cod Regional Technical High School to Gallo Ice Arena, and installation of pedestrian-scale lighting, wayfinding signage, and rectangular rapid-flashing beacons at Sandwich Road crossing points. |
| | Entrance improvements at Gallo Ice Arena | Design update | Reconfiguration of the entrance to Gallo Ice Arena, including provision of right-in, right-out access from Sandwich Road. |

# 12 What are the potential effects of the Preferred Alternative and how will adverse effects be mitigated?

**Table ES-4** summarizes the potential long-term operational effects of the Build Alternative relative to environmental resources and topics evaluated in the EIS, compared to the No Build Alternative. **Table ES-5** summarizes the potential effects of temporary construction-related activities for the Build Alternative. Both tables incorporate mitigation measures and commitments to address potential adverse effects of the Build Alternative, where applicable.

Table ES-4. Summary of the Preferred Alternative's Potential Operational Effects and Mitigation

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Transportation, Traffic, and Safety (Section 4.2)** | **Commuter Parking:** No change to existing conditions. The Bourne Park and Ride Lot would continue to operate with its current capacity and configuration | **Commuter Parking:** Permanent loss of 12 parking spaces within MassDOT's Bourne Park and Ride Lot due to realignment of Scenic Highway and construction of a shared-use path on the south side of Scenic Highway; the lot would be reduced from 396 to 384 spaces | No mitigation proposed. Continue coordination with local and regional partners to assess the need for replacement parking and ensure functionality of the lot is maintained. |
| | **Rail Transit Facilities:** No changes to existing conditions | **Rail Transit Facilities:** Removal of the Bourne Train Station on the Cape Main Line to accommodate construction of the replacement Bourne Bridge | Relocate the Bourne Train Station within the new Bourne Recreation Area west of Gallo Ice Arena to include a new bus loop and approximately 24 parking spaces to support transit operations and short-term parking needs; a larger parking lot accommodating up to 100 vehicles for rail users, recreational visitors, and rideshare activities; a new 24-foot-wide roadway providing access from Sandwich Road; and a shared-use path connection. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| | **Traffic Operations:** Under the No Build Alternative, future 2050 traffic conditions would continue to experience congestion and delay during peak periods within the Traffic Focus Area and Regional Study Area | **Traffic Operations:** 26% reduction in travel times (vehicle hours traveled) within the Traffic Focus Area during the fall weekday PM peak hour, compared to the 2050 No Build Alternative. No intersections within the Traffic Focus Area or Regional Study Area are projected to experience a decline in Level of Service (LOS) to a level at or above capacity (LOS E or LOS F), compared to the 2050 No Build Alternative | **Beneficial Effect** – No mitigation proposed |
| | **Traffic Safety:** Retains the existing configuration of Sagamore and Bourne Bridges and their approaches, with no improvements to current safety conditions | **Traffic Safety:** Predicted crash reductions on the bridges are estimated to reach up to 48%, based on safety performance metrics and crash modification factors associated with the proposed improvements. The Build Alternative also incorporates safety enhancements identified in prior MassDOT road safety audits, further supporting long-term crash reduction and improved user safety | **Beneficial Effect** – No mitigation proposed |
| **Pedestrian and Bicycle Facilities (Section 4.3)** | Continuation of ongoing safety and mobility problems due to poor conditions on the bridges and lack of connectivity between the bridges and the surrounding road network, including the Canal Service Roads | Improved pedestrian and bicycle facilities within the Program Limits on the new bridges with connections to new shared-use paths and pedestrian and bicycle accommodations adjacent to the local roadways | **Beneficial Effect** – No mitigation proposed |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Maritime Transportation, Traffic, and Safety (Section 4.4)** | Reduced capacity to accommodate the largest vessels using the canal over time, no improvement in navigation safety, potential adverse effect to navigation due to channel closures required by bridge maintenance activities | • Improved navigability and navigational safety due to an effective increase in horizontal clearance and rip rap pier protection system<br>• No effect to maximum vessel class types and sizes currently using the canal | **Beneficial Effect** – No mitigation proposed |
| | No new bridge construction | Permanent construction of new bridges across navigable Waters of the United States | • Construct vertical and horizontal bridge clearances through the navigable channel of Cape Cod Canal in accordance with USCG's Preliminary Navigation Clearance Determination, dated March 11 2025.<br>• Submit plans to the USCG for permanent navigation lights on the replacement bridges in accordance with 33 CFR Part 118. |
| **Socioeconomics (Section 4.5)** | Anticipated adverse effects to worker productivity, local business employment, tourism, and freight costs due to worsening traffic congestion and future traffic delays associated with continued maintenance of the bridges | Increased economic output, value added, jobs, and labor income due to travel time savings and improved mobility and accessibility | **Beneficial Effect** – No mitigation proposed |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Land Use, Zoning, and Community Cohesion (Section 4.6)** | **Land Use**: No changes to land use or development patterns | **Land Use**: Alteration of 328.10 acres of land, consisting of:<br>• 146.77 acres of tree clearing;<br>• 76.33 acres of existing pavement; and<br>• 105.00 acres of previously disturbed areas. | • Minimize tree clearing and grading by using steeper safe slopes, existing disturbed corridors, and tree-preservation measures.<br>• Construct MassDOT/USACE access roads with pervious gravel to limit new impervious area.<br>• Provide approximately 185.83 acres of new landscaping and vegetation to repair, restore and enhance the landscape.<br>• Install tree protection fencing at grading limits and adjust disturbance boundaries to preserve existing conditions where feasible.<br>• Incorporate low-impact stormwater features (e.g., vegetated swales, infiltration basins) to offset impervious impacts.<br>• Restore unused acquired areas to pre-existing conditions after land-based construction. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| | **Community Cohesion:** Worsening traffic congestion and the lack of pedestrian and bicycle connectivity within the Study Areas would result in reduced community connectivity and diminished access to recreational opportunities, leisure activities, cultural events, and historical sites, hindering community cohesion in the town of Bourne | **Community Cohesion:** Improved access, mobility, and connectivity within the Study Areas would strengthen community cohesion and provide quality of life benefits for surrounding neighborhoods | • **Beneficial Effect** – No mitigation proposed |
| **Community Facilities (Section 4.7)** | No property acquisition | Property acquisitions (partial fee takings, permanent easements and temporary easements) from community facility locations including:<br>• United States Postal Service (Sagamore South<br>• State Police Station D7 (Bourne South)<br>• Bourne High School, Bourne Intermediate School, Bourne Middle School (Bourne South)<br>Upper Cape Cod Regional Technical High School (Bourne South) | Adhere to the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) for all property acquisitions |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Property Acquisition, Displacement, and Relocation (Section 4.8)** | No changes to current conditions | • Full acquisition of 30 parcels; partial acquisition of 59 parcels<br>• Permanent and/or temporary easements on 143 parcels, consisting of 53 partial acquisitions and 90 easements<br>• Displacement of 26 property owners, consisting of 17 residential displacements, 7 commercial displacements, and 2 personal property displacements | • Comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, 1971, and Massachusetts General Laws, primarily Chapter 79.<br>• Prepare relocation plans as a planning tool, including identifying advisory services, financial support, and steps for securing replacements.<br>• Phase relocations to secure suitable housing for all displaced residents. To the extent feasible, MassDOT will collaborate with local builders to keep relocated families close together, maintaining neighborhood cohesion.<br>• Identify tailored mitigation solutions in coordination with property owners affected by easements or partial acquisitions. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Wetlands and Floodplains (Section 4.9)** | No changes to current conditions | • Approximately 3.8 acres of permanent impact to tidal waters of the U.S.<br>• Approximately 6,350 square feet of permanent impact to non-tidal (inland) vegetated wetlands<br>• Approximately 2,130 cubic feet of flood storage lost within inland floodplain | Develop and implement compensatory mitigation to replace the loss of floodplain, wetland, and aquatic resource functions per federal and state regulatory requirements |
| **Water Quality and Stormwater (Section 4.10)** | • No changes to current conditions<br>• Stormwater runoff would remain largely untreated | Increase of approximately 52.3 acres of impervious area, resulting in potential increased surface runoff, higher peak flows during storm events, higher pollutant loads, and reduced groundwater discharge | Design, implement, and maintain stormwater control measures, including infiltration basins and bioretention areas/rain gardens, to comply with the Massachusetts Stormwater Management Standards. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Threatened, Endangered, and Protected Species and Habitats (Section 4.11)** | Continued baseline conditions, with the U.S. Army Corps of Engineers (USACE) coordinating protections with federal agencies during bridge and canal maintenance activities | • Loss of suitable summer habitat for northern long-eared bats and tricolored bats due to tree removal<br>• Direct or indirect and temporary or permanent stressors to aquatic resources, including underwater noise, entrapment, changes in water quality/turbidity, benthic disturbance, reduction in fish passage, habitat alteration and/or conversion, and vessel interaction<br>• Loss of existing submerged aquatic vegetation at the Bourne Bridge site | • Incorporate multiple mitigation measures and best management practices, including time-of-year restrictions, to minimize effects to terrestrial- and aquatic-based resources<br>• Coordinate with NOAA Fisheries and implement the Marine Mammal and Sea Turtle Monitoring Plan<br>• Maintain ongoing coordination with the Massachusetts Natural Heritage and Endangered Species Program, including obtaining a Conservation Management Permit as needed<br>• Implement state mitigation requirements and federal mitigation requirements to compensate for the loss of of submerged aquatic vegetation. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Coastal Zone Consistency (Section 4.12)** | Routine bridge maintenance activities and future dredging operations conducted by USACE would be implemented per permit requirements to protect coastal resources | Project requires listed federal actions that have been determined to have reasonably foreseeable effects on coastal uses or resources, thereby subject to federal consistency review by the Massachusetts Office of Coastal Zone Management (CZM). | Prepare and submit Individual Federal Consistency Review determination to MA CZM for approval. |
| **Air Quality (Section 4.13)** | Increased localized carbon monoxide and regional criteria pollutant emissions due to worsening congestion and delays under 2050 traffic volumes | Reduced localized carbon monoxide and regional criteria pollutant emissions due to improved traffic operations and reduced delays | **Beneficial Effect** – No mitigation proposed |
| **Noise and Vibration (Section 4.14)** | A total of 70 noise-sensitive properties are predicted to have traffic noise levels that approach or exceed Federal Highway Administration Noise Abatement Criteria under the 2050 No Build Alternative | A total of 65 sensitive receptors are predicted to experience traffic noise levels that approach or exceed Federal Highway Administration Noise Abatement Criteria in the 2050 Build Alternative:<br>• Sagamore North: 9<br>• Sagamore South: 45<br>• Bourne North: 9<br>• Bourne South: 2 | No mitigation measures are proposed. Noise abatement was not determined to be feasible and reasonable based on FHWA noise regulations in 23 Code of Federal Regulations (CFR) 772 and MassDOT's traffic noise policies. |
| **Visual Resources (Section 4.15)** | • No changes to the visual quality of the bridges<br>• Changes to travelers' viewshed on local and regional roadway networks due to proposed developments | Loss of existing residences and/or introduction of incompatible elements to existing viewsheds at two visual inventory locations, resulting in adverse changes to the visual quality of the areas of visual effect at these locations. | • Design replacement bridges to visually reference the existing bridges, retaining the iconic arch form and proportions while simplifying superstructure elements and incorporating contemporary pier designs compatible with |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| | | | modern construction methods.<br>• Provide context-sensitive bridge lighting that maintains the canal's historic low-light character, using standard roadway and pedestrian lighting and subtle architectural lighting on select bridge elements to enhance aesthetics without visual intrusion.<br>• Incorporate pedestrian viewing platforms and scenic overlooks at each bridge crossing, providing new public vistas of the Cape Cod Canal as a visual natural and cultural resource.<br>• Implement a substantial landscape plan, including recreational features and amenities, to restore the disturbed sites, enhance sight lines and views, screen undesirable areas, and soften the visual impact of new infrastructure to maintain the region's character.<br>• Design shared-use path elements with a coordinated, context-sensitive aesthetic to provide coordinated appearance throughout the Project Limits. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| | | | • Apply visual/aesthetic treatments to high-visibility bridge abutment walls and retaining walls, using different materials to enhance Cape Cod's coastal character and improve visual quality for travelers and neighbors.<br>• Incorporate Section 106 and Section 4(f) mitigation measures as visual enhancements throughout the Project Limits, such as reuse of historic bridge elements, aesthetic bridge treatments, and design features that improve viewsheds and reinforce historic character. |
| **Cultural Resources (Section 4.16)** | No changes to the appearance of the bridges or to other architectural historic properties due to USACE's bridge maintenance and repair program | • Adverse effects due to the demolition of National Register-eligible Sagamore and Bourne Bridges<br>• No adverse effects to the Cape Cod Canal Historic District or historic architectural properties within the viewshed area of potential effect<br>• No adverse effects to the South Sagamore Area due to shared-use path at Keith Field Recreation Area | • Adhere to stipulations in the executed Section 106 Programmatic Agreement to resolve adverse effects associated with demolition of the existing Sagamore and Bourne Bridges.<br>• Salvage, reuse, or adaptively repurpose historic bridge elements, including plaques and other components, consistent with Section 106 and Section 4(f) mitigation |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Public Parks, Recreational Facilities, and Open Space (Section 4.17)** | • Temporary effects to USACE-leased and -operated recreational areas under or immediately adjacent to bridges due to USACE's bridge maintenance and repair program<br>• No effects to other parks, recreational facilities, or open space | Partial parcel acquisition, permanent easements, and/or long-term access agreements on Bourne Scenic Park, Bourne, Recreation Area, Sagamore Recreation Area, Keith Field Recreation Area, and Gallo Ice Arena. | • Implement the mitigation and enhancements at Sagamore Recreation Area, Keith Field Recreation Area, Bourne Scenic Park, relocated Bourne Recreation Area, and Gallo Ice Arena as established through coordination with officials with jurisdiction. |
| **Solid and Hazardous Waste Material Management (Section 4.18)** | Routine maintenance activities would require the removal of lead-containing paint from both bridges | • Potential to encounter hazardous materials in contaminated soil, groundwater, and sediment during excavation, dredging, and construction.<br>• Potential to encounter hazardous material during structure and/or building demolition and construction. | Adhere to applicable laws and regulations governing the removal, handling, storage, and transport of hazardous materials for any future bridge and roadway maintenance activities |
| **Utilities and Services (Section 4.19)** | No long-term effects | Relocation or replacement of water, sewer and septic, gas, electrical, and telecommunications facilities | • Relocate affected water mains in coordination with appropriate water districts.<br>• Develop land damage agreements through the right-of-way process with affected property owners to support restoration of impacted leach fields and septic systems.<br>• Relocate or replace affected sewer facilities within Bourne Scenic Park before the existing |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| | | | facilities are taken out of service.<br>• Coordinate with Enbridge to support its efforts in ensuring that all necessary work by the utility company is completed in advance of the Program.<br>• Relocate or bury and protect electrical lines as needed to avoid construction conflicts and coordinate all work with Eversource.<br>• Relocate or bury and protect telecommunications lines as needed to avoid construction conflicts. Relocate utility poles as needed.<br>• Relocate USACE power, navigation, and signal facilities along Cape Cod Canal into underground ducts prior to demolition of the existing bridges.<br>• Coordinate with utilities that are currently crossing the existing bridges via outgrants with USACE to obtain new agreements via MassDOT's Highway Access Permit. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Public Health (Section 4.20)** | • Declining traffic operations could adversely affect public health due to higher vehicle emissions, increased emergency response times and delays accessing healthcare services.<br>• Lack of accommodations and network connectivity for pedestrians and bicyclists would not support healthy modes of transportation | Beneficial health-related effects due to improved traffic operations, access for emergency vehicles, pedestrian and bicycle network connectivity, and air quality | **Beneficial Effect** – No mitigation proposed |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Adaptation and Resiliency (Section 4.21)** | • Vulnerable to progressive bridge collapse due to the lack of redundancy in steel truss design<br>• Continued vulnerability to fluctuations in sea level<br>• Continued vulnerability of the bridges to winter weather and extreme wind | • Potential for submerged or partially submerged outfalls and infiltration basin flooding due to storm surge in permanent condition.<br>• Potential for flooding of roadways, evacuation routes, and shared-use paths due to fluctuations in relative sea level and storm surge in permanent condition.<br>• Potential for winter weather icing on bridge in permanent condition.<br>• Increased structural redundancy due to replacement network tied-arch bridge types<br>• Raised elevation to establish a vertical clearance of 138.3 feet under existing mean high water conditions<br>• Improved resistance against wind-induced vibrations and deformation due to the replacement network tied-arch bridge types | • Install backflow preventers at seven stormwater control measure infiltration basins or in-pipe tide gates for outfalls, where appropriate, to reduce backflow into infiltration basins.<br>• Update Cape Cod Emergency Traffic Plan to reflect construction and proposed configurations and flows, and potential remaining flood risk at Belmont Circle, including signage and public notices when storms are forecast, as appropriate.<br>• Implement deicing measures for bridge cables in accordance with best management practices. |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| **Indirect Effects (Section 4.22)** | N/A | • Potential unintended introduction of invasive plant species due to construction activities.<br>• Build Alternative would not result in meaningful induced travel demand, and the total number of trips and overall travel demand are anticipated to remain consistent with forecasted conditions.<br>• No potential for induced commercial or residential development based on factors such as high cost of living and housing, seasonal employment, utility and municipal service constraints, and regional transportation bottlenecks. | Include and implement contract specifications for the management and disposal of soil and plant material and the prevention of the spread of invasive species via equipment (per Executive Order 13112). |
| **Section 4(f) Resources (Chapter 5)** | No use of any Section 4(f) properties. | • Use of the following 4(f) recreational resources: Sagamore Recreation Area, Keith Field Recreation Area, Bourne Scenic Park, Bourne Recreation Area, and Gallo Ice Arena.<br>• Use of the following 4(f) NRHP-eligible historic resources:<br>– Sagamore and Bourne Bridges through demolition of the bridges; | • Implement measures to minimize harm at Sagamore Recreation Area, Keith Field Recreation Area, Bourne Scenic Park, Bourne Recreation Area, and Gallo Ice Arena such that the proposed use of each Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures, will not adversely affect the activities, features, or attributes that qualify |

| Environmental Resource/Topic (FEIS Section) | Operational Effects of No Build Alternative | Operational Effects of Build Alternative | Mitigation Measures and Commitments |
|---|---|---|---|
| | | – Cape Cod Canal Historic District through operation of the replacement Sagamore and Bourne Bridges; and<br>– South Sagamore Area due to the shared-use path connection at Keith Field Recreation Area<br>• Loss of NRHP-eligible structures that are contributing resources to the historic district. | the resource for protection under Section 4(f), as established through coordination with officials with jurisdiction.<br>• In coordination with FHWA, MassDOT has conducted all possible planning to minimize harm, including making the existing bridges available for an alternative use, provided a responsible party agrees to maintain and preserve the bridge, and reaching agreement among SHPO, USACE, and FHWA, via the Section 106 Programmatic Agreement, on measures to minimize harm and the incorporation of them into the project. |

Table ES-5. Summary of the Build Alternative's Potential Temporary Construction Effects and Mitigation

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Transportation, Traffic, and Safety (Section 4.2)** | • Increased congestion and delays anticipated due to additional construction vehicle trips, work zone interactions, and reduced traffic speeds<br>• Service disruptions to freight and seasonal passenger train operations along Cape Main Line Corridor | • Prepare and implement a comprehensive Transportation Management Plan (TMP) for managing work zone operations and communicating anticipated impacts to roadway users during construction. Components of the TMP will include a temporary traffic control plan (TTCP), transportation operations (TO) strategies, and a Public Involvement and Communication Plan.<br>• Prepare and implement a Public Involvement and Communication Plan as part of the TMP to provide timely information to stakeholders and the traveling public regarding construction activities that could affect freight and seasonal passenger rail operations. |
| **Pedestrian and Bicycle Facilities (Section 4.3)** | Temporary closure of sections of the Canal Service Roads, Scenic Highway, and Sandwich Road during construction | • Establish and maintain temporary pedestrian and bicycle detours, wherever practicable, to ensure safe travel around work zones.<br>• Deploy closure warning signage in coordination with the U.S. Army Corps of Engineers (USACE).<br>• Install fencing and barricades to prevent pedestrian access into construction work zones, where appropriate.<br>• Maintain coordination with the public as part of the TMP to ensure timely communication of any upcoming closures, detours, and access changes. |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Maritime Transportation, Traffic, and Safety (Section 4.4)** | Construction equipment and/or vessel encroachment into the 480-foot-wide federal navigation channel | • Coordinate with the USACE Marine Traffic Controller and U.S. Coast Guard.<br>• Maintain a minimum navigational width of 350 feet for vessel passage<br>• Coordinate with USCG during construction plan development for a determination of temporary lighting needs. |
| | Six short-term, full closures of Cape Cod Canal associated with the float-in and float-out activities during construction | • Advise the public of in-water construction work through the Cape Cod Bridges Program (Program) website.<br>• Maintain ongoing communication with the Town of Bourne Harbormaster, U.S. Coast Guard, and USACE regarding channel closures, to facilitate their advance notifications to mariners and use of temporary aids to navigation.<br>• Meet with marinas and marine-related users as needed. |
| **Wetlands and Floodplains (Section 4.9)** | Potential erosion and sedimentation of wetlands and waterbodies due to ground disturbing and demolition activities | Prepare, implement, and maintain a comprehensive Stormwater Pollution Prevention plan (SWPPP) in accordance with U.S. Environmental protection Act National Pollutant Discharge Elimination System (NPDES) requirements, ensuring the identification, control, and ongoing monitoring of potential pollution sources associated with stormwater runoff. |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Water Quality and Stormwater (Section 4.10)** | Potential sedimentation of waterbodies due to soil disturbance and runoff, impacting water quality and aquatic habitats | Prepare, implement, and maintain a comprehensive Stormwater Pollution Prevention plan (SWPPP) in accordance with U.S. Environmental protection Act National Pollutant Discharge Elimination System (NPDES) requirements, ensuring the identification, control, and ongoing monitoring of potential pollution sources associated with stormwater runoff. |
| **Threatened, Endangered, and Protected Species and Habitats (Section 4.11)** | • Potential effects to terrestrial and aquatic species due to in-water construction activities, including vessel activity<br>• Potential effects to terrestrial species due to permanent tree clearing within suitable habitats for federal and state listed and protected species<br>• Potential effects to terrestrial species due to demolition of existing buildings and bridge abutments | • Confine in-water work to approved in-water work windows<br>• Implement protocols and best management practices to protect terrestrial and aquatic species and habitats |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Air Quality (Section 4.13)** | • Increases in construction-period emissions due to operation of diesel-powered construction equipment and marine vessels, and fugitive dust emissions from demolition and ground disturbing activities.<br>• Potential generation of airborne lead dust and particulate matter due to bridge demolition and work involving painted steel | • Adhere to MassDOT's Diesel Emission Control Specifications, which requires the use of cleaner fuels, verified emission control technologies, and strict idling limits for construction equipment to reduce diesel emissions during construction.<br>• Adhere to MassDOT's Dust Control Specification, which requires proactive measures, such as regular watering of exposed soils, covering loads, cleaning paved surfaces, and preparation and implementation of an approved Dust Control Plan<br>• Adhere to MassDOT's Standard Specifications for demolition activities including painted steel, which requires development and implementation of a site-specific plan with monitoring and other protective measures to prevent potential exposure of workers and surrounding receptors to airborne contaminants. |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Noise and Vibration (Section 4.14)** | • Exceedances of one or more of MassDOT's construction noise limits at sensitive receptors due to the operation of construction equipment, demolition activities, and pile driving:<br>– Daytime: 194 receptors<br>– Evening: 568 receptors<br>– Nighttime: 628 receptors<br>• Potential for structural damage and exceedances of Federal Transit Administration land-use category annoyance thresholds based on the distance between vibration generating construction activities and nearby receptors. | • Prepare and implement a Noise Control Plan to establish procedures for predicting construction noise levels before performing construction activities, including identification of noise reduction measures required to meet the noise level limitations and minimize nuisance noise conditions.<br>• Prepare and implement a Vibration Control and Mitigation Plan to identify nearby structures susceptible to vibration impacts, establish monitoring procedures, and define measures to minimize the impacts of construction vibration. |
| **Visual Resources (Section 4.15)** | Visual impacts due to staging areas, construction lighting, and vegetation clearing | • Stabilize and protect disturbed areas during construction through seeding, erosion controls, and tree/plant protection measures while minimizing fugitive light near residential areas.<br>• Restore all disturbed areas at the completion of construction. |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Cultural Resources (Section 4.16)** | Disturbance of areas with low archaeological sensitivity | • Provide plans at the 75% and 100% design stages for review by the MassDOT Archaeologist to determine the need for additional archaeological survey.<br>• Require further consultation in coordination with MassDOT Archaeologist for any potential expansion of construction area of potential effects.<br>• Include a special provision in the construction contract for the Discovery of Unanticipated Archaeological and Skeletal Remains. |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| **Public Parks, Recreational Facilities, and Open Space (Section 4.17)** | Temporary easements on Bourne Recreation Area, Sagamore Recreation Area, Keith Field Recreation Area, and Sandwich Road Conservation Area. | • Coordinate with the Bourne Conservation Commission to minimize construction effects at Sandwich Road Conservation Area.<br>• Implement measures to minimize harm established in coordination with officials with jurisdiction, including USACE for Sagamore Recreation Area; the Town of Bourne for Keith Field Recreation Area; the Bourne Recreation Authority and USACE for Bourne Scenic Park and Gallo Ice Arena; and USACE for Bourne Recreation Area, including temporarily relocating park uses.<br>• Adhere to MassDOT's Standard Specifications which require contractors to protect existing property and restore all areas disturbed by construction, including implementing pollution prevention measures, conducting vibration monitoring, maintaining drainage systems, preserving roadside vegetation, and returning temporary easement areas to pre-construction conditions. |
| **Solid and Hazardous Waste Material Management (Section 4.18)** | • Potential to encounter hazardous materials in contaminated soil, groundwater, and sediment during excavation, dredging, and construction.<br>• Potential to encounter hazardous material during structure and/or building demolition and construction. | • Conduct Phase I and, if needed, Phase II Environmental Site Assessments prior to finalizing land acquisitions, to identify potential environmental liabilities.<br>• Use a MassDEP Licensed Site Professional to oversee work within areas of known or suspected contamination.<br>• Complete pre-demolition hazardous building materials surveys and require abatement, as needed, by appropriately certified personnel.<br>• Prepare and implement a Sediment Sampling and Analysis Plan to |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| | | identify the presence of contaminants in anticipated dredge material to inform the need for special management considerations during construction.-<br>• Develop and implement a Soil and Groundwater Management Plan identifying procedures for the field screening, classification, and proper handling of soil and groundwater generated during excavation activities.<br>• Develop and implement a site-specific Environmental Health and Safety Plan to identify potential hazards and necessary measures to protect the health and safety of employees, the public, and the environment during construction.<br>• Develop and implement an Asbestos and Lead Paint Abatement Work Plans to ensure proper management of asbestos and lead-based materials during construction.<br>• Require valid licensing and training certifications for personnel involved in lead and asbestos removal.<br>• Develop and implement a Spill Prevention Plan to minimize impacts from accidental spills or releases of oil and hazardous materials during construction.<br>• Comply with regulatory requirements for the management of contaminated groundwater under the Massachusetts Contingency Plan or U.S. Environmental Protection Agency's Dewatering and Remediation General Permit.<br>• Perform underground storage tank relocation/removal during |

| FEIS Section | Temporary Construction Effects | Mitigation Measures and Commitments |
|---|---|---|
| | | construction in accordance with MassDEP's Underground Storage Tank Program. |
| **Utilities and Services (Section 4.19)** | Short-term service disruptions due to utility relocations | • Coordinate with local water authorities to restore water systems and minimize service disruptions.<br>• Coordinate with Bourne Sewer Department, Bourne Recreation Authority, and property owners to minimize sewer service disruptions, ensuring affected facilities are relocated or replaced before existing infrastructure is taken out of service.<br>• Coordinate with Eversource and property owners to minimize short-term electrical outages.<br>• Coordinate with USACE to ensure new connections from USACE utilities to the proposed bridges are made prior to demolition of the existing bridges. |

# 13 What are the effects of the Preferred Alternative on Section 4(f) properties?

Section 4(f) of the U.S. Department of Transportation Act of 1966, commonly referred to as Section 4(f), protects publicly owned parks, recreation areas, and wildlife and waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing in the National Register of Historic Places from "use" by transportation projects that receive funding from or require approval by an agency of the U.S. Department of Transportation.

**Table ES-6** summarizes the effects of the Build Alternative on Section 4(f) properties and the proposed approval option to comply with Section 4(f), including *de minimis* impact determinations and programmatic Section 4(f) evaluations.

Table ES-6. Summary of Effects, Uses, and Section 4(f) Approval Option

| Section 4(f)-Protected Property | Build Alternative Impacts | Section 4(f) Approval Option |
|---|---|---|
| Sagamore Bridge | Demolition | Programmatic Section 4(f) Evaluation and Approval for Federal Highway Administration Projects that Necessitate the Use of Historic Bridges (Nationwide Historic Bridges Programmatic Evaluation) |
| Bourne Bridge | Demolition | Nationwide Historic Bridges Programmatic Evaluation |
| Cape Cod Canal Historic District | Replacement of Sagamore and Bourne Bridges within the District, including construction and operation of transportation infrastructure, requiring temporary occupancy and permanent easements within the Cape Cod Canal Federal Navigation Project (FNP). | *De Minimis* Impact Determination, based on the "No Adverse Effect" recommendation under Section 106 of the National Historic Preservation Act |
| South Sagamore Area | Fee takings and permanent utility easements for operation and maintenance of the Sagamore Bridge Project | *De Minimis* Impact Determination |
| Sagamore Recreation Area | Temporary easement during construction and permanent easement for operation and maintenance of the Sagamore Bridge Project | *De Minimis* Impact Determination |
| Keith Field Recreation Area | Permanent easement for operation and maintenance of the Sagamore Bridge Project | *De Minimis* Impact Determination |

| Section 4(f)-Protected Property | Build Alternative Impacts | Section 4(f) Approval Option |
|---|---|---|
| Bourne Scenic Park | Temporary easement during construction and permanent easement for operation and maintenance of the Bourne Bridge Project | *De Minimis* Impact Determination |
| Bourne Recreation Area | Permanent easement for operation and maintenance of the Bourne Bridge Project | *De Minimis* Impact Determination |
| Gallo Ice Arena | Temporary easement during construction and permanent easement for operation and maintenance of the Bourne Bridge Project | *De Minimis* Impact Determination |

FHWA and MassDOT, in coordination with the officials with jurisdiction over the resources, have identified measures to minimize harm, including mitigation and enhancement measures, to these Section 4(f) protected properties. The agreed-upon measures to minimize harm to Section 4(f) protected parkland, recreational areas, and historic sites are included in the FEIS and ROD.

# 14 What authorizations, permits, and approvals will be required?

**Table ES-7** lists the federal authorizations and state permits and approvals that are required prior to implementation of the Program.

Table ES-7. List of Required Federal and State Authorizations, Permits, and Approvals

| Authorization, Permit, or Approval | Issuing Agency |
|---|---|
| Issuance of Combined Final Environmental Impact Statement/Record of Decision under the National Environmental Policy Act | Federal Highway Administration |
| Finding under Section 4(f) of the U.S. Department of Transportation Act | Federal Highway Administration |
| Consultation under Section 7 of the Endangered Species Act | • U.S. Fish and Wildlife Service<br>• National Oceanic and Atmospheric Administration/National Marine Fisheries Service |
| Consultation under the Fish and Wildlife Coordination Act | • U.S. Fish and Wildlife Service<br>• National Oceanic and Atmospheric Administration/National Marine Fisheries Service |
| Consultation under the Magnuson-Stevens Fishery Conservation and Management Act | National Oceanic and Atmospheric Administration/National Marine Fisheries Service |

| Authorization, Permit, or Approval | Issuing Agency |
|---|---|
| • Issuance of Section 408 permission under Section 14 of the Rivers and Harbors Act of 1899<br>• Issuance of permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act | U.S. Army Corps of Engineers |
| Issuance of Bridge Permits under the General Bridge Act of 1946 | U.S. Coast Guard |
| Approval of Notice of Proposed Construction or Alteration under Title 14 of the Code of Federal Regulations Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace | Federal Aviation Administration |
| • Issuance of National Pollutant Discharge Elimination System – Construction General Permit under Section 402 of the Clean Water Act<br>• Issuance of public comments on the Draft and Final Environmental Impact Statement under Section 309 of the Clean Air Act | U.S. Environmental Protection Agency |
| Issuance of Secretary Certificate on the Final Environmental Impact Report under the Massachusetts Environmental Policy Act | Massachusetts Executive Office of Energy and Environmental Affairs |
| Programmatic Agreement under Section 106 of the National Historic Preservation Act among FHWA, USACE, State Historic Preservation Officer, and MassDOT | Federal Highway Administration |
| Federal Consistency Review under the Coastal Zone Management Act | Massachusetts Office of Coastal Zone Management |
| Issuance of Water Quality Certification under the Massachusetts 401 Water Quality Certification Regulations | Massachusetts Department of Environmental Protection |
| Issuance of a Conservation and Management Permit under the Massachusetts Endangered Species Act | Massachusetts Division of Fisheries and Wildlife – Natural Heritage and Endangered Species Program |
| Issuance of an Order of Conditions under the Massachusetts Wetlands Protection Act | Bourne Conservation Commission |

# 15 What is the construction plan and approach?

MassDOT proposes to use a "best value" design-build procurement method for construction of the Program to accelerate project delivery, better control costs and schedule, promote innovation, and reduce overall risk. Design-build is a construction delivery system that combines design and construction services within a single contract and can "fast-track" the overall construction process. Under this approach, MassDOT will award a single contract based on the highest overall value, considering both cost and quality. The design-build team will be required to complete final design and construction in compliance with all regulatory permits and approvals and in accordance with MassDOT design standards and specifications.

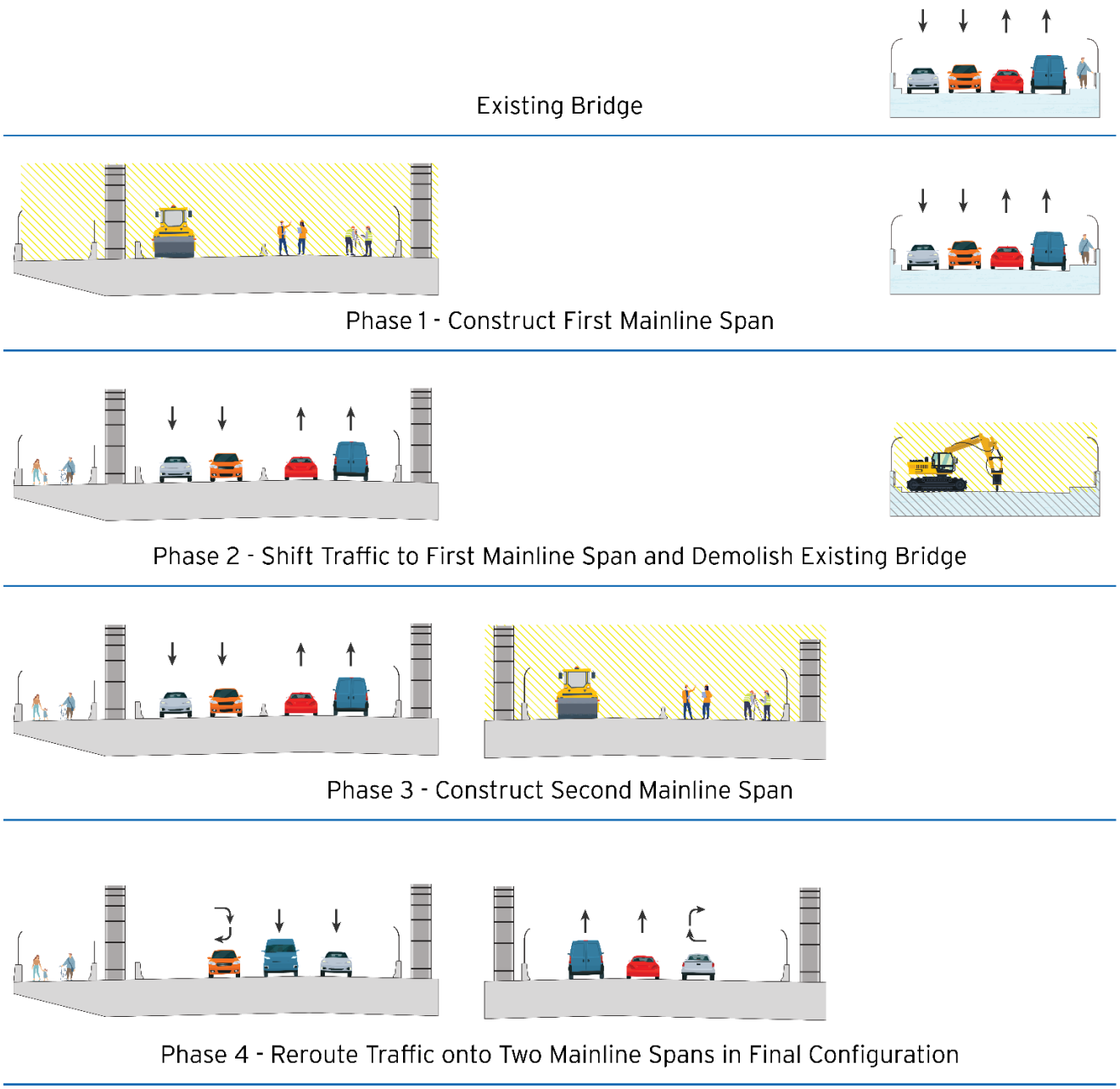
**Figure ES-6** presents a simplified schematic of the Program's bridge construction sequencing approach, illustrating four key phases that apply to both bridges. The replacement bridges would be constructed offline (outside the footprint of the existing bridges) and inboard (on the side of the canal between the two existing bridges, toward the center of the canal crossing area) of the existing highway bridges. Sagamore Bridge would be replaced first followed by Bourne Bridge. At each site, the inboard main span would be constructed first. At the Sagamore Bridge site, this would be the westernmost bridge, which would ultimately carry traffic onto Cape Cod. For the Bourne Bridge site, this would be the easternmost bridge, which would ultimately carry traffic off Cape Cod. After construction of the first new span, all traffic would be shifted onto it so the existing bridge could be demolished, and the second main span would be constructed.

The Program's construction sequencing approach is a critical element of the design of the highway bridges, interchanges, and surrounding local roadway network. The construction sequencing goals for the Program include the following:

- Remove traffic from the existing bridge as quickly as possible.
- Maintain existing roadway and ramp connections throughout the construction duration.
- Avoid the need for construction detours.
- Reduce or minimize traffic shifts.
- Maintain pedestrian and bicycle connectivity.

Early construction activities would include tree removal, demolition of structures on acquired properties, and site mobilization. Additional information on the construction approach is provided in **Appendix 3.2, Construction Approach Technical Report**.

Figure ES-6. Proposed Bridge Construction Sequencing Approach




Source: Massachusetts Department of Transportation, 2025

# 16 What are the next steps for the Program?

MassDOT is completing applications for federal and state permits and approvals for the Sagamore Bridge Project, identified in **Chapter 7**, and is involved in ongoing consultations with the agencies. Following receipt of the necessary permits and approvals, MassDOT will initiate the design-build procurement process for the Sagamore Bridge Project.

The Sagamore Bridge Project is fully funded through a combination of federal grants, including funding from the U.S. Army Corps of Engineers and the Commonwealth of Massachusetts. MassDOT was selected to receive federal funding for the Sagamore Bridge Project through the Multimodal Project Discretionary Grant and Bridge Investment Program administered by FHWA within the U.S. Department of Transportation.

MassDOT and USACE are actively pursuing funding for the Bourne Bridge Project, including submission of a Bridge Investment Program grant application in August 2025 requesting approximately 50% federal funding, with the remaining 50% to be provided by the Commonwealth of Massachusetts. As of June 2026, MassDOT is awaiting a funding determination from the U.S. Department of Transportation. Funding for the Bourne Bridge Project is reasonably expected to be available through a combination of state and federal sources similar to the Sagamore Bridge Project, including comparable federal grant programs.

The Sagamore Bridge Project is proceeding according to the following schedule:

- **Summer 2026**: Preliminary design complete
- **Fall 2026**: Request for Proposals issued for the design-build contract
- **Winter 2027/Spring 2028**: Design-build contract Notice to Proceed issued
- **Spring 2037**: Substantial construction complete

Construction of the Bourne Bridge Project is anticipated to commence approximately one year after the start of Sagamore Bridge construction, subject to funding.

# 17 How can the public stay involved in the Program?

FHWA and MassDOT are committed to ongoing communication with the public throughout design, procurement, and construction. MassDOT will provide regular updates on program milestones, construction activities, and traffic impacts as the Program advances. The public can continue to stay informed of project updates, including construction progress and milestones, through the **Cape Cod Bridges Program website**.