Cape Cod Bridges Program

Bourne, Massachusetts

Appendix 5.1
Sagamore Bridge: Section 4(f) Programmatic Evaluation for a Historic Bridge

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Table of Contents

Tables

Exhibit

Attachment

Attachment 3: Draft Programmatic Agreement among FHWA - Massachusetts Division, Massachusetts SHPO, Advisory Council on Historic Preservation, New England District of the USACE, and MassDOT for the Cape Cod Bridges Program

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ACHP	Advisory Council on Historic Preservation
CFR	Code of Federal Regulations
FHWA	Federal Highway Administration
MassDOT	Massachusetts Department of Transportation
MHC	Massachusetts Historical Commission
MRER/EA	Major Rehabilitation Evaluation Report/Environmental Assessment
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
Program	Cape Cod Bridges Program
SHPO	State Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation

1 Introduction

As a U.S. Department of Transportation (USDOT) financially supported transportation program through the Federal Highway Administration (FHWA), the Cape Cod Bridges Program (Program) is subject to the regulatory requirements of Section 4(f) of the U.S. Department of Transportation Act of 1966 (USDOT Act), as amended.[1] Section 4(f) of the USDOT Act, commonly referred to as Section 4(f), protects publicly owned parks, recreation areas, and wildlife and waterfowl refuges of national, state, or local significance, or any publicly or privately owned historic site listed or eligible for listing in the National Register of Historic Places (NRHP) from "use" by transportation projects that receive funding from or require approval by an agency of the USDOT. FHWA's regulations for implementing Section 4(f) are available at Title 23 Code of Federal Regulations (CFR) 774.

Sagamore Bridge is a historic site that is eligible for listing on the NRHP; therefore, it qualifies for protection under Section 4(f). The construction and operation of the Program would demolish the bridge, thereby resulting in an "Adverse Effect" to the bridge under Section 106 of the National Historic Preservation Act (NHPA), and a "use" of the bridge under Section 4(f).

This appendix presents an evaluation of the use of Sagamore Bridge under Section 4(f). FHWA and the Massachusetts Department of Transportation (MassDOT) have conducted extensive planning and as a result of review under Section 4(f) and Section 106 of the NHPA, FHWA has determined that the proposed use of Sagamore Bridge meets the criteria for Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges (Nationwide Historic Bridges Programmatic Evaluation).[2] There are no feasible and prudent alternatives to the use of the Section 4(f) resource and the proposed activity includes all possible planning to minimize harm to the Section 4(f) resource.

2 Applicability

The Section 4(f) Regulations at 23 CFR 774.3(d) provide the authority to develop programmatic Section 4(f) evaluations as a time-saving alternative to individual evaluations for certain types of uses. The Nationwide Historic Bridges Programmatic Evaluation may be applied by FHWA when a proposed action will "use" a bridge that is on, or eligible for listing on, the NRHP and when the action will impair the historic integrity of the bridge, either by rehabilitation or demolition. The following presents the specific criteria for the Nationwide Historic Bridges Programmatic Evaluation for Sagamore Bridge:

1. The bridge is to be replaced or rehabilitated with Federal funds.

The replacement of Sagamore Bridge will be supported in part with funds issued by the USDOT.

[1] 49 U.S. Code Section (USC) 303, 23 USC 138

[2] 48 FR 38135-03. https://archives.federalregister.gov/issue_slice/1983/8/22/38134-38140.pdf#page=2.

2. **The project will require the use of a historic bridge structure that is on or is eligible for listing on the NRHP.**

The replacement of Sagamore Bridge will demolish the existing Sagamore Bridge, resulting in the use of a historic bridge structure. Sagamore Bridge was determined eligible for listing on the NRHP on March 6, 1991.

3. **The bridge is not listed as a National Historic Landmark.**

Sagamore Bridge is not listed as a National Historic Landmark by the National Park Service.

4. **The FHWA Division Administrator determines that the facts of the project match those set forth in the sections of this document labeled Alternatives, Findings, and Mitigation.**

This Nationwide Historic Bridges Programmatic Evaluation has been prepared to comply with the requirements as identified in 23 CFR 774 and Section 4(f) guidance documents.

5. **Agreement among the FHWA, the State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) has been reached through procedures pursuant to Section 106 of the NHPA.**

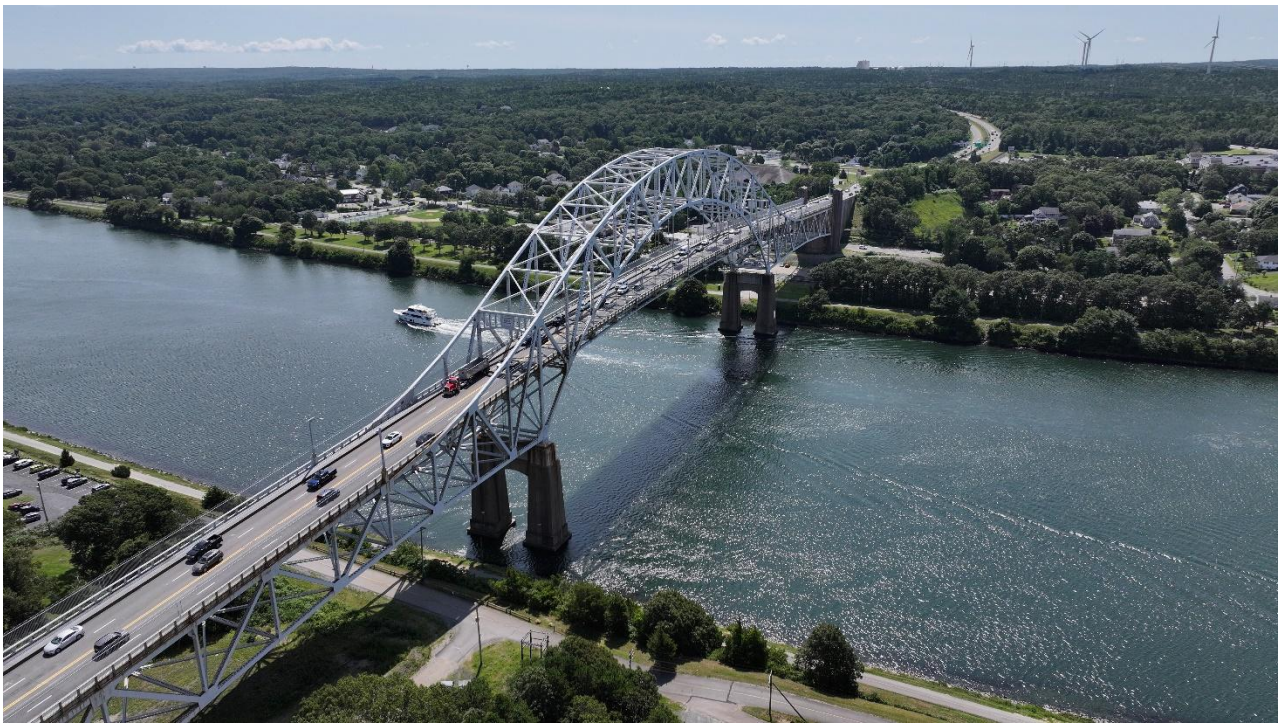
FHWA, MassDOT, U.S. Army Corps of Engineers (USACE), and the Massachusetts SHPO are developing a Programmatic Agreement for the Program to resolve adverse effects to Sagamore Bridge under Section 106 of the NHPA. Documentation of the agreement among FHWA, MassDOT, USACE, and the Massachusetts SHPO will be provided in the combined Final Environmental Impact Statement and Record of Decision. A draft Programmatic Agreement is available in **Appendix 5, Attachment 3**.

3 Description of Sagamore Bridge

Sagamore Bridge (Bridge B-17-005) carries U.S. Route 6 across Cape Cod Canal, Sandwich Road, and the Massachusetts Coastal Railroad in the town of Bourne, Barnstable County, Massachusetts. Along with Bourne Bridge, the USACE constructed Sagamore Bridge between 1933 and 1935 during an extensive reconstruction of Cape Cod Canal to its current width and depth. Both bridges were funded under the National Industrial Recovery Act of 1933 and constructed through the Depression-era Public Works Administration. Sagamore Bridge is a three-span, 1,408-foot-long steel riveted Warren continuous truss bridge. According to the original USACE design drawings, Sagamore Bridge is comprised of three continuous spans with span lengths of 396 feet, 616 feet, and 396 feet.

Sagamore Bridge was determined eligible for inclusion in the NRHP on March 6, 1991. It is included in the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (MHC Inventory), which is managed through the online Massachusetts Cultural Resources Information System, as BOU.918. Additionally, it is a contributing resource to the NRHP-eligible Cape Cod Canal Historic District. **Section 4.16, Cultural Resources**, provides additional details about the historic bridge. **Exhibit 1** presents a view of Sagamore Bridge.

Exhibit 1. View of Sagamore Bridge, facing southeast



Source: Massachusetts Department of Transportation, 2024

4 Impacts, Use, and Section 4(f) Determination

FHWA and USACE, in consultation with SHPO, have determined that demolition of Sagamore Bridge has an Adverse Effect on the NRHP-eligible bridge structure in accordance with 36 CFR 800.5(a)(2)(i), resulting in a use of a Section 4(f)-protected property.

5 Avoidance Alternatives Evaluation

5.1 Summary of Requirements

Avoidance alternatives have been evaluated for the application of the Nationwide Historic Bridges Programmatic Evaluation in compliance with Section 4(f) of the USDOT Act. According to 23 CFR 774.17, alternatives that compromise the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need are not considered prudent.

The Nationwide Historic Bridges Programmatic Evaluation identifies the following avoidance alternatives to be evaluated, as an all-inclusive list:

- Do Nothing.

- Build on a new location without affecting the historic integrity of the old bridge, as determined by procedures implementing NHPA.
- Rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA.

Section 5.1.1 through Section 5.1.3 describe the specific factors presented in the Nationwide Historic Bridges Programmatic Evaluation, whereby alternatives would not be considered feasible and prudent.

5.1.1 Do-Nothing Alternative

The Do-Nothing Alternative is not feasible and prudent because it would neither address nor correct the transportation need cited as the National Environmental Policy Act purpose and need, which necessitated the proposed project.

5.1.2 Build on New Location Without Using the Old Bridge

An alternative that constructs a bridge on a new location or parallel to the old bridge without using the old bridge is not feasible and prudent if one or more of the following would apply:

(a) Terrain – The present bridge structure has already been located at the only feasible and prudent site. To build a new bridge at another site will result in extraordinary bridge and approach engineering and construction difficulty or costs or extraordinary disruption to established traffic patterns.

(b) Adverse Social, Economic, or Environmental Effects – Building a new bridge away from the present site would result in social, economic, or environmental impact of extraordinary magnitude.

(c) Engineering and Economy – Where difficulty associated with the new location is less extreme than those encountered above, a new site would not be feasible and prudent where cost and engineering difficulties reach extraordinary magnitude.

(d) Preservation of Old Bridge – It is not feasible and prudent to preserve the existing bridge, even if a new bridge were to be built at a new location.

5.1.3 Rehabilitation Without Affecting the Historic Integrity of the Bridge

An alternative that rehabilitates the existing bridge without affecting the historic integrity of the bridge is not feasible and prudent if one or more of the following would apply:

(a) The bridge is so structurally deficient that it cannot be rehabilitated to meet minimum acceptable load requirements without affecting the historic integrity of the bridge.

(b) The bridge is seriously deficient geometrically and cannot be widened to meet the minimum required capacity of the highway system on which it is located without affecting the historic integrity of the bridge.

5.2 Evaluation of Cape Cod Bridges Program Avoidance Alternatives

As part of the alternatives analyses conducted for the Program, FHWA and MassDOT screened the Universe of Alternatives presented in the USACE's Major Rehabilitation Evaluation Report/Environmental Assessment (MRER/EA) to determine those reasonable alternatives to be carried forward for evaluation in the Environmental Impact Statement. MassDOT documented its extensive alternatives analysis in the following reports, provided as **Appendix 3.1, Alternatives Assessments Technical Report:**

- Cape Cod Bridges Program Alternatives Analysis Report (February 2024, updated July 2025)
- Cape Cod Bridges Program Highway Interchange Approach Options Detailed Assessment Report (July 2025)

Of the 12 alternatives comprising the Universe of Alternatives, **Table 1** lists the alternatives that would avoid a Section 4(f) use of the Sagamore Bridge and are consistent with the alternatives identified in the Nationwide Historic Bridge Programmatic Evaluation.

Table 1. Avoidance Alternatives

Nationwide Historic Bridges Programmatic Evaluation – Avoidance Alternatives Required for Consideration	Applicable Avoidance Alternative
Do Nothing	No Build Alternative
Build on New Location without Using the Old Bridge	New Third Highway Bridge Alternative, consisting of building an additional highway bridge on a new location
Rehabilitation without Affecting the Historic Integrity of the Bridge	Major Rehabilitation of Both Bridges Alternative

The following sections discuss the evaluation of avoidance alternatives for the Section 4(f) use of Sagamore Bridge.

5.3 No Build Alternative

The No Build Alternative was presented as the Base Condition in the MRER/EA's Universe of Alternatives. For the No Build Alternative, the USACE would implement continued maintenance and repairs to Sagamore Bridge, as needed to maintain safety (Fix as Fails). In this scenario, Sagamore Bridge would retain its current configuration of substandard lane widths, inadequate safety barriers, minimal pedestrian and bicycle accommodations and steep approach grades. No major rehabilitation efforts involving extensive repairs and replacement of major bridge components would occur. Structural components would be repaired, and critical elements would be replaced only when inspections indicate unsatisfactory reliability ratings.

In the MRER/EA, the USACE concluded that for the Base Condition (No Build Alternative), there would be no adverse effect on the NRHP-eligible Sagamore Bridge (and therefore, no Section 4(f) use would occur), as there would be no change in the bridge's appearance or location and the bridge would continue to be maintained and repaired.[3]

While the No Build Alternative would avoid use of the NRHP-eligible Sagamore Bridge, it would not meet the purpose and need for the Program, as described in **Chapter 2, Purpose and Need**. Therefore, the No Build Alternative is not a feasible and prudent alternative.

5.4 New Third Highway Bridge Alternative

Construction of a New Third Highway Bridge was presented as an alternative in the MRER/EA's Universe of Alternatives based on MassDOT's conceptual development in its 2019 Cape Cod Canal Transportation Study. In this alternative, a new mid-canal bridge crossing extending from State Route 25 north of Cape Cod Canal to U.S. Route 6 south of the canal would be provided, and the USACE would implement an ongoing program of inspection, maintenance, and repairs of the existing Sagamore and Bourne Bridges through their remaining life (No Build Alternative).

Based on conceptual level design, MassDOT determined that the New Third Highway Bridge Alternative would require major infrastructure construction, as well as extensive redesign and realignment of regional highways and local roadways on both the Cape Cod and mainland sides of the canal. The roadway infrastructure necessary to accommodate a new mid-canal crossing would result in extensive impacts to residential and commercial land uses, Joint Base Cape Cod, as well as sensitive environmental resources, including wetlands, protected open space, and rare species habitat.

Additionally, the New Third Highway Bridge Alternative would not provide a solution for addressing the underlying structural and roadway design deficiencies of the existing highway bridges and their approaches. Sagamore Bridge would retain its current configuration of substandard lane widths, inadequate safety barriers, minimal pedestrian and bicycle accommodations, and steep approach grades. The component deficiencies of the approaching 90-year-old bridge and its increasingly frequent maintenance needs would continue to impede mobility and accessibility for road users crossing Cape Cod Canal.

Similar to the No Build Alternative, in the New Third Highway Bridge Alternative, there would be no effect on Bourne Bridge; the bridge would continue to be maintained and repaired, and there would be no change in the bridge's appearance or location.

While the New Third Highway Bridge Alternative would avoid use of the NRHP-eligible Sagamore Bridge, it is not a feasible and prudent alternative as it would not meet the purpose and need for the Program, and it would also have extensive adverse social and environmental effects. **Table 2** summarizes MassDOT's reasons for eliminating the New Third Highway Bridge Alternative as a feasible and prudent avoidance alternative according to the criteria described in **Section 5.1.2**.

[3] U.S. Army Corps of Engineers. Cape Cod Canal Highway Bridges, Bourne, Massachusetts, Major Rehabilitation Evaluation Report and Environmental Assessment, EA-46. March 2022.

Table 2. Assessment of the New Third Highway Bridge Alternative as a Feasible and Prudent Avoidance Alternative

It is not feasible and prudent to avoid Section 4(f) property by constructing at a new location if:	New Third Highway Bridge Alternative
(b) Adverse Social, Economic, or Environmental Effects – Building a new bridge away from the present site would result in social, economic, or environmental impact of extraordinary magnitude.	Based on conceptual level design, the Massachusetts Department of Transportation determined that the New Third Highway Bridge Alternative would require major infrastructure construction, as well as extensive redesign and realignment of regional highways and local roadways on both the Cape Cod and mainland sides of the canal. The roadway infrastructure necessary to accommodate a new mid-canal crossing would result in extensive impacts to residential and commercial land uses, Joint Base Cape Cod, as well as sensitive environmental resources, including wetlands, protected open space, and rare species habitat.

5.5 Major Rehabilitation of Both Bridges Alternative

The Major Rehabilitation Alternative was presented as a reasonable alternative in the MRER/EA's Universe of Alternatives that met the USACE's project purpose and need. For the Major Rehabilitation Alternative, the USACE would implement a program of repairs and major rehabilitation for both Sagamore and Bourne Bridge to maintain safety and avoid future restrictions on bridge weight postings. Major rehabilitation would involve substantial repairs and replacement of major bridge components such as connections between the spans and the piers/abutments, hangers that connect deck and truss sections, fracture-critical gusset plates that tie truss members together, and substructure members of the decks. The ongoing program of continual inspection, maintenance, and repairs also would continue throughout the remaining life of the bridges.

For the Major Rehabilitation Alternative, Sagamore Bridge would not be brought up to current engineering standards and regulations. The bridge would retain its current configuration of substandard lane widths, inadequate safety barriers, minimal pedestrian and bicycle accommodations, and steep approach grades. These component deficiencies of the existing bridge, combined with prolonged construction period bridge closures and ongoing maintenance requirements throughout the remaining life of the bridge, would continue to impede mobility and accessibility for road users crossing Cape Cod Canal.

In the MRER/EA, the USACE concluded that the major rehabilitation of the existing bridge would not change the appearance or location of the bridge and would have no adverse effect to the bridge. While changes would be made to the bridge, they would have the same appearance following rehabilitation,

as materials would be replaced in-kind. The SHPO concurred with the USACE's determination on August 22, 2019.[4]

While the Major Rehabilitation Alternative would avoid use of the NRHP-eligible Sagamore Bridge, this alternative would not meet the purpose and need for the Program, as described in **Chapter 2, Purpose and Need**. Therefore, the Major Rehabilitation Alternative is not feasible and prudent. **Table 3** summarizes MassDOT's reason for eliminating the Major Rehabilitation Alternative as a feasible and prudent avoidance alternative according to the criteria described in **Section 5.1.3**.

Table 3. Assessment of the Major Rehabilitation Alternative as a Feasible and Prudent Avoidance Alternative

It is not feasible and prudent to avoid Section 4(f) property if it would result in any of the following:	Major Rehabilitation Alternative
(b) *The bridge is seriously deficient geometrically and cannot be widened to meet the minimum required capacity of the highway system on which it is located without affecting the historic integrity of the bridge.*	The Major Rehabilitation Alternative would not meet the identified transportation needs of the Program, including: • Address the deteriorating structural condition and escalating maintenance demands of Sagamore Bridge. • Address the substandard design elements of Sagamore Bridge, the immediate mainline approaches, and the adjacent interchanges and intersections. The Major Rehabilitation Alternative would not bring Sagamore Bridge up to current engineering standards and regulations, including current seismic design standards. The bridge would retain its current configuration of substandard lane widths, inadequate safety barriers, minimal pedestrian and bicycle accommodations, and steep approach grades.

6 Measures to Minimize Harm

To apply the Nationwide Historic Bridges Programmatic Evaluation for bridges that are replaced, FHWA must concur that the proposed action includes all possible planning to minimize harm. For the Sagamore Bridge project, all possible planning to minimize harm consists of the following:

- The existing bridge is made available for an alternative use, provided a responsible party agrees to maintain and preserve the bridge; and
- Agreement among the SHPO, ACHP, and FHWA is reached through the Section 106 process of the NHPA on measures to minimize harm and those measures are incorporated into the project.

[4] U.S. Army Corps of Engineers. Cape Cod Canal Highway Bridges, Bourne, Massachusetts, Major Rehabilitation Evaluation Report and Environmental Assessment, EA-46. March 2022.

The following sections describe these measures to minimize harm.

6.1 Alternative Use of Existing Bridge

6.1.1 Notice of Availability for an Alternative Use

In compliance with the Nationwide Historic Bridges Programmatic Evaluation, MassDOT will advertise the availability of Sagamore Bridge for an alternative use, provided a responsible entity agrees to relocate, maintain, and preserve the bridge.

Retaining the existing Sagamore Bridge superstructure or substructure in its current location for an alternative use would conflict with the primary purpose of the Cape Cod Canal Federal Navigation Project to support navigation. As the entity responsible for operating the Cape Cod Canal Federal Navigation Project and as the current owner and operator of Sagamore Bridge, USACE requires the complete removal of Sagamore Bridge following construction of the replacement bridge, due to the impediments to navigation within the Cape Cod Canal that would be created by retaining the existing bridge.

In its 2019 MRER/EA for the Cape Cod Canal Highway Bridges, in which the USACE recommended the replacement of the Sagamore and Bourne Bridges as the Preferred Alternative, the USACE indicated that USACE policy requires civil works projects to consider and evaluate future fluctuations in relative sea level; as such, the replacement bridge design would "incorporate considerations for potential sea level change into the design analysis…". With a vertical height of 135 feet above mean high water (MHW), the existing bridge does not account for future fluctuations in relative sea level. As a result, over time, the existing bridge would prohibit canal travel by auto carriers and cruise ships, the largest ships currently using Cape Cod Canal. Further, the USACE concurred that proposed location of the replacement piers outside of the canal waters would remove the potential for vessel strikes to critical members of the bridge structure and would effectively increase the horizontal clearance at the crossing. The U.S. Coast Guard confirmed this determination in its preliminary navigation clearance determination, issued on March 11, 2025, noting:

> "…the replacement Bourne and Sagamore Bridges should provide at least 138.3 feet of vertical clearance (MHW) and at least 500 feet of horizontal clearance to not unreasonably obstruct the free navigation of the waters over which the bridge is constructed."

While maintaining and preserving the bridge on its existing alignment would be infeasible as it would create impediments to navigation, MassDOT commits to marketing the bridge for availability as an alternative use at a relocated site.

6.1.2 Salvage and Adaptive Reuse of Historic Bridge Elements

In coordination with the Massachusetts SHPO, MassDOT will salvage the original bridge plaques at Sagamore Bridge prior to demolition of the bridge, including the bridge name and date plaques at the two portals of the bridge, and the bridge dedication plaques located at the southeast and northeast pylons on the approaches to Sagamore Bridge. The plaques will be reinstalled at publicly accessible

locations within the project area or transferred to other appropriate local public entities, in consultation with the Section 106 consulting parties.

6.2 Agreement on Measures to Minimize Harm through the Programmatic Agreement

FHWA and MassDOT are preparing a Programmatic Agreement to mitigate for the use of Sagamore Bridge, in accordance with 36 CFR 800.14(b). The Programmatic Agreement commits the Program to certain stipulations that would mitigate the adverse effects on the NRHP-eligible Sagamore Bridge, including the following:

- Design and construction of a new, high-level bridge comprised of parallel, twin, steel tied-arch superstructures supported on delta frames to replace Sagamore Bridge.
- Preparation of Historic American Engineering Record documentation.
- Fabrication of at least one interpretative panel for installation at the pedestrian overlook on the new bridge.
- Salvage and relocation of the historic bridge plaques at a publicly accessible location or transfer to an appropriate local entity(ies).

FHWA and MassDOT are coordinating the development of the Programmatic Agreement in coordination with the MHC, acting in its authority as the Massachusetts SHPO, the designated Official with Jurisdiction over the Section 4(f)-protected Sagamore Bridge. The draft Programmatic Agreement is provided in **Appendix 5, Attachment 3.**

7 Coordination and Consultation

FHWA initiated the Section 106 consultation process with MHC, the Massachusetts SHPO, and the Official with Jurisdiction over the Section 4(f)-protected historic bridge, on March 30, 2023. Additionally, FHWA initiated the Section 106 process with Consulting Parties on January 23, 2024.

MassDOT and FHWA have coordinated with the SHPO regarding the proposed demolition of Sagamore Bridge. Additionally, MassDOT and FHWA have notified the SHPO that the agencies will pursue a Nationwide Historic Bridges Programmatic Evaluation for Sagamore Bridge under Section 4(f). MassDOT and FHWA have received no objection from the SHPO related to the proposed Section 4(f) compliance pathway.

In accordance with the requirements of the Nationwide Historic Bridges Programmatic Evaluation, FHWA and MassDOT will continue coordination with the USACE and SHPO through signing of the Programmatic Agreement. The combined Final Environmental Impact Statement and Record of Decision will include the signed Programmatic Agreement. Other than consultation and coordination through the Section 106 process, the Nationwide Historic Bridges Programmatic Evaluation does not require public involvement.