

4 Affected Environment, Environmental Consequences, and Mitigation

4.15 Visual Resources

4.15.1 Introduction

This section assesses the effects of the No Build Alternative and Build Alternative on visual resources in the Cape Cod Bridges Program (Program) Study Areas. This section also discusses measures that the Massachusetts Department of Transportation (MassDOT) is proposing to mitigate for visual changes to the environment and compensate for adverse effects. This section summarizes the Program's **Appendix 4.15, Visual Impact Assessment**.

4.15.1.1 Regulatory Context

This section has been prepared pursuant to the Federal Highway Administration's (FHWA) [Guidelines for the Visual Impact Assessment of Highway Projects](#) (2015) (FHWA Guidelines).¹ This section also incorporates information and direction from the following regulatory and guidance documents:

- [Section 106 of the National Historic Preservation Act](#),² 36 Code of Federal Regulations (CFR) Section 800
- [Programmatic Agreement between the U.S. Army Corps of Engineers \(USACE\) and the Massachusetts Historic Preservation Officer \(MA SHPO\) regarding the Cape Cod Canal Highway Bridges Project](#),³ March 11, 2022, executed concurrently with the Finding of No Significant Impact for the USACE's Major Rehabilitation and Evaluation Report/Environmental Assessment (MRER/EA)
- [Section 4\(f\) of the U.S. Department of Transportation Act of 1966](#), 23 CFR 774⁴
- [MassDOT, Project Development and Design Guide](#), Context Sensitive Design⁵
- [Town of Bourne Open Space and Recreation Plan](#), February 8, 2018⁶
- [Town of Bourne Local Comprehensive Plan](#), approved October 29, 2019⁷
- [Cape Cod Commission, Cape Cod Regional Policy Plan](#), December 2018⁸

¹ The FHWA's Guidelines uses the term "impacts" as opposed to "effects" relative to the visual changes of a proposed project upon the existing environment. Except for references to specific terminology defined in the FHWA Guidelines, this section uses the term "effects" for consistency with the DEIS.

https://www.environment.fhwa.dot.gov/env_topics/other_topics/VIA_Guidelines_for_Highway_Projects.aspx

² <https://www.achp.gov/digital-library-section-106-landing/section-106-regulations>

³ https://www.nae.usace.army.mil/Portals/74/docs/Topics/Cape_Cod_Canal_Bridges/Reports/MRER-Appendix-K.pdf

⁴ https://www.environment.fhwa.dot.gov/env_topics/4f_tutorial/overview.aspx?h=e

⁵ <https://www.mass.gov/manual/massdot-project-development-and-design-guide>

⁶ https://www.townofbourne.com/sites/g/files/vyhlif12841/f/uploads/open_space_and_rec_plan_final_2018.pdf

⁷ <https://www.townofbourne.com/planning/news/local-comprehensive-final-certified-plan>

⁸ <https://www.capecodcommission.org/our-work/rpp/>

4.15.1.2 Methodology and Study Area

As an initial step, MassDOT defined the Study Areas for the visual effects assessment. MassDOT used geographic information system software to identify areas where the proposed bridges would be visible, accounting for visual obstructions, such as topography, vegetation, and buildings. These viewsheds comprise the visual resources Areas of Visual Effect (AVEs). [Figure 4.15-1](#) presents the Sagamore Bridge and Bourne Bridge AVEs.

To determine the Build Alternative's visual effects, MassDOT photographed existing conditions from different viewpoints of each bridge's AVEs that abut the existing roadways in the four Study Area quadrants (Sagamore North, Sagamore South, Bourne North, and Bourne South). These viewpoints include the following:

- Static viewsheds, defined as what neighbors of the bridges or roadways see from their stationary location.
- Dynamic viewsheds, defined as what travelers on the bridge or road see as they travel through the Program Limits.

From these photographs, MassDOT identified 17 visual inventory locations in the Sagamore Bridge and Bourne Bridge AVEs consisting of key views of and from the bridges and highway interchange networks. Simulations were prepared of the Build Alternative at these locations using proposed 3D design models developed from Computer Aided Design (CAD) software.

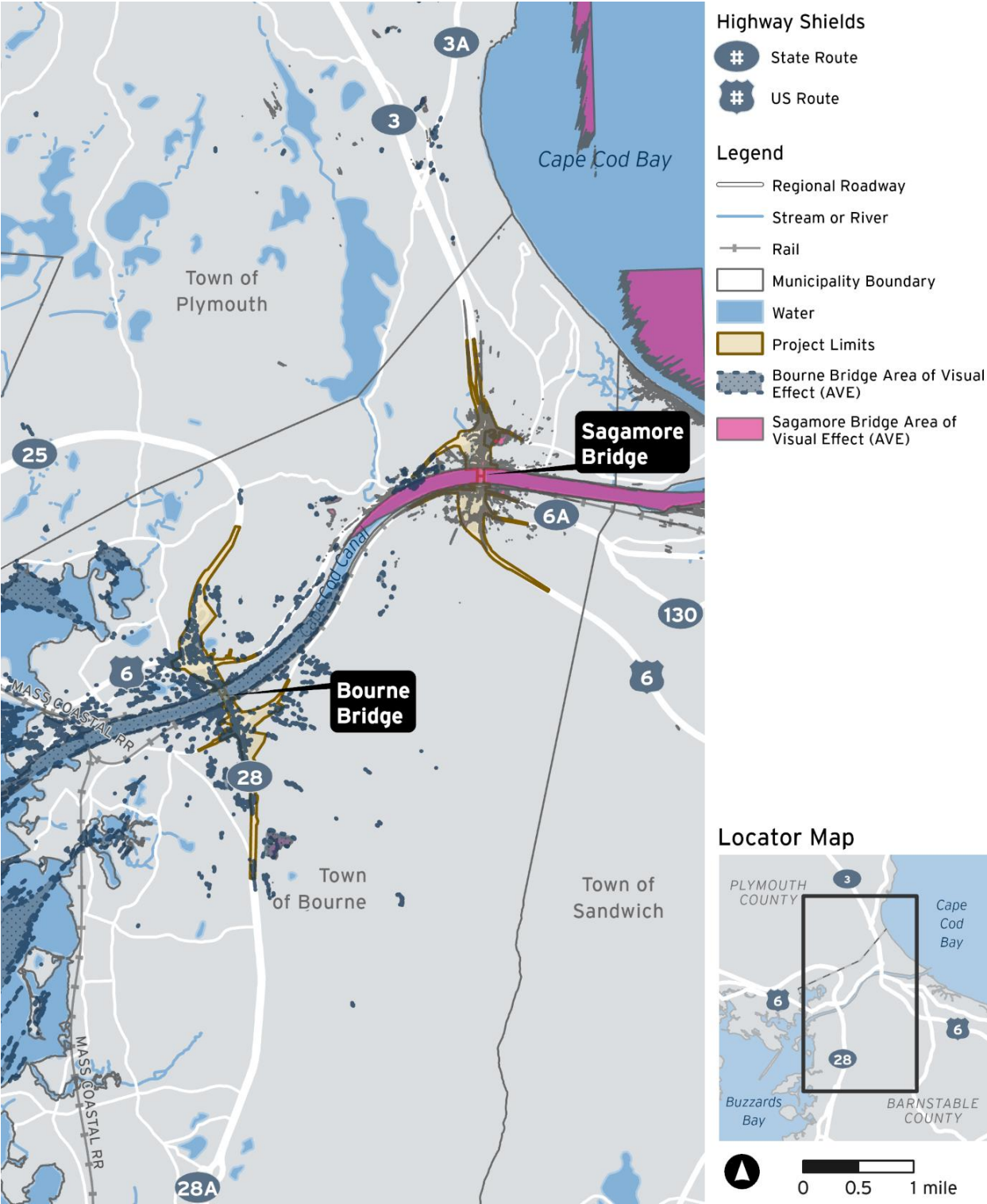
As directed in the FHWA Guidelines, MassDOT then assessed the visual inventory locations with respect to the following:

- Compatibility of the visual impact
- Viewer sensitivity to the visual impact
- Resulting degree of impact

The FHWA Guidelines define a visual impact as a change to the environment—measured by the compatibility of the impact with the visual character of the environment—or a change to the viewer's reaction to the impact, which is measured by their sensitivity to the impact. Compatibility of the impact is defined as the ability of the environment to visually absorb a proposed project, because the project and the environment have compatible visual characters (elements), such as project size and scale, form, and materials. The Guidelines assign the ratings for compatibility of the proposed impacts as compatible or incompatible.

The FHWA Guidelines define a viewer's sensitivity to the impact as the ability of viewers to see and care about a project's impacts. Viewer sensitivity to an impact is the result of viewer exposure to the impact and viewer awareness of the impact. The greater the exposure and awareness, the more viewers will be concerned about visual impacts. The FHWA Guidelines assign the ratings for viewer sensitivity to proposed impacts as low, moderate, or high sensitivity.

Figure 4.15-1. Areas of Visual Effect (Sagamore Bridge and Bourne Bridge)



Source: Massachusetts Department of Transportation, 2024

Together, the compatibility of the impact and the viewer's sensitivity to the impact determine the degree of impact to visual quality. The FHWA Guidelines assign the ratings for degree of proposed impacts as a beneficial change to the visual quality, a neutral change to the visual quality, or an adverse change to the visual quality.

4.15.2 Affected Environment

4.15.2.1 Existing Visual Environment

The existing visual environment within the Sagamore Bridge and Bourne Bridge AVEs includes three categories of visual resources, defined as the following

- Natural visual resources, defined as areas with limited human-made structures
- Cultural visual resources, referring to the built environment
- Program-related visual resources, the elements of the visual environment directly relating to the Build Alternative

Cape Cod Canal is the most prominent natural visual resource within the Sagamore Bridge and Bourne Bridge AVEs. Sagamore Bridge and Bourne Bridge are the most prominent cultural visual resources. In addition to the bridges, project-related visual resources consist of the Sagamore Bridge and Bourne Bridge highway interchange networks on both sides of the canal.

4.15.2.2 Affected Populations

Per FHWA's Guidelines, the Build Alternative would affect two distinct viewers (or populations):

- Neighbors, defined as people who view the bridges and/or interchange network
- Travelers, defined as people who use and have views from the bridge and the interchange network

The affected populations in the Sagamore Bridge and Bourne Bridge AVEs include residential, recreational, commercial, and institutional and civic neighbors, and travelers. Travelers include motorists, pedestrians, and bicyclists, and include local and regional commuters, tourists, and shipping and freight travelers using the bridges and highway networks.

4.15.2.3 Visual Quality of the Environment

Visual quality consists of identifying what people like and dislike about the visual character of the AVEs. To ascertain the visual quality of the Sagamore Bridge and Bourne Bridge AVEs, MassDOT reviewed local and regional policy and planning documents addressing visual quality and the viewshed-related stipulations of the Programmatic Agreement between the USACE and the MA SHPO regarding the Program. Additionally, MassDOT polled the public to assess viewers' preferences during its public meetings presenting optional bridge types.

Visual Preferences Identified by Local and Regional Policy and Planning Documents

In its 2019 revision, the [Town of Bourne Local Comprehensive Plan](#)⁹ (Comprehensive Plan) cites the vision for the town of Bourne that was established in its first (2009) Local Comprehensive Plan:

“a vision of a town of village centers serving the daily needs of surrounding neighborhoods, with an active downtown in Buzzards Bay that would be a center for government, marine research, and education. Regional commercial and industrial uses would be located on MacArthur Boulevard and other areas with good highway access. Village centers would be connected by pedestrian and bicycle paths, as well as local roads that were off the path of regional traffic.”

The Comprehensive Plan notes that over the 10 years since the initial comprehensive planning effort, substantial progress has been made toward achieving the town’s vision.

The [Town of Bourne Open Space and Recreation Plan](#)¹⁰ (Recreation Plan) identifies the town as a medium-sized rural community that is unique due to its community of villages, its abundance of cultural and natural resources, its home to Cape Cod Canal, and its reputation as the “Gateway to Cape Cod.”

As integral elements of Cape Cod Canal and as contributing resources to the Cape Cod Canal Historic District, Sagamore and Bourne Bridges occupy prominent roles in the AVEs, including protections through community and regional goals and zoning.

The Recreation Plan provides context for defining the visual quality of the AVEs, as well as the visual preferences within the town. According to the Recreation Plan, the most distinctive landform and physically impressive element of the town of Bourne’s landscape is Cape Cod Canal. Nearly all of Cape Cod Canal is within the town. The Recreation Plan notes that the canal’s “scenic and recreational value is an indisputable asset to the community.” The Recreation Plan includes the following “community character” goal focused on natural and cultural resources, developed with input from the public:

“Protect existing cultural and landscape assets. Such features are critical to Bourne’s self-understanding and sense of community. They provide linkages between the history and the present and help shape the Town’s unique character.”

The Comprehensive Plan acknowledges the need for the bridges to be replaced and cites the importance of constructing replacement bridges that “respect the iconic natures of these bridges to the Cape’s image,” noting that the bridges are integral to the local heritage of Cape Cod. The Cape Cod

⁹ https://www.townofbourne.com/sites/g/files/vyhlif12841/f/uploads/2019_final_revision_comprehensive_version_2.14.20.pdf

¹⁰ https://www.townofbourne.com/sites/g/files/vyhlif12841/f/uploads/open_space_plan_fina_2018.pdf

Commission's [Cape Cod Regional Policy Plan](#)¹¹ (Policy Plan) includes two policy goals applicable to the existing bridges and their replacements:

- Community Design, to “protect and enhance the unique character of the region’s built and natural environment based on the local context.”
- Cultural Heritage, to “protect and preserve the significant cultural, historic, and archaeological values and resources of Cape Cod.”

Further, the Policy Plan’s vision for historic areas, including local and/or National Register of Historic Places (NRHP) districts, is to protect historic resources and to support development that respects the form, scale, and character of existing historic areas.

Visual Preferences Identified in the Programmatic Agreement

The [Programmatic Agreement between the USACE and the MA SHPO for the Cape Cod Canal Highway Bridges Project](#)¹² (i.e., the Program) addresses the importance of viewsheds of and from the NRHP-eligible Cape Cod Canal Historic District. The agreement states that viewshed analyses of the existing and proposed bridges shall be prepared to determine if historic properties within the Cape Cod Canal Historic District and outside the Cape Cod Canal Federal Navigation Project have views that could be affected by the construction of the proposed bridges. Further, the agreement states that the USACE and MassDOT shall “make a good faith effort to design, position, and construct new bridges that will avoid adverse effects” to the Cape Cod Canal Historic District and any NRHP-eligible properties within the viewshed of the proposed undertaking.

Visual Preferences Identified through Public Involvement

As part of its series of public meetings to identify recommendations for Program elements, in November 2022, MassDOT conducted two virtual public meetings to review preliminary recommendations of the feasible bridge types, obtain public sentiment on the bridge types, and confirm the bridge type to be advanced for further design. MassDOT conducted a poll to determine the community’s visual preferences relative to the existing bridges and preferences for the replacement bridges via two questions:

- How important is it that the new Cape Cod Bridges resemble the current Bourne and Sagamore Bridges?
- How important is it to replace the Cape Cod Bridges with landmark structures?

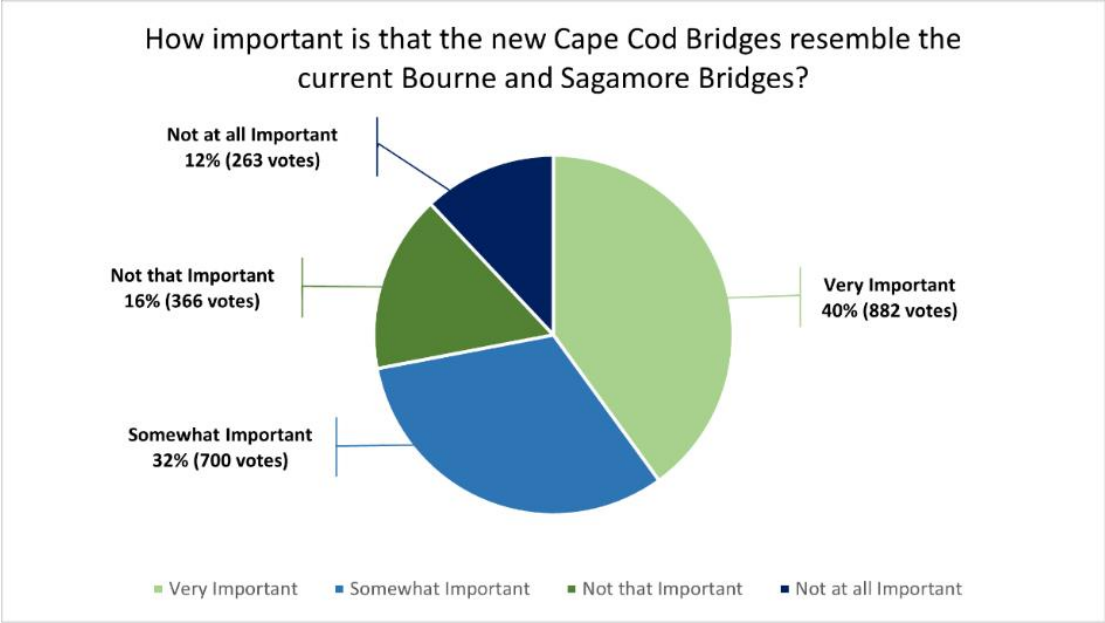
MassDOT received over 2,200 responses during and following the two public meetings. As indicated in [Figure 4.15-2](#) and [Figure 4.15-3](#), most respondents indicated that it is somewhat to very important that

¹¹ https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/RPP/2018_Cape_Cod_Regional_Policy_Plan_for_web.pdf

¹² <https://www.nae.usace.army.mil/Portals/74/docs/Topics/Cape%20Cod%20Canal%20Bridges/Agreements/USACE-MassDOTCapeCodCanalBridgesApproachesCollaborativeMemorandumofUnderstanding.pdf>

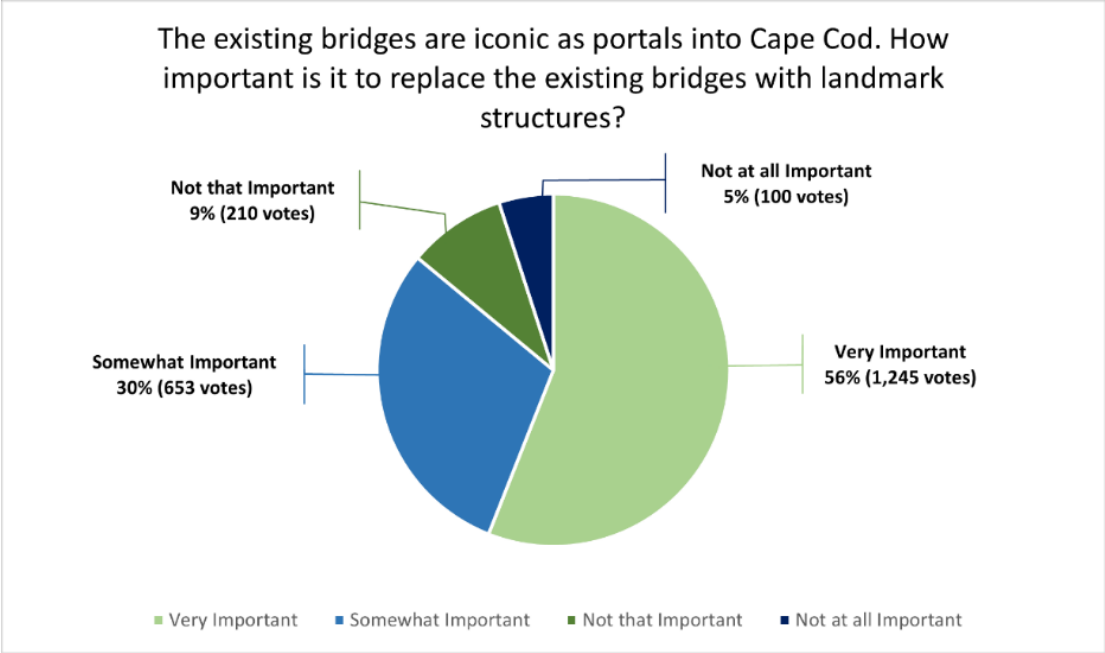
the replacement bridges resemble the existing Sagamore and Bourne Bridges, indicating a high level of viewer sensitivity to the bridges.

Figure 4.15-2. Assessment of Community Visual Preferences, Public Polling Question #1



Source: Massachusetts Department of Transportation, 2024

Figure 4.15-3. Assessment of Community Visual Preferences, Public Polling Question #2



Source: Massachusetts Department of Transportation, 2024

4.15.3 No Build Alternative

The No Build Alternative would not alter the visual quality of Sagamore and Bourne Bridges or affect the visual landscape of the interchange highway networks because they would retain their current configurations. It is not anticipated that the USACE's program of continued inspections and maintenance and repair of both existing bridges as needed ("Fix as Fails") in the No Build Alternative would substantially alter the viewsheds of the motorist crossing the bridges or the views of the bridges from the Canal Service Roads.

The No Build Alternative would include proposed transportation improvements projects in and near the Project Limits within the interchange improvements network (identified in **Chapter 3, Proposed Action and Alternatives**), consisting primarily of traffic safety improvements at Belmont Circle, Bourne Rotary, Scenic Highway, and State Route 28. It is not anticipated that these improvements, such as restriping, additional lanes, signage, and flashing beacons, raised medians, and deck replacement, would alter the existing visual landscape.

The No Build Alternative would include changes to the viewsheds of travelers on the regional and local roadways networks due to proposed development, such as the proposed Cumberland Farms retail development on MacArthur Boulevard, the proposed storage unit facility at Bourne Rotary, and the proposed mixed-use development on Canal Street. However, travelers are expected to have low viewer sensitivity due to their generally narrow viewshed and the short amount of time that drivers would be exposed to the new views. As a result, the degree of effect from new development abutting the highway networks would likely be neutral.

4.15.4 Build Alternative

This section describes the visual effects of the Build Alternative using the 17 visual inventory locations that MassDOT identified in the Sagamore Bridge and Bourne Bridge AVEs. [Figure 4.15-4 through Figure 4.15-7](#) present the visual inventory locations. In [Section 4.15.4.1 through Section 4.15.4.5](#), MassDOT compares existing and simulated viewsheds and assesses the effects to viewsheds of the highway bridges and interchange networks within the four Study Area quadrants. [Section 4.15.4.6](#) presents a summary of the visual effects of the Build Alternative. This visual assessment was conducted based on MassDOT's preliminary recommendations for intersection control, as presented in **Chapter 3, Section 3.4.3, Intersection Control Preliminary Recommendations** of the Draft Environmental Impact Statement.

4.15.4.1 Visual Assessment of Replacement Sagamore and Bourne Bridges

MassDOT identified two visual inventory locations for Sagamore Bridge and Bourne Bridge. These views apply to both bridges.

Comparison of Existing and Simulated Viewsheds

B1. View from Motorist, Sagamore and Bourne Bridges

Exhibit 4.15-1a and **Exhibit 4.15-1b** present existing and simulated viewsheds of motorists on the bridges (**Figure 4.15-7**, B1). **Table 4.15-1** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-1a. Existing View from Motorist on Sagamore Bridge or Bourne Bridge



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-1b. Simulated View from Motorist on Sagamore Bridge or Bourne Bridge



Source: Massachusetts Department of Transportation, 2024

B2. View of Sagamore and Bourne Bridges from Cape Cod Canal Service Road

Exhibit 4.15-2a and **Exhibit 4.15-2b** present existing and simulated views of the bridges from the Cape Cod Canal Service Road (**Figure 4.15-4**, B2). **Table 4.15-1** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-2a. Existing View of Sagamore Bridge or Bourne Bridge from Cape Cod Canal Service Road



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-2b. Simulated View of Sagamore Bridge or Bourne Bridge from Cape Cod Canal Service Road



Source: Massachusetts Department of Transportation, 2024

Viewshed Effect Assessment: Replacement Highway Bridges

Table 4.15-1 presents a summary comparison of existing and proposed viewsheds of the highway bridges. The table assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-1. Anticipated Effects to Viewsheds: Replacement Bridges

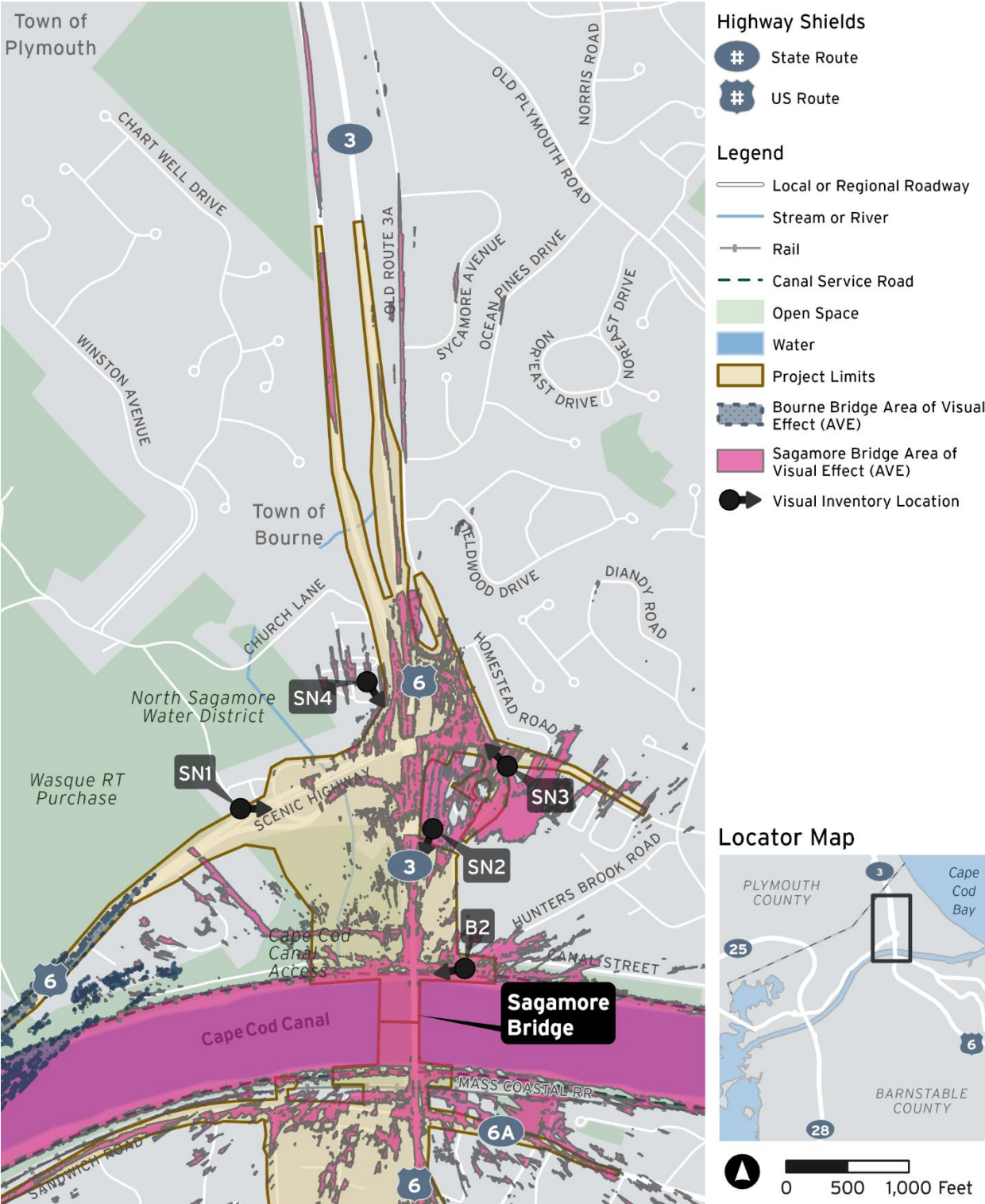
Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
B1 (Figure 4.15-7)	View from Motorist on Sagamore Bridge or Bourne Bridge. Existing: Viewshed of a portal entry onto the bridge, with prominent historic plaque at the portal entrance, reinforced by tall safety/visual fences on both sides of the highway and heavily trafficked narrow traffic lanes. Minimal roadway lighting is provided. Proposed: The overall shape of the delta-frame-supported arches would replicate the rounded arches of the existing steel truss bridges and would be compatible with the existing steel truss bridge in scale and form. It would successfully mimic the portal “gateway” entrance of the existing bridges. The proposed use of steel and concrete, with grey as the finish color, would provide a traditional look consistent with the appearance of the existing bridge. The separation of opposing traffic and the additional width of the travel lanes would provide travelers with a sense of visual separation and orderliness that is not present in the existing conditions. Lighting would be provided on the roadway and selected bridge elements.	Compatible	Travelers/ High	Neutral
B2 (Figure 4.15-4)	View of Sagamore Bridge or Bourne Bridge from Cape Cod Canal Service Road Existing: Viewshed includes the expanse of the waterway and the extensive length of the parallel service road, with the curve of the waterway in the distant view. Proposed: The views of the replacement bridges from the Canal Service Roads would be consistent with the existing views of the bridges. The increased height of the bridge deck and the lower height of the top of the arch would not be obvious. The placement of the new piers into the riprap portion of the canal would open views of the waterway from the Canal Service Roads, enhancing the natural vista. The piers would be physically closer to the Canal Service Roads and due to the depth of the delta frame, would be approximately 10 feet lower in height than the existing piers; however, the visual differences would be negligible.	Compatible	Recreational Neighbors/ High	Neutral

* The bridge visual inventory locations apply to all figures.

4.15.4.2 Visual Assessment of Sagamore North Quadrant Interchange Network

MassDOT identified four visual inventory locations in the Sagamore North quadrant highway interchange approach network Project Limits, presented in [Figure 4.15-4](#).

Figure 4.15-4. Visual Inventory Locations (Sagamore North Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

SN1. View From Scenic Highway at Church Lane

Exhibit 4.15-3a and **Exhibit 4.15-3b** present existing and simulated views from Scenic Highway, facing east, at its intersection with Church Lane (**Figure 4.15-4**, SN1). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-3a. Existing View from Scenic Highway at Church Lane, facing east



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-3b. Simulated View from Scenic Highway at Church Lane, facing east



Source: Massachusetts Department of Transportation, 2025

SN2. View from Bourne Park and Ride Lot

Exhibit 4.15-4a and **Exhibit 4.15-4b** present existing and simulated views from Bourne Park and Ride Lot facing south toward Sagamore Bridge (**Figure 4.15-4**, SN2). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-4a. Existing View from Bourne Park and Ride Lot, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-4b. Simulated View from Bourne Park and Ride Lot, facing south



Source: Massachusetts Department of Transportation, 2025

SN3 View from Meetinghouse Lane at State Road

Exhibit 4.15-5a and **Exhibit 4.15-5b** present existing and simulated views from Meetinghouse Lane at State Road, facing northwest (**Figure 4.15-4**, SN3). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-5a. Existing View from Meetinghouse Lane at State Road, facing northwest



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-5b. Simulated View from Meetinghouse Lane at State Road, facing northwest



Source: Massachusetts Department of Transportation, 2025

SN4 View from Church Lane at Cape Pine Road

Exhibit 4.15-6a and **Exhibit 4.15-6b** present existing and simulated views from Church Lane at Cape Pine Road, facing south (**Figure 4.15-4**, SN4). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-6a. Existing View from Church Lane at Cape Pine Road, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-6b. Simulated View from Church Lane at Cape Pine Road, facing south



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Sagamore North Quadrant Interchange Approach Network

Table 4.15-2 presents a summary comparison of existing and proposed viewsheds within the Sagamore North quadrant interchange approach network. It assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-2. Anticipated Effects to Viewsheds: Sagamore North Quadrant Interchange Approach Network

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN1	View from Scenic Highway at Church Lane, facing east. Existing: Viewshed includes a string of overhead signals across 4-lane divided Scenic Highway (with a State Route 3 turning lane) and the State Route 3 south on-ramp from Scenic Highway, directional signage, and forested areas bordering both sides of Scenic Highway. Proposed: The proposed view would be consistent with the existing view. Views of the shared-use path on the south side of Scenic Highway would provide visual interest. The removal of overhead utilities would present a more harmonious and coherent view to travelers.	Compatible	Residential Neighbors, Travelers/ Moderate	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN2	View from Bourne Park and Ride Lot, facing south. Existing: Viewshed includes parked vehicles, dense vegetation, sidewalk to Canal Street, commercial building (Starbucks) and signs, and Sagamore Bridge arch to the west. Proposed: Sagamore Bridge would be less prominent, as the bridge location would shift to the west, but proposed State Route 3 would be more prominent to viewers than in existing conditions. The State Route 3 mainline would be approximately 15 feet higher than the existing roadway along the length of the Bourne Park and Ride lot, on average. The elevation difference would range from approximately 7 feet closer to Scenic Highway to a maximum 20-foot difference at the abutment of the replacement bridge, which would align with the existing Starbucks parking lot. The hardness of the concrete mainline would be softened by extensive landscaping. The natural environmental features of the setting and views of the new shared-use path that would start at the Bourne Park and Ride Lot would be visually appealing, introducing a harmonious view that would provide both visual interest and visual relief.	Compatible	Travelers/ Low	Beneficial

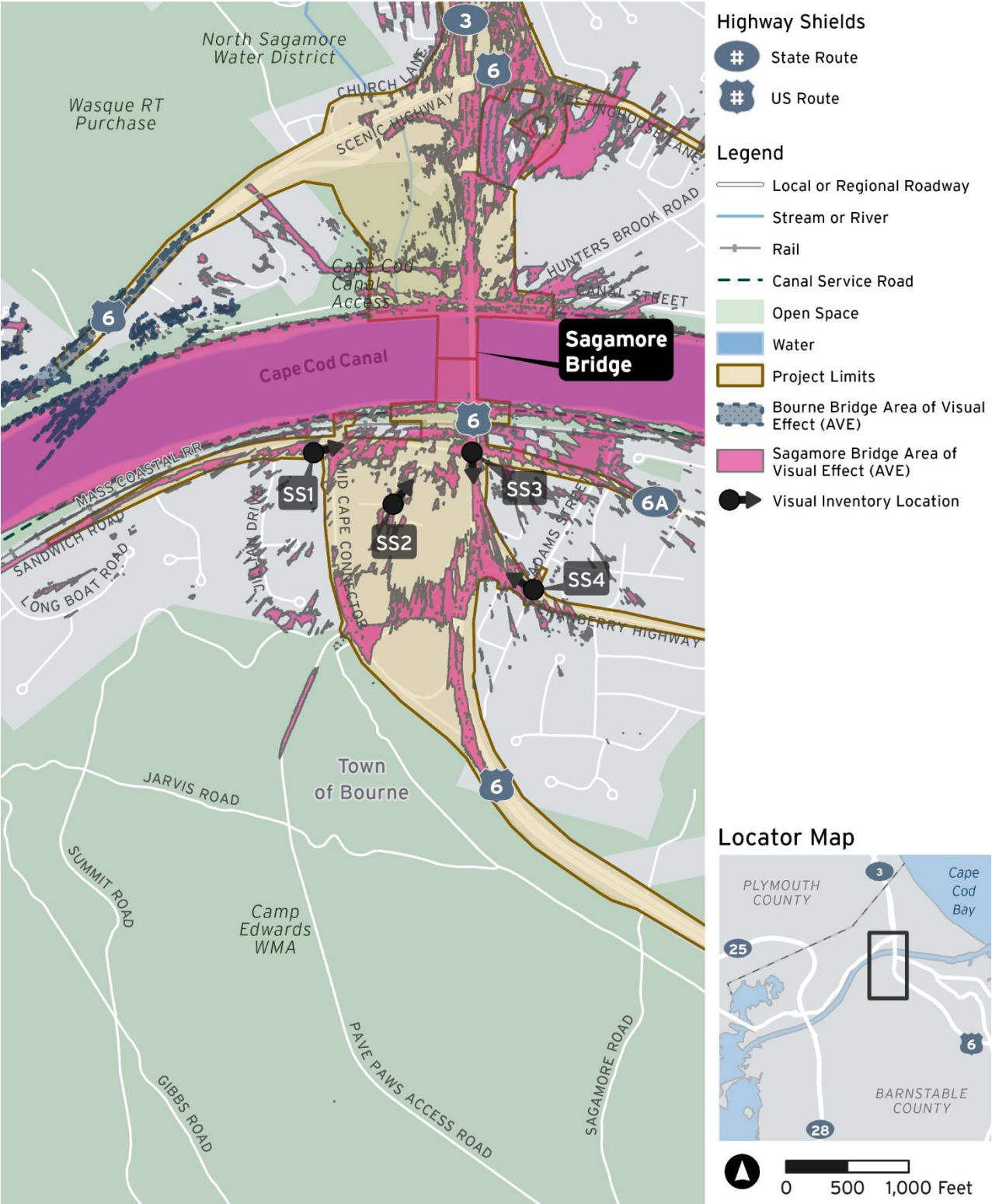
Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN3	View from Meetinghouse Lane at State Road, facing northwest. Existing: Viewshed includes high abutment wall and State Road to the north, overhead and side traffic signals, utility poles and overhead wiring, directional signage, and divided 4-lane Scenic Highway directly west. Proposed: The removal of the utility poles, overhead signals, and wiring would eliminate visual clutter and present a more harmonious and coherent view. The roundabout would be more visually appealing than the existing signalized intersection; it would reduce the amount of paved area and the landscape treatment in the center island would provide a natural feature and visual relief. The channelized entry of the roundabout would provide a sense of orderliness that is not present in the existing condition.	Compatible	Commercial Neighbors, Travelers/ Moderate	Beneficial
SN4	View from Church Lane at Cape Pine Road, facing south. Existing: Viewshed includes the Sagamore Bridge arch in the distance. Proposed: The proposed view generally would be consistent with the existing view, where the residential neighbors would have only a distant view of the Sagamore Bridge. The change in bridge alignment would not be readily apparent from this distant view.	Compatible	Residential Neighbors/ Low	Neutral

* **Figure 4.15-4** shows the Sagamore North quadrant visual inventory locations.

4.15.4.3 Visual Assessment of Sagamore South Quadrant Interchange Approach Network

MassDOT identified four visual inventory locations in the Sagamore South quadrant highway interchange approach network Project Limits (**Figure 4.15-5**).

Figure 4.15-5. Visual Inventory Locations (Sagamore South Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

SS1. View From Sandwich Road at Mid-Cape Connector

Exhibit 4.15-7a and **Exhibit 4.15-7b** present existing and simulated views from Sandwich Road at its intersection with Mid-Cape Connector, facing east (**Figure 4.15-5**, SS1). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-7a. Existing View from Sandwich Road at Mid-Cape Connector, facing east



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-7b. Simulated View from Sandwich Road at Mid-Cape Connector, facing east



Source: Massachusetts Department of Transportation, 2025

SS2. View From Eleanor Avenue

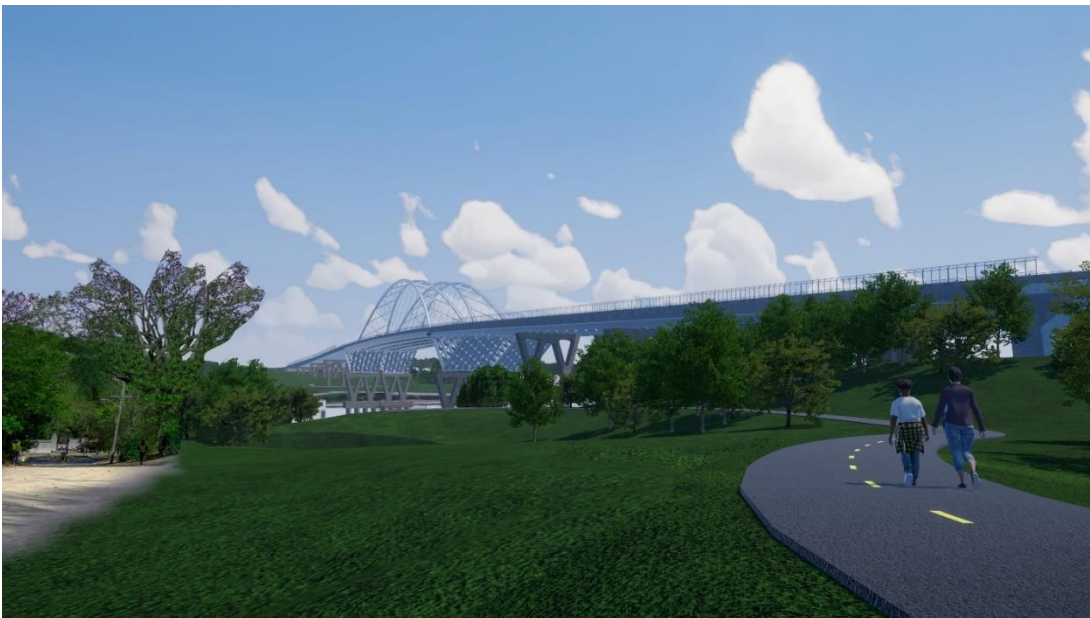
Exhibit 4.15-8a and **Exhibit 4.15-8b** present existing and simulated views from Eleanor Avenue, facing northeast (**Figure 4.15-5**, SS2). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-8a. Existing View from Eleanor Avenue, facing northeast



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-8b. Simulated View from Eleanor Avenue, facing northeast



Source: Massachusetts Department of Transportation, 2025

S3. View from Sandwich Road at Sagamore Bridge South Abutment

Exhibit 4.15-9a presents an existing view from Sandwich Road at the Sagamore Bridge south abutment, facing south. **Exhibit 4.15-9b** presents a simulated view from Sandwich Road at the new Sandwich Connector, facing south (**Figure 4.15-5**, SS3). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-9a. Existing View from Sandwich Road at Sagamore Bridge South Abutment, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-9b. Simulated View of Sandwich Road Connector at Sandwich Road, facing south



Source: Massachusetts Department of Transportation, 2025

SS4. View from Cranberry Highway at Adams Street

Exhibit 4.15-10a presents an existing view of Cranberry Highway at its intersection with Adams Street, facing west. **Exhibit 4.15-10b** presents a simulated view of the new Cranberry Highway Connector from Cranberry Highway at its intersection with Adams Street, facing west (**Figure 4.15-5**, SS4). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-10a. Existing View from Cranberry Highway at Adams Street, facing west



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-10b. Simulated View from Cranberry Highway at Adams Street, facing west



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Sagamore South Quadrant Interchange Approach Network

Table 4.15-3 presents a summary comparison of existing and proposed viewsheds within the Sagamore South quadrant interchange approach network. The table assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-3. Anticipated Effects to Viewsheds: Sagamore South Quadrant Interchange Approach Network

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SS1	View from Sandwich Road at Mid-Cape Connector, facing east. Existing: Viewshed includes median island, a crossarm with three overhead signals, two ground-level signal lights, utility pole and overhead wiring, directional signage, Sagamore Bridge arch and span, and residential and commercial uses on both sides of Sandwich Road. Proposed: The signalized intersection would remain, but the overhead wiring and utility poles would be removed, providing a more coherent and harmonious view. Views of a new shared-use path on the south side of Sandwich Road would provide visual interest. Views of the existing residences and commercial uses along Sandwich Road would not change. The relocated Sagamore Bridge would be a more prominent feature in the viewshed; however, the difference in height between the existing and proposed arches would be difficult to discern.	Compatible	Residential and Commercial Neighbors, Travelers/ Moderate	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/Sensitivity	Degree of Impact
SS2	View from Eleanor Avenue, facing northeast. Existing: Viewshed includes the intersection with John's Lane, single-family residential houses on the east side of Eleanor Avenue, trees lining the roadway, dense canopy cover at rear of houses, and Sagamore Bridge arch in the background. Proposed: MassDOT would potentially acquire and demolish the residences along the east side of Eleanor Avenue, because this area would be needed to construct the new bridge and demolish the existing bridge. The replacement Sagamore Bridge and reconfigured State Route 6 mainline would be closer to the neighborhood on the west side of Eleanor Avenue and would be more prominent features in viewsheds. At the southern end of Eleanor Avenue, the mainline would be approximately 37 feet higher than in existing conditions, increasing to a 103-foot height difference at the northern end of Eleanor Avenue. The dense tree canopy along the embankment of the existing State Route 6 would be removed and replaced with a buffer area. While the buffer area would separate the Round Hill neighborhood on the west side of Eleanor Avenue from the elevated State Route 6 mainline, the loss of residential units and the existing dense tree canopy (and the resulting view of the more prominent transportation elements) would substantially alter the neighborhood's existing visual character and would adversely affect the sensitivity of the residential viewers.	Incompatible	Residential Neighbors/High	Adverse

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/Sensitivity	Degree of Impact
SS3	View from Sandwich Road at Sagamore Bridge South Abutment, facing south. Existing: Viewshed includes concrete abutment of Sagamore Bridge against steep embankment, overhead wires, and sidewalk in front of abutment. The vertical under-clearance of the bridge over Sandwich Road is 21 feet. Proposed: The existing Sagamore Bridge would be eliminated; the existing bridge and State Route 6 mainline footprint would be replaced with a new road connecting Sandwich Road with the new Cranberry Highway Extension via a new roundabout. The new Sandwich Road Connector would parallel the relocated State Route 6 mainline, which would be located approximately 100 feet to the west; travelers would have views of the elevated concrete roadway. Sidewalks would be provided on both sides of the Sandwich Road Connector. With its distinct and straight lines, the new connector would introduce a sense of orderliness and a vista of the roundabout in the distance. The viewshed would include the windmill of the former Christmas Tree Shops development, giving viewers a sense of familiarity and placemaking within the new vista. Due to the rolling terrain at this location, construction of the Sandwich Road Connector would require substantial excavation of up to 58 feet; the areas bordering the road would be landscaped. The connector road would introduce a new appealing view to an area from Sandwich Road with an existing void. While the new view would substantially differ from the existing view of the bridge abutment, it would be generally consistent with the character of the transportation network in this section of Sandwich Road. Travelers typically would have low sensitivity to this travel corridor because the purpose of Sandwich Road Connector would be to bypass local traffic with destinations to Market Basket and Mid-Cape Connector.	Compatible	Travelers/Low	Neutral

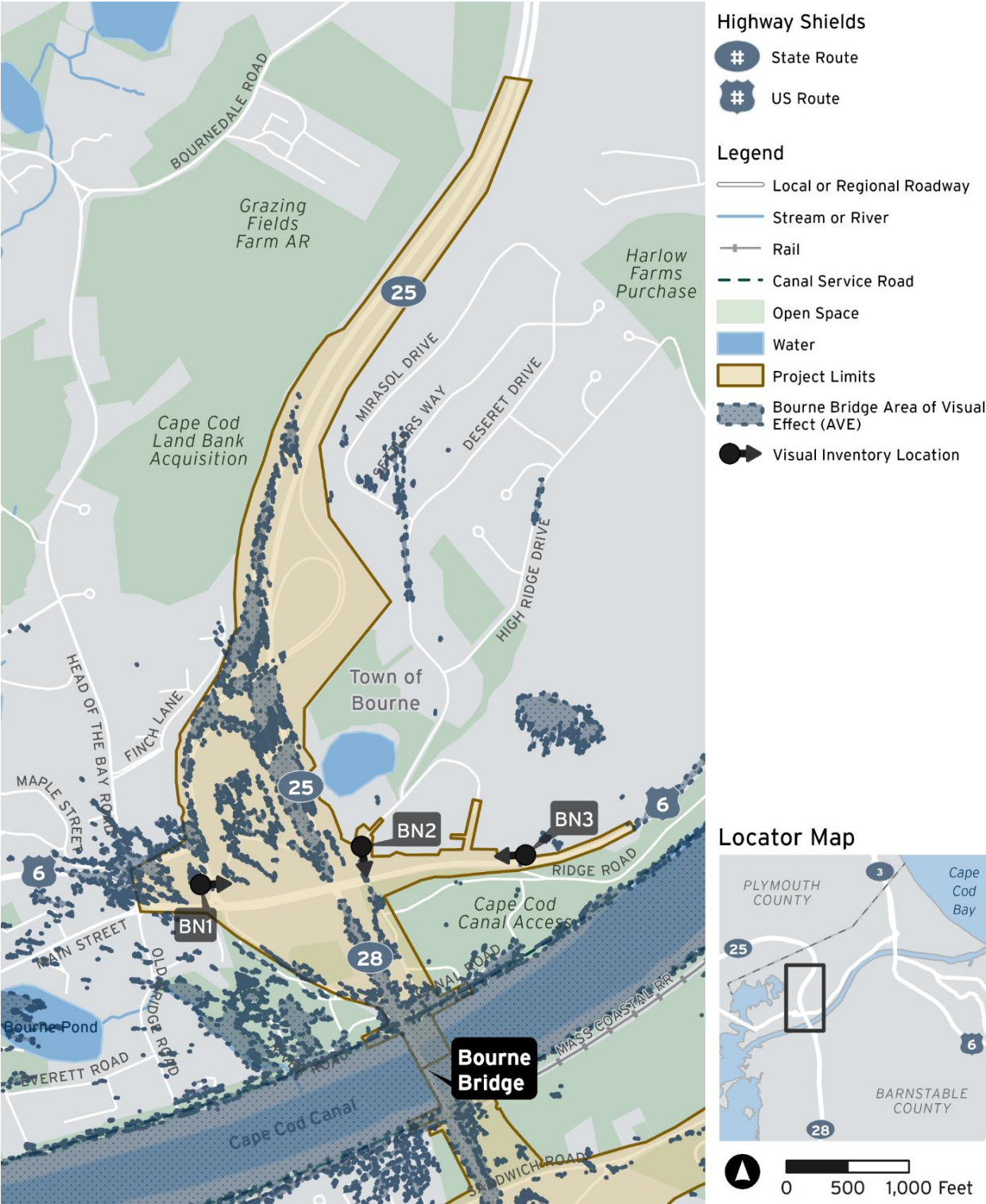
Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SS4	View from Cranberry Highway at Adams Street, facing west. Existing: Viewshed includes two-lane, striped roadway separated from frontage road by narrow, grassed median strip with utility poles and overhead electrical wiring; scattered individual residential and commercial buildings; distant view of facades of shopping development; and minimal landscaping. Proposed: The removal of the utility poles and overhead wiring would eliminate visual clutter and present a more harmonious and coherent view. The roundabout would be more visually appealing than the existing diverging roadways that lack visual directional cues; it would reduce the paved area and incorporate a landscaped treatment in the center island, providing visual relief. The channelized entry of the roundabout would provide travelers with a sense of orderliness that is not present in the existing condition and would be a visual entry for travelers to the Market Basket commercial area. Travelers and residential and commercial neighbors would have prominent views of the elevated State Route 6 mainline beyond the roundabout. While the elevated structure would be a new viewshed element, it would be consistent with the character of the transportation corridor.	Compatible	Residential and Commercial Neighbors/ Moderate	Beneficial

* [Figure 4.15-5](#) shows the Sagamore South quadrant visual inventory locations.

4.15.4.4 Bourne North Quadrant Interchange Network

MassDOT identified three visual inventory locations in the Bourne North quadrant highway interchange approach network Project Limits ([Figure 4.15-6](#)).

Figure 4.15-6. Visual Inventory Locations (Bourne North Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

BN1. View From Belmont Circle

Exhibit 4.15-11a and **Exhibit 4.15-11b** present existing and simulated views from Belmont Circle, facing east (**Figure 4.15-6**, BN1). **Table 4.15-4** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-11a. Existing View from Belmont Circle, facing east



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-11b. Simulated View from Belmont Circle, facing east



Source: Massachusetts Department of Transportation, 2025

BN2. View From Nightingale Road at Scenic Highway

Exhibit 4.15-12a and **Exhibit 4.15-12b** present existing and simulated views from Nightingale Road at its intersection with Scenic Highway, facing south (**Figure 4.15-6**, BN2). **Table 4.15-4** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-12a. Existing View from Nightingale Road at Scenic Highway, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-12b. Simulated View from Nightingale Road at Scenic Highway, facing south



Source: Massachusetts Department of Transportation, 2025

BN3. View from Scenic Highway

Exhibit 4.15-13a and **Exhibit 4.15-13b** present existing and simulated views from Scenic Highway, facing west (**Figure 4.15-6**, BN3). **Table 4.15-4** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-13a. Existing View from Scenic Highway, facing west



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-13b. Simulated View from Scenic Highway, facing west



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Bourne North Quadrant Interchange Approach Network

Table 4.15-4 presents a summary comparison of existing and proposed viewsheds within the Bourne North quadrant interchange approach network. It assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-4. Anticipated Effects to Viewsheds: Bourne North Quadrant Interchange Approach Network

Visual Inventory Location*	Change in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BN1	View from Belmont Circle, facing east. Existing: Viewshed includes circular rotary, sidewalk in front of shopping development plaza with parking and storefronts; overhead traffic lights and directional signage. Proposed: Viewshed of the new 18-foot-high flyover ramp connecting Scenic Highway to State Route 25 would add a higher structural element than existing conditions; however, the new flyover ramp would be consistent with the visual character of the existing transportation environment. Commercial neighbors and travelers would not be sensitive to these visual changes; as in the current view, the altered transportation elements in the background would not occupy a prominent position in their viewshed. The visibility of and access to existing commercial uses in Belmont Circle would not be affected.	Compatible	Commercial Neighbors, Travelers/ Low	Neutral

Visual Inventory Location*	Change in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BN2	View from Nightingale Road at Scenic Highway, facing south. Existing: Viewshed includes roadway with left and right turning lanes, overhead traffic signals, directional signage, and entrance sign to Bourne Scenic Park, with a prominent Bourne Bridge arch in background. Proposed: The relocated Bourne Bridge would be diminished by the approximate 80-foot relocated State Route 25 mainline and the approximate 30-foot-high new elevated flyover ramp connecting State Route 25 eastbound to Scenic Highway eastbound, which would be the dominant visual structural elements in the viewshed. The removal of the utility poles, overhead signals, and wiring would eliminate visual clutter and present a more harmonious and coherent view. The roundabout would be more visually appealing than the existing signalized intersection; it would reduce the amount of paved area and the landscape treatment in the center island would provide a natural feature and visual interest. The shared-use path would provide a new element of visual interest to the viewshed. The viewshed of neighbors exiting the Nightingale Pond neighborhood onto Scenic Highway would substantially change from existing conditions, however, conveying an urban form with hard lines of the highways in contrast to their current view of the natural, park setting of the Bourne Scenic Park entrance.	Incompatible	Residential Neighbors/ Moderate	Adverse

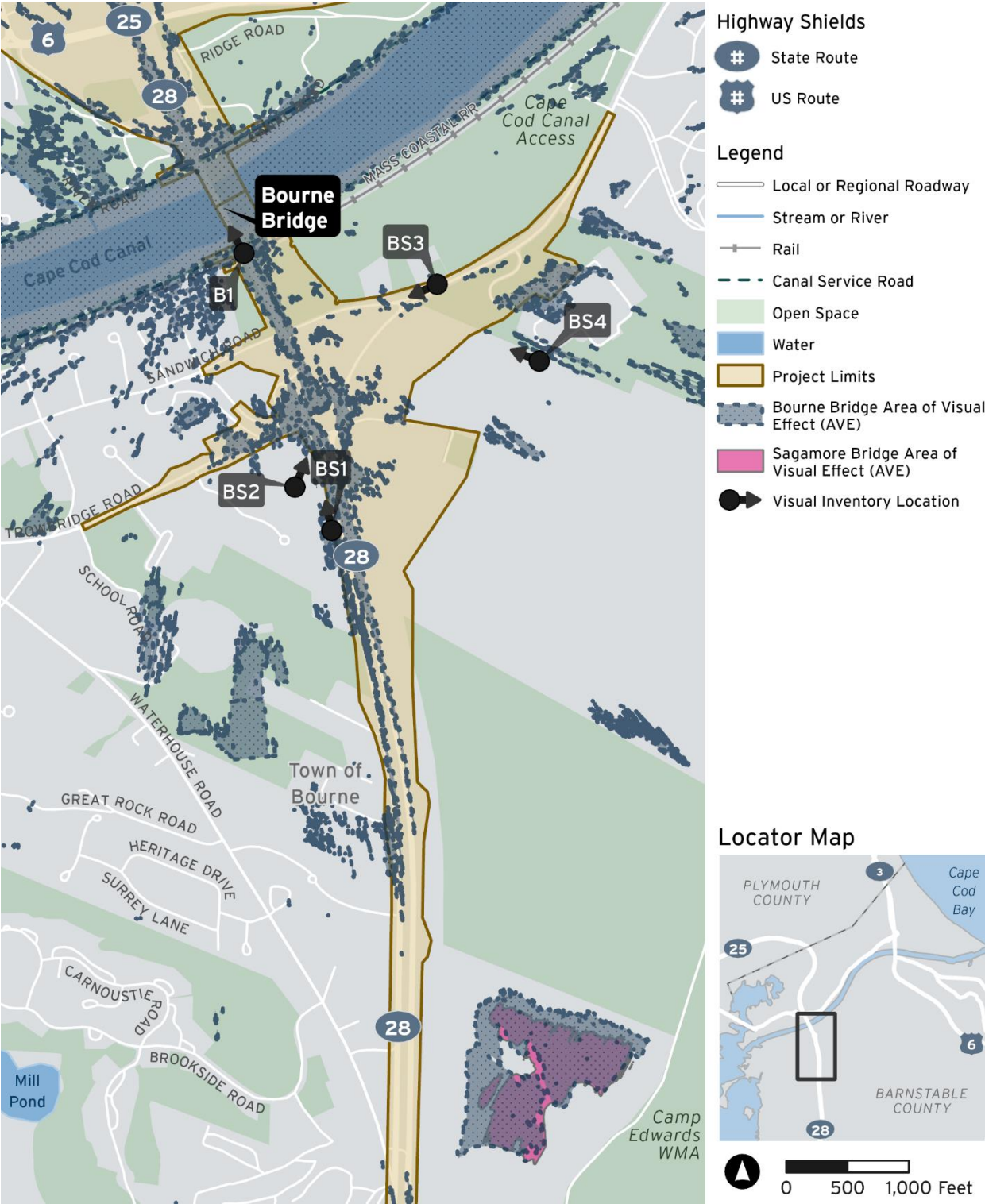
Visual Inventory Location*	Change in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BN3	View from Scenic Highway, facing west. Existing: Viewshed of striped divided highway with two lanes in each direction, distant overpass highway; densely forested landscape paralleling Scenic Highway. Proposed: Travelers would have views of the elevated State Route 25 mainline, the elevated flyover ramp connecting State Route 25 eastbound to Scenic Highway eastbound, and the new State Route 28 northbound on-ramp. In the proposed view, the existing dense canopy of trees on both sides of Scenic Highway would be replaced with an extensive roadway network, creating a more developed, urban character in this portion of Scenic Highway. The reconfigured State Route 25, approximately 28 feet higher than existing conditions, and the new ramps would be dominant structures within the viewshed. The single-lane roundabout would be a traffic calming measure; it would provide travelers with a sense of orderliness and serve as a visual entry to the Belmont Circle commercial area. The landscaped treatment in the center of the roundabout would add visual interest. The reconfigured State Route 25 would be 28 feet higher than existing conditions and would be a dominant structure within the viewshed. While the more physically dominating presence of the transportation network would constitute a substantial change from existing conditions, travelers along this portion of Scenic Highway typically would have low sensitivity to this travel corridor. Further, the inclusion of the roundabout, sidewalks, and landscaping would provide visually appealing features to the viewshed.	Incompatible	Travelers/ Low	Neutral

* [Figure 4.15-6](#) shows the Bourne North quadrant visual inventory locations.

4.15.4.5 Bourne South Quadrant Interchange Network

MassDOT identified four visual inventory locations in the Bourne South quadrant highway interchange approach network Project Limits ([Figure 4.15-7](#)).

Figure 4.15-7. Visual Inventory Locations (Bourne South Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

BS1. View from Nickerson-Bourne Funeral Home Parcel

Exhibit 4.15-14a and **Exhibit 4.15-14b** present existing and simulated views from Nickerson-Bourne Funeral Home on State Route 28, facing north (**Figure 4.15-7**, BS1).

Exhibit 4.15-14a. Existing View from Nickerson-Bourne Funeral Home, facing north



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-14b. Simulated View from Nickerson-Bourne Funeral Home, facing north



Source: Massachusetts Department of Transportation, 2025

BS2. View from Cumberland Farms Parcel

Exhibit 4.15-15a and **Exhibit 4.15-15b** present existing and simulated views from the Cumberland Farms parcel at the Bourne South Rotary, facing northeast (**Figure 4.15-7**, BS2).

Exhibit 4.15-15a. Existing View from Cumberland Farms Parcel, facing northeast



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-15b. Simulated View from Cumberland Farms Parcel, facing northeast



Source: Massachusetts Department of Transportation, 2025

BS3. View from Sandwich Road

Exhibit 4.15-16a and **Exhibit 4.15-16b** present existing and simulated views from Sandwich Road, facing west (**Figure 4.15-7**, BS3).

Exhibit 4.15-16a.Existing View from Sandwich Road, facing west



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-16b. Simulated View from lower Sandwich Road, facing west



Source: Massachusetts Department of Transportation, 2025

BS4. View from Upper Cape Cod Regional Technical High School Scenic Overlook

Exhibit 4.15-17a and **Exhibit 4.15-7b** present existing and simulated views from the scenic overlook at Upper Cape Cod Regional Technical High School, facing northwest (**Figure 4.15-7**, BS4).

Exhibit 4.15-17a. Existing View from Upper Cape Cod Regional Technical High School Scenic Overlook, facing northwest



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-17b. Simulated View from Upper Cape Cod Regional Technical High School Scenic Overlook, facing northwest



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Bourne South Quadrant Interchange Approach Network

Table 4.15-5 presents a summary comparison of existing and proposed viewsheds within the Bourne South quadrant interchange approach network. The table assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-5. Anticipated Effects to Viewsheds: Bourne South Quadrant Interchange Approach Network

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BS1	View from Nickerson-Bourne Funeral Home, facing north. Existing: Viewshed includes entrance driveway from State Route 28 to fenced and signed commercial property; utility poles and overhead wiring; divided State Route 28, separated by guardrail and median strip; and dense vegetation bordering State Route 28 northbound; and the Bourne Bridge arch in the distance on the west. Proposed: The new frontage road along State Route 28, implemented for safety and access management, would provide a continuity of visibility of and accessibility to commercial neighbors who would be sensitive to project changes: it would be similar to existing conditions where commercial businesses and their patrons have access and visibility to and from State Route 28. The new shared-use path along the frontage road would provide visual interest. The forested area along existing State Route 28 would be removed; the highway would be relocated approximately 35 feet to the east, elevated by approximately 5 feet, and separated from the frontage road by a landscaped area. Views of Bourne Bridge would be more prominent with the change in realignment, but the difference in the arch height would not be discernible from this distance. Views of the project along this heavily trafficked corridor would be consistent with the visual character of the existing transportation elements.	Compatible	Commercial Neighbors/ High	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BS2	View from Cumberland Farms Parcel, facing northeast. Existing: Viewshed includes commercial signage, off-ramp to State Route 28 south, directional signage, circular drive around rotary with irregular landscaping and vegetation in the center, and utility poles with overhead wiring. Proposed: The removal of the utility poles and overhead wiring would eliminate visual clutter and present a more harmonious and coherent view. Replacement of the two-lane Bourne Rotary with a single-lane, double (dog-bone) roundabout would serve as a traffic calming measure and the channelized entry would allow for visual traffic separation, providing travelers with a sense of orderliness that is not present with the existing rotary that allows for higher speeds. The dog-bone roundabout would improve visibility and access to commercial neighbors. The two center islands of the dog-bone roundabout would provide opportunities for landscaping to add natural elements and visual interest.	Compatible	Commercial Neighbors, Travelers/ Moderate	Beneficial

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BS3	View from Sandwich Road, facing west. Existing: Viewshed includes Sandwich Road at a fork—proceeding southwest on two-lane upper Sandwich Road to State Route 28 or northwest on two-lane lane lower Sandwich Road to Bourne Recreation Area/Bourne Village—one directional sign, and densely forested/brush bordering both sides of Sandwich Road. Proposed: The existing fork separating upper and lower Sandwich Road would be removed, and the existing dense forested canopy bordering Sandwich Road would be removed and replaced with landscaped sloped areas and relocated State Route 28 as prominent features. Upper Sandwich Road would be barely visible from lower Sandwich Road. While the more prominent elevated roadway and the loss of the existing tree canopy would alter the existing rural character along this portion of Sandwich Road, travelers generally would be less sensitive to viewshed changes. Further, the newly landscaped area, and the shared-use path on the north side of lower Sandwich Road would create a harmonious, visually appealing viewshed. Additionally, the substantially improved sight lines for travelers on Sandwich Road would enhance traveler safety and promote a sense of orderliness.	Incompatible	Travelers/ Low	Neutral
BS4	View from Upper Cape Cod Regional Technical School Scenic Overlook, facing northwest. Existing: Viewshed of landscaped and paved scenic overlook with aesthetic visual elements includes Bourne Bridge in the distance as the single focal point. Proposed: The view of the replacement bridge would be consistent with the existing view of Bourne Bridge. Due to the distance from this focal point, the lower height of the top of the arch would not be discernible to the viewer.	Compatible	Institutional and Recreational Neighbors/ High	Neutral

* [Figure 4.15-7](#) shows the Bourne South quadrant visual inventory locations.

4.15.4.6 Visual Effects of the Build Alternative

Beneficial Changes to the Visual Quality of the AVEs

MassDOT determined that the degree of visual impact would be beneficial for the following four visual inventory locations in the interchange approach networks:

- View from Bourne Park and Ride Lot (SN2)
- View from Meetinghouse Lane at State Road (SN3)
- View from Cranberry Highway at Adams Street (SS4)
- View from Cumberland Farms Parcel (BS2)

MassDOT determined that **beneficial changes** to the visual quality of the Sagamore Bridge and Bourne Bridge AVEs would result from the following:

- Removing utility poles and overhead signals and wiring at roadway intersections would present more harmonious and coherent views to travelers and neighbors.
- Replacing existing intersections or rotaries with roundabouts would result in reduced paved areas, increased landscaping, and a sense of orderliness that is not present in the existing condition.
- Incorporating landscaping and shared use paths or pedestrian walkways into the transportation network, thereby providing visual interest and relief from the concrete environment.

Neutral Changes to the Visual Quality of the AVEs

For nine visual inventory locations in the interchange approach networks, MassDOT determined that **neutral changes** to the visual quality of the Sagamore Bridge and Bourne Bridge AVEs would result from the Build Alternative. This total number included the following locations where shifts in the bridge or roadway location and elevation would not be discernible by the viewer:

- View from Church Lane at Cape Pine Road (SN4)
- View from Upper Cape Cod Regional Technical High School Scenic Overlook (BS4)

It also included the following locations with low to moderate viewer sensitivity where proposed effects, including the introduction of new infrastructure, would be consistent with the visual character of the existing transportation environment and/or elements:

- View from Scenic Highway at Church Lane (SN1)
- View from Sandwich Road at Mid-Cape Connector (SS1)
- View from Sandwich Road facing south (SS3)
- View from Belmont Circle (BN1)

A neutral rating was given to one location where the new transportation infrastructure would provide a continuity of access and visibility to commercial neighbors who would be sensitive to project changes:

- View from Nickerson-Bourne Funeral Home (BS1)

The visual inventory included two locations where the more dominant and physically imposing transportation elements would introduce incompatible elements into the existing viewshed, thereby altering the roadway's rural visual character with a more urban appearance. However, due to low viewer sensitivity at these portions of the roadways, and through the incorporation of minimization and mitigation measures, these locations received neutral ratings:

- View from Scenic Highway (BN3)
- View from Sandwich Road facing west (BS3)

MassDOT determined that the visual changes would be neutralized through the introduction of landscaping and pedestrian/bicycle paths to soften the hardscape and provide visual interest, as well as other improvements, such as increased safety, that would enhance the traveler's driving experience.

MassDOT determined that with the minimization measures incorporated into the Build Alternative, the degree of visual impact would be **neutral** for the two visual inventory locations at the bridge sites:

- View from Motorist on Sagamore and Bourne Bridges (B1)
- View of Sagamore and Bourne Bridges from Cape Cod Canal Service Road (B2)

While the demolition of Sagamore Bridge and Bourne Bridge would be an adverse effect on those NRHP-eligible structures, MassDOT selected a replacement bridge design that would closely resemble the existing structures and complement their setting within Cape Cod Canal, to avoid and/or minimize effects to the NRHP-eligible Cape Cod Canal Historic District. [Section 4.15.5](#) further describes measures that MassDOT will incorporate into the Build Alternative to compensate for the loss of the historic structures.

Adverse Changes to the Visual Quality of the AVEs

For the following two visual inventory locations in the interchange approach networks, MassDOT determined that **adverse changes** to the visual quality of the Sagamore Bridge and Bourne Bridge AVEs would result from the Program:

- View from Eleanor Avenue (SS2) – MassDOT determined that the proposed Program effects—potentially acquiring residences for construction of the new bridge, demolition of the existing bridge, and incorporation of stormwater control measures—would adversely affect the sensitivity of the Round Hill residential viewers on the west side of Eleanor Avenue.
- View from Nightingale Road (BN2) – MassDOT determined that the elevated relocated State Route 25 mainline and flyover ramp would introduce incompatible elements to the existing views of residential neighbors, who would be sensitive to their altered views of the landscaped Bourne Scenic Park entrance.

To address these adverse visual effects, MassDOT is proposing minimization and mitigation measures, which are described in [Section 4.15.5](#).

4.15.5 Mitigation

This section describes MassDOT's proposed design-related and construction-related mitigation measures, encompassing minimization, restoration, maintenance, and compensation, for visual effects that cannot be avoided, including the adverse visual effects to the Round Hill neighborhood on the west side of Eleanor Avenue and the Nightingale Road neighborhood viewers resulting from new and realigned transportation infrastructure.

In coordination with the MA SHPO, FHWA and MassDOT will identify mitigation measures to compensate for the loss of the NRHP-eligible Sagamore and Bourne Bridges; these measures will be memorialized as stipulations in the Section 106 Programmatic Agreement for the Program, further discussed in **Section 4.16, Cultural Resources**. As design advances, MassDOT will continue to refine the proposed mitigation measures, as well as identify additional mitigation measures, in coordination with stakeholders and the public.

4.15.5.1 Design-Related Mitigation

Bridge Design

Because of the historic significance of Sagamore and Bourne Bridges and Cape Cod Canal, and the high sensitivity of neighbors and travelers to the loss of the NRHP-eligible structures, MassDOT has selected a design for the replacement bridges that would resemble the overall shape of the historic bridge arches, while also incorporating modern elements into the design and maximizing constructability. For example, the 115-foot rise of the bridge arch was selected to echo the appearance of the existing bridges; the height would also be the upper bound limit that would meet clearance requirements for the anticipated construction method of floating in the completed arch on barges. The number of delta frames in the superstructure has been minimized to create clean lines. Additionally, the series of connected Y-shapes of the proposed piers would introduce a more contemporary version of the straight, vertical pier stems of the existing bridges.

Aesthetic Bridge Lighting

Existing bridge lighting is limited to minimal roadway lighting. MassDOT proposes to provide standard roadway and pedestrian-scale lighting along the highway bridges, the approach highway networks, and shared-use paths (SUP). In keeping with the historic nature of Cape Cod Canal, MassDOT is considering aesthetic bridge lighting concepts that propose understated, low-level lighting of the bridge arch and different bridge components, such as the bridge cables, inner piers, outer piers, and inner delta frames. As design advances, MassDOT will continue to evaluate incorporating aesthetic lighting for the new bridges.

Incorporation of Recreational Amenities as Visual Enhancements

At each bridge crossing, MassDOT is proposing to create a walkway/fishing platform at the top of the delta pier footing, at the same elevation as the Canal Service Road. Additionally, at each bridge crossing, MassDOT proposes to incorporate a scenic overlook at the top of the bridge arch. The overlook would be constructed by widening the proposed pedestrian/bicycle SUP.

Both of these recreational amenities would provide visual enhancements of the Cape Cod Canal Historic District by providing new vistas of Cape Cod Canal as a visual natural resource and cultural resource.

Exhibit 4.15-18 provides a conceptual plan of the pier walkway/fish platform, and **Exhibit 4.15-19** provides a conceptual plan of the scenic overlook at the bridge arch.

Exhibit 4.15-18. Conceptual Plan of Pier Walkway/Fishing Platform



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-19. Conceptual Plan of Bridge Scenic Overlook



Source: Massachusetts Department of Transportation, 2024

Landscaping

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 on Cape Cod, MassDOT proposes to implement a substantial landscaping plan to repair, restore, and enhance the landscape flanking the mainline highways, bridges, and local roads and connections. MassDOT's goals for the landscaping plan correlate with the goals identified in **Appendix 4.15, Visual Impact Assessment**, to maintain and enhance visual quality:

- Revegetate all areas disturbed by construction around the new Sagamore and Bourne Bridges, adjacent highways, local roadways, SUPs, stormwater and utility infrastructure, and construction staging areas.
- Develop landscape zones that restore and/or enhance existing habitats and reinforce the unique landscape character of the region.
- Screen undesirable views for both users of the Project Limits as well as abutters.
- Improve sight lines and views while mitigating the appearance of undesirable areas within and beyond the bridge sites.
- Soften the visual appearance of new and expanded infrastructure to maintain the character of the region.
- Utilize landscape to create gateways as visitors approach Cape Cod, including placemaking opportunities as visitors enter and exit Cape Cod.
- Enhance pedestrian zones with planting at trailheads, in medians, and in roundabouts in lieu of impervious surfaces.
- Integrate stormwater basins with the surrounding restored landscapes so they appear natural and contribute to the creation of habitat as much as possible.
- Maintain site visibility for safety along highways and roadways and around pedestrian zones and off-road areas for site security.

MassDOT's landscape plan consists of developing several landscape types to restore the disturbed site and to integrate the new infrastructure into the landscape. These landscape types include landscape restoration, reforestation, street tree planting, limited areas for lawn, stormwater basins and rain gardens, buffer planting, roundabout planting, and special plantings. [Exhibits 4.15-4b, 4.15-8b, 4.15-12b, and 4.15-16b](#) present examples of landscape treatments that are incorporated into the Program infrastructure to restore, maintain, and enhance visual quality.

Coordinated Shared-Use Path Site Elements

In recognition of the community's goals to protect its existing cultural and landscape assets, MassDOT is designing features and amenities of the Program's pedestrian and bicycle zones and SUPs to provide a coherent and coordinated appearance and complement the town's unique character. Examples include designating trailheads, overlooks, and waysides through special pavements or stamped/

colored concrete; using natural and color-coordinated site furnishings along the SUPs, such as bench seating, trash receptacles, and railings; and providing themed interpretive and wayfinding signage.

Aesthetic Wall Treatments

MassDOT is investigating the visual/aesthetic treatment of bridge abutment walls and retaining walls required throughout the Sagamore Bridge and Bourne Bridge AVEs. Based on their visibility to travelers and neighbors, different finish materials, including materials echoing the rural character of Cape Cod, may be utilized. MassDOT has categorized walls in the AVEs by priority:

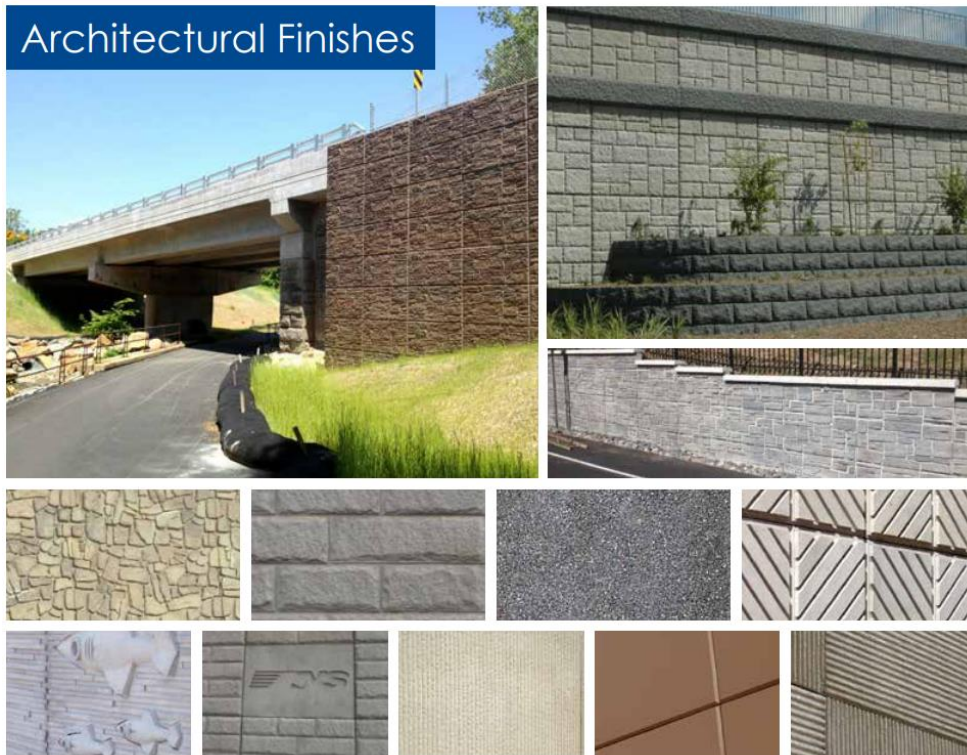
- **High Priority Walls** would be very visible to the public, including where the Cape Cod character would be important to highlight. An example of a high priority wall would be the retaining wall supporting the SUP at the Bourne South quadrant where the State Route 28 south off-ramp connects to Trowbridge Road. In this location, a cast-in-place retaining wall with New England fieldstone veneer would be aesthetically pleasing and appropriate for the site character. Interpretive features could also be incorporated into the wall. Other high priority walls would include smaller retaining walls along SUPs that would be visible to recreation neighbors.
- **Medium Priority Walls** would include most bridge abutments and wingwalls that are near and visible from local roadways and SUPs, and walls that retain local roadways that would be visible to residential and commercial neighbors. An example treatment for the cast-in-place concrete walls would be a formliner to create a pattern on the wall face.¹³ Plant material could also be used to screen portions of these walls.
- **Low Priority Walls** would include retaining walls that support highways and ramps facing naturalized areas, interiors to off- and on-ramps, and walls that are distant from local roads and residential neighbors. Example treatments could include concrete block gravity walls.

As design advances, and as appropriate for the wall location, MassDOT is investigating the use of different types of walls and wall treatments to minimize effects to visual quality.

The many wall types being evaluated include stone masonry walls; mechanically stabilized earth (MSE) walls or prefabricated walls with stamped, textured, and/or colored designs; pre-fabricated modular walls; and cast-in-place concrete walls, which can include precast concrete veneers with a variety of textures and finishes. [Exhibit 4.15-20](#) presents an example of architectural wall finishes.

¹³ A wall formliner consists of a plastic or rubber liner that is used to create a texture or pattern onto a concrete surface.

Exhibit 4.15-20. Examples of Aesthetic Wall Treatments



4.15.5.2 Construction-Related Mitigation

To minimize visual effects in the Sagamore Bridge and Bourne Bridge AVEs, MassDOT would incorporate construction-related mitigation into the Program through permits, special provisions and guidance documents, and its Standard Specifications for Highways and Bridges (2024 Edition, Division II).

The Program's Stormwater Pollution Prevention Plan, described in **Section 4.10.7, Water Quality and Stormwater, Mitigation**, would contain multiple measures to reduce adverse effects from construction, including, among other control measures, the requirement to stabilize disturbed areas and minimize the extent of disturbance at any one time.

MassDOT has issued extensive guidance for tree preservation, including plant protection fencing for public places and staging or other construction activity near desirable vegetation. As applicable, MassDOT will use plant protection fencing to minimize effects to visual natural resources.

MassDOT's manual of Standard Specifications for Highways and Bridges contains standard specifications to mitigate for temporary construction-related effects, including potential effects to visual quality. Construction-related mitigation to be incorporated into the Program would include minimizing fugitive light from portable sources and directing light sources away from residential areas and restoring all disturbed areas at the completion of construction.