

4 Affected Environment, Environmental Consequences, and Mitigation

4.3 Pedestrian and Bicycle Facilities

4.3.1 Introduction

This section assesses the potential construction and operational effects of the No Build Alternative and Build Alternative on existing pedestrian and bicycle transportation facilities and identifies mitigation measures that will be implemented to avoid or minimize any potential adverse effects to these resources. This assessment specifically focuses on the effects of the alternatives on pedestrian and bicycle safety, accessibility, connectivity, and opportunities for future local and regional multimodal connections.

This section also assesses the consistency of the alternatives with federal, state, and municipal plans, policies, and guidelines related to pedestrian and bicycle transportation facilities.

4.3.1.1 Resource Definition

Pedestrian facilities include sidewalks, crosswalks, curb ramps, walkways, paths, and trails that are exclusively for pedestrians in the public right-of-way. Bicycle facilities include a portion of roadway, shoulder, or public right-of-way that has been designated for preferential or exclusive use by bicyclists by pavement markings and/or signage. Bicycle facilities also include bike-share facilities and bicycle parking areas. Pedestrian and bicycle facilities also include off-road shared-use or multi-use facilities commonly used by pedestrians, bicyclists, and other nonmotorized users. In this section, a shared-use path (SUP) refers to infrastructure where pedestrians and bicyclists share the same path of travel, whereas a shared-use facility refers to infrastructure that provides separated space for both pedestrians and bicyclists.

4.3.1.2 Regulatory Context

Bicycle and pedestrian needs must be given due consideration in developing and implementing federal aid transportation projects under federal surface transportation law.¹ The [Americans with Disabilities Act](#) (ADA),² and [Section 504 of the Rehabilitation Act of 1973](#) require that new construction and alteration of pedestrian facilities be accessible to persons with disabilities.³

¹ [23 United States Code \(USC\) Section 217: Bicycle transportation and pedestrian walkways](https://uscode.house.gov/view.xhtml?req=granuleid:USC-2010-title23-section217&num=0&edition=2010).

<https://uscode.house.gov/view.xhtml?req=granuleid:USC-2010-title23-section217&num=0&edition=2010>

² 42 USC Sections 12131 through 12164. <https://www.ada.gov/>

³ 29 USC Section 794. <https://www.hhs.gov/civil-rights/for-individuals/disability/section-504-rehabilitation-act-of-1973/index.html>

Policy statements, design guidelines, and regulations that apply to pedestrian and bicycle transportation facilities include the following:

- [U.S. Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations](#)⁴
- [Federal Highway Administration \(FHWA\) Technical Advisory T 6640.8A](#)⁵
- [FHWA Bikeway Selection Guide](#)⁶
- [Massachusetts Department of Transportation \(MassDOT\) Engineering Directive E-20-001](#)⁷
- [MassDOT Project Development and Highway Design Guide](#)⁸
- [MassDOT Separated Bike Lane Planning and Design Guide](#)⁹
- [MassDOT Healthy Transportation Policy](#)¹⁰
- [U.S. Access Board's Public Right-of-Way Accessibility Guidelines](#)¹¹
- [Statewide Bicycle Transportation Plan](#)¹²
- [Statewide Pedestrian Transportation Plan](#)¹³

4.3.1.3 Methodology and Study Area

MassDOT obtained mapping and information for existing pedestrian and bicycle transportation facilities through site visits (November 2024) and geographic information systems databases, including MassMapper, Massachusetts GeoDOT Open Data Portal, as well as internet-based sources such as Google Maps. MassDOT identified information on future planned pedestrian and bicycle transportation facilities by reviewing the following:

- [Cape Cod 2024 Regional Transportation Plan](#)¹⁴

⁴ https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm?_gl=1*eiuu5u*_ga*MTQ5MTA0MDQ3Ny4xNzM4NzY0Mjk0*_ga_VW1SFWJKBB*MTczODc2NDI5My4xLjAuMTczODc2NDMwMi4wLjAuMA

⁵ https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_preparing_env_documents.aspx

⁶ https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

⁷ <https://www.mass.gov/doc/controlling-criteria-and-design-justification-process-for-massdot-highway-division-projects-e/download>

⁸ <https://www.mass.gov/manual/massdot-project-development-and-design-guide>

⁹ <https://www.mass.gov/lists/separated-bike-lane-planning-design-guide>

¹⁰ <https://www.mass.gov/doc/healthy-transportation-policy-directive/download>

¹¹ <https://www.access-board.gov/prowag/technical.html>

¹² <https://www.mass.gov/info-details/bicycle-plan>

¹³ <https://www.mass.gov/info-details/pedestrian-plan>

¹⁴ <https://www.capecodcommission.org/our-work/rtp/>

- [Cape Cod Metropolitan Planning Organization Federal Fiscal Year 2026-2030 Transportation Improvement Program](https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/tr/Transportation%20Plans/TIP/FY2026-2030%20TIP/Endorsement%20Files/Cape_Cod_2026-2030_Transportation_Improvement_Program%20-%20Endorsed%20May%2019%202025.pdf)¹⁵
- [Town of Bourne Local Comprehensive Plan](https://www.capecodcommission.org/resource-library/file?url=%2Fdept%2Fcommission%2Fteam%2Fmember%2FProject+Documents%2FInactive+Reviews%2FPlans%2FBourne+LCP+Certification%2FApplication_Materials%2F2019.11.12+Bourne+LCP+for+Review.pdf)¹⁶

The Study Areas for this assessment include areas within 500 feet of the [refined](#) Project Limits of the Build Alternative at Sagamore Bridge and Bourne Bridge.

4.3.2 Affected Environment

Gaps and unsafe conditions exist in pedestrian and bicycle access across Cape Cod Canal via Sagamore Bridge and Bourne Bridge and between adjacent roadways. There is also a lack of pedestrian and bicycle access to surrounding shared-use facilities within the Study Areas. Many roadways in the Study Areas include a sidewalk on one side of the road. Many sidewalks are discontinuous, noncompliant with ADA standards, or in need of repair. The following sections describe existing pedestrian and bicycle transportation facilities within the Study Areas, with additional details provided for each of the following Study Area quadrants: Sagamore North, Sagamore South, Bourne North, and Bourne South. Discussion of planned pedestrian and bicycle facilities is also presented.

4.3.2.1 Existing Pedestrian and Bicycle Facility Network

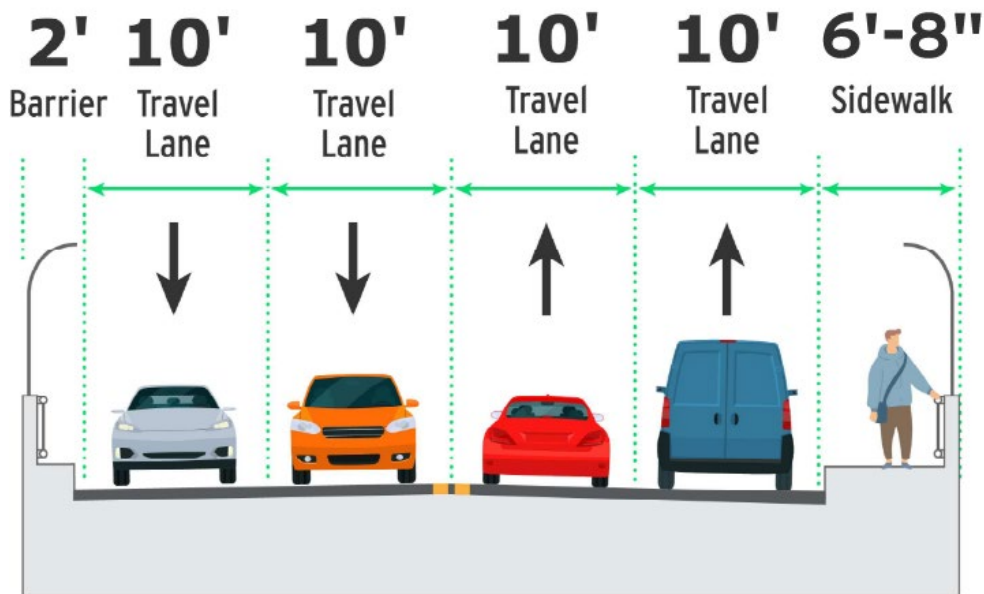
Sagamore Bridge and Bourne Bridge

Sagamore Bridge and Bourne Bridge provide the only roadway connections for vehicles and pedestrians across Cape Cod Canal. Each bridge provides a narrow, raised, 6-foot, 8-inch-wide sidewalk along one side that includes steep grades of up to 6%, which are noncompliant with ADA standards. There are no dedicated accommodations for bicycle travel on the bridges. The lack of shoulders and physical barrier separation between the sidewalks and vehicle traffic lanes on the bridges presents safety risks and discomfort for pedestrians due to the proximity of moving motor vehicles. [Figure 4.3-1](#) provides a representative cross-section of the existing bridges.

¹⁵ https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/tr/Transportation%20Plans/TIP/FY2026-2030%20TIP/Endorsement%20Files/Cape_Cod_2026-2030_Transportation_Improvement_Program%20-%20Endorsed%20May%2019%202025.pdf

¹⁶ https://www.capecodcommission.org/resource-library/file?url=%2Fdept%2Fcommission%2Fteam%2Fmember%2FProject+Documents%2FInactive+Reviews%2FPlans%2FBourne+LCP+Certification%2FApplication_Materials%2F2019.11.12+Bourne+LCP+for+Review.pdf

Figure 4.3-1. Representative Existing Bridge Cross-Section



Source: Massachusetts Department of Transportation, 2024

For safety reasons, limited-access highways within the Study Areas—State Route 3 and U.S. Route 6 approaching Sagamore Bridge, and State Route 25 approaching Bourne Bridge (north of Cape Cod Canal)—prohibit pedestrian access and do not provide sidewalks. Bicycle access is also prohibited along these limited-access highways.

Shared-use Canal Service Roads

Within the Study Areas, the [shared-use Canal](#) Service Roads¹⁷ run along the north and south sides of Cape Cod Canal. The U.S. Army Corps of Engineers (USACE) [operates](#) and maintains these service roads as navigational support for the Cape Cod Canal Federal Navigation Project. The north-[side shared-use Canal](#) Service Road is approximately 7 miles long, while the south-[side Canal](#) Service Road is approximately 6.5 miles long. While the purpose of these service roads is primarily for navigation support, they are also popular resources for bicycling, walking, and jogging. As illustrated in [Figure 4.3-2](#), public access to the [shared-use Canal](#) Service Roads is provided from three points in the Study Areas:

- North of Cape Cod Canal
 - Sagamore Recreation Area
 - Bourne Scenic Park
- South of Cape Cod Canal
 - Bourne Recreation Area

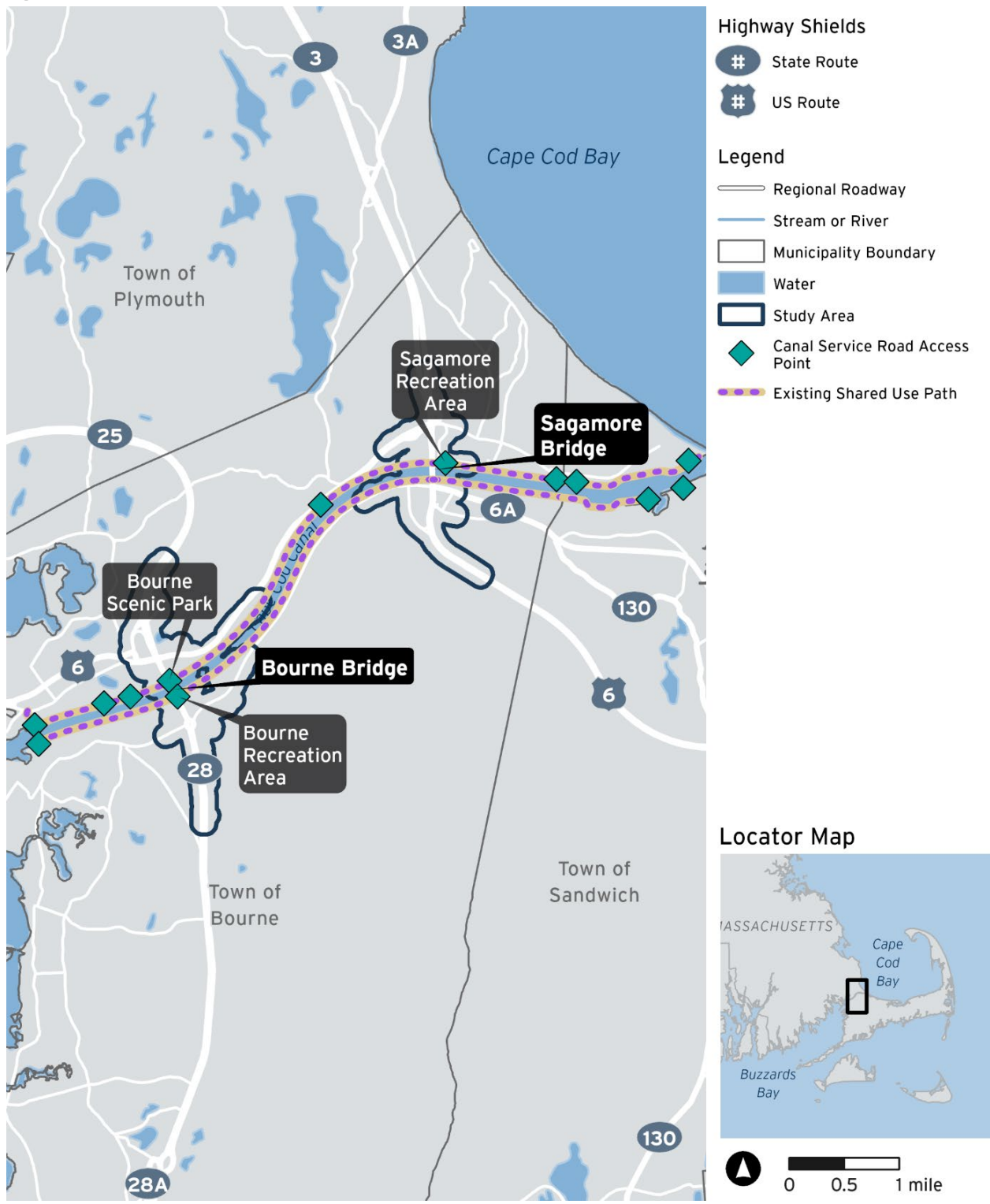
¹⁷ For this section of the Final Environmental Impact Statement, the U.S. Army Corps of Engineers (USACE)-operated Cape Cod Canal Service Roads are referred to as “shared-use Canal Service Roads.”

Regional Bicycle and Pedestrian Routes

Within the Study Areas, there are two regional bicycle and pedestrian routes (refer to [Figure 4.3-3](#) illustrating segments of these routes):

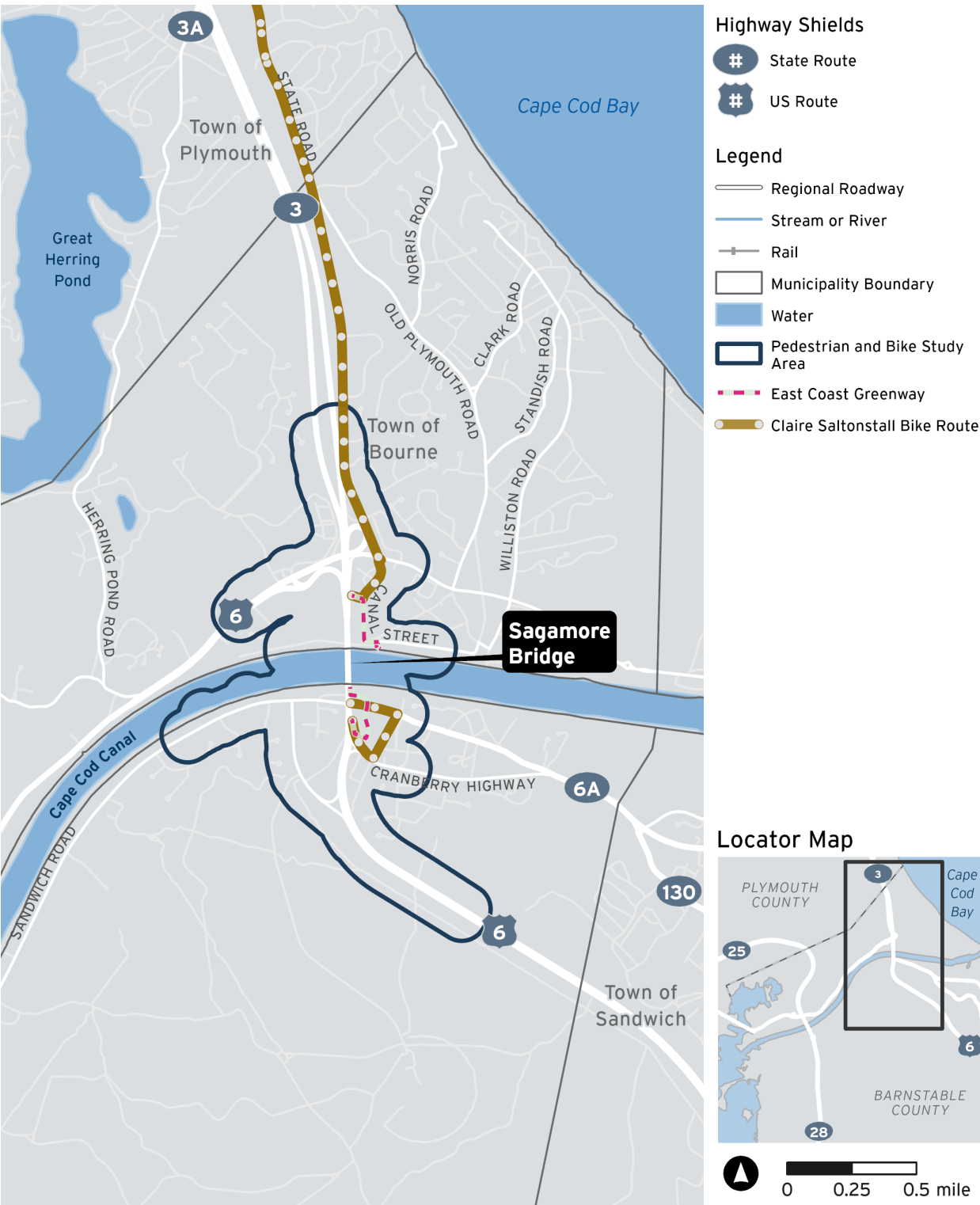
- The Claire Saltonstall Memorial Bikeway is a series of bike paths and on-street routes that travel from the Charles River Bike Path in Boston to Provincetown and Woods Hole in Cape Cod.
- The East Coast Greenway is a 3,000-mile-long pedestrian and bicycle route between Maine and Florida along the East Coast of the United States.

Figure 4.3-2. Shared-Use Canal Service Road Public Access Points



Source: Massachusetts Department of Transportation, 2025

Figure 4.3-3. Regional Bikeways (Sagamore Bridge Study Area)



Source: Massachusetts Department of Transportation, [2025](#)

Sagamore North Quadrant

North of Cape Cod Canal, the Sagamore Bridge walkway provides pedestrian access to the sidewalk along the east side of Sagamore Bridge at the southern end of the Bourne Park and Ride Lot.

Exhibit 4.3-1 depicts the Sagamore Bridge sidewalk.

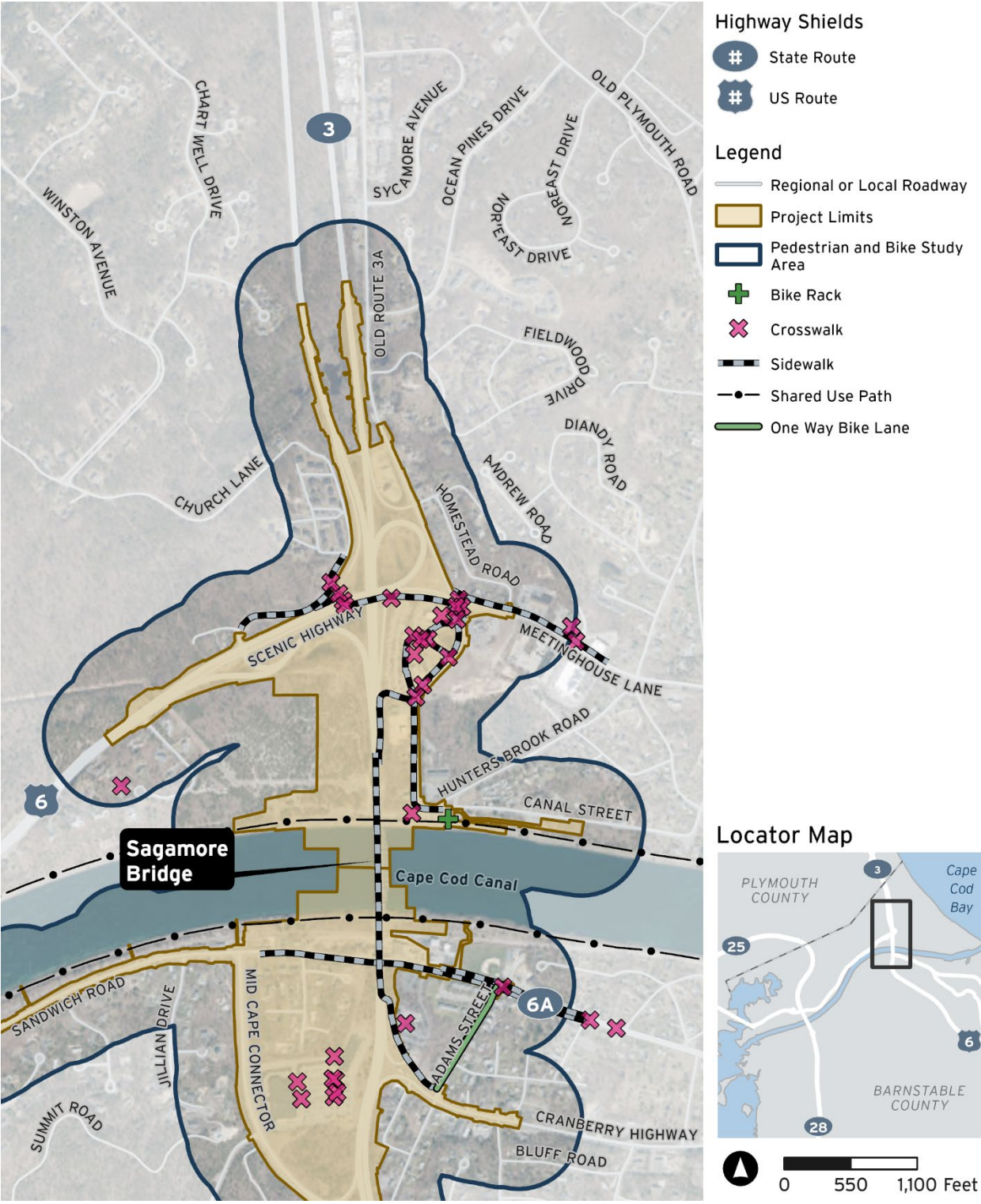
Exhibit 4.3-1. Walkway Leading to Sagamore Bridge



Source: Massachusetts Department of Transportation, 2024

As illustrated in **Figure 4.3-4**, there are missing links or gaps in the network of bicycle and pedestrian facilities from Sagamore Bridge to surrounding neighborhoods south of Scenic Highway and east of State Road (Old Route 3A). There is also a lack of pedestrian and bicycle connectivity to [the shared-use Canal Service Road](#) west of the Sagamore Bridge approach. Apart from the shared use of the Canal Service Road, there is a lack of off-road shared-use facilities in the Sagamore North quadrant.

Figure 4.3-4. Existing Pedestrian and Shared-Use Facilities (Sagamore North Quadrant)



Source: Massachusetts Department of Transportation, 2025

Sagamore South Quadrant

The sidewalk along the east side of Sagamore Bridge ends immediately south of the bridge at a driveway near the windmill at the former Christmas Tree Shops store in Bourne (5 Cranberry Highway).

Exhibit 4.3-2 depicts the Sagamore Bridge sidewalk terminus south of Cape Cod Canal.

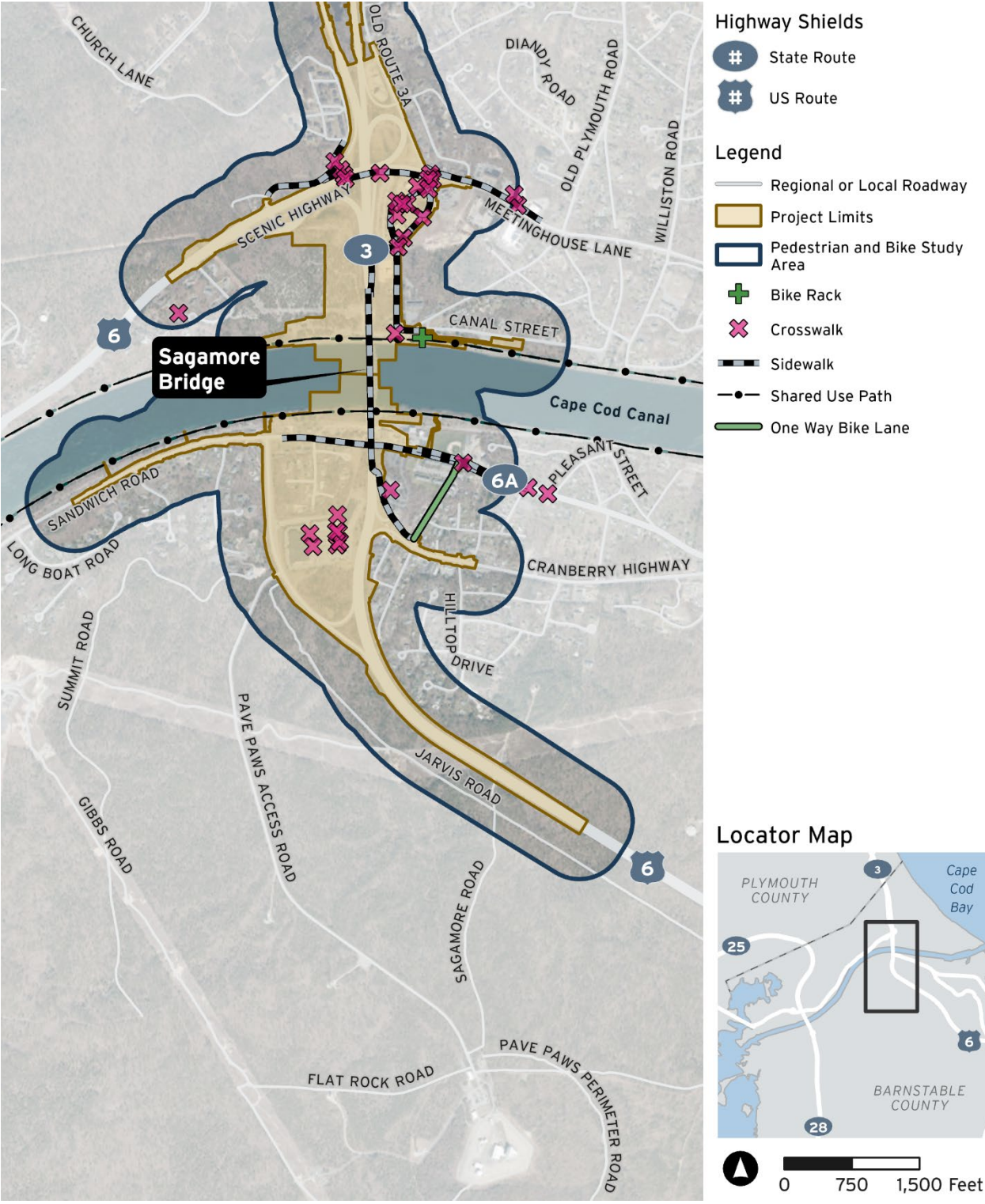
Exhibit 4.3-2. Sagamore Bridge Sidewalk Terminus at Cul-de-Sac (5 Cranberry Highway)



Source: Massachusetts Department of Transportation, 2024

As illustrated in **Figure 4.3-5**, there are missing links or gaps in the network of bicycle and pedestrian facilities from Sagamore Bridge to surrounding neighborhoods north and south of Sandwich Road and Cranberry Highway. There is also a lack of pedestrian and bicycle connectivity from surrounding neighborhoods to the shared-use Canal Service Road and to Factory Outlet Way, which provides access to a commercial complex, including the Market Basket grocery store and other retail businesses. There is a one-way, marked, on-road bicycle lane along the east side of Adams Street from Sandwich Road ending near its intersection with Cranberry Highway. This marked on-road bicycle lane on Adams Street is part of the Claire Saltonstall Memorial Bikeway (**Figure 4.3-5**). Apart from the shared use of Canal Service Road, there is a lack of off-road shared-use facilities in the Sagamore South quadrant.

Figure 4.3-5. Existing Pedestrian and Shared-Use Facilities (Sagamore South Quadrant)



Source: Massachusetts Department of Transportation, [2025](#)

Bourne North Quadrant

North of Cape Cod Canal, a narrow, paved walkway from the cul-de-sac at Old Bourne Bridge approach provides pedestrian access to the sidewalk along the west side of Bourne Bridge. [Exhibit 4.3-3](#) depicts the paved walkway connection from Old Bourne Bridge approach leading to Bourne Bridge.

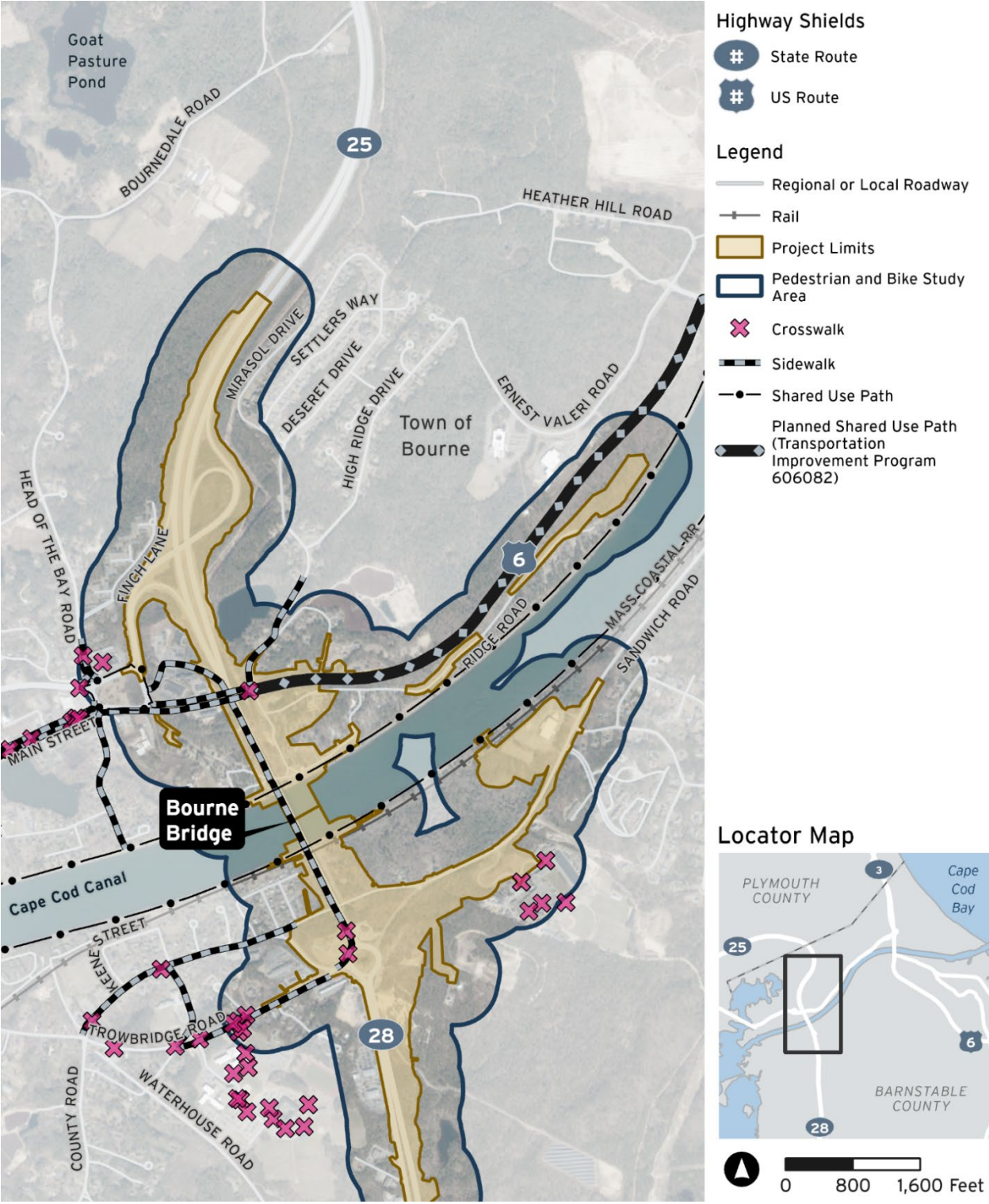
Exhibit 4.3-3. Paved Walkway Leading to Bourne Bridge



Source: Massachusetts Department of Transportation, 2024

In 2023, MassDOT completed traffic and multimodal improvements at Belmont Circle under MassDOT Project File No. 606900. This project installed sidewalks and a SUP along the outer perimeter of the circle, with connections to sidewalks along the roadway approaches to the circle including Scenic Highway, Old Bridge Road, Main Street, Buzzards Bay Bypass, Head of the Bay Road, and Bourne Bridge approach, which provides pedestrian access to Bourne Bridge. In 2025, MassDOT plans to construct a SUP on the south side of Scenic Highway under Project File No. 606082 that would run west to east from the intersections at Nightingale Road/Andy Oliva Drive to Edgehill Road. The western terminus of the planned SUP under MassDOT Project File No. 606082 would be within the Bourne North quadrant. [Figure 4.3-6](#) depicts existing and planned pedestrian and bicycle facilities within the Bourne North quadrant.

Figure 4.3-6. Existing and Planned Pedestrian and Shared-Use Facilities (Bourne North Quadrant)



Source: Massachusetts Department of Transportation, 2025

Bourne South Quadrant

The sidewalk along the west side of Bourne Bridge ties into a short section of a SUP that continues through the northwest quadrant of Bourne Rotary to the second driveway of the District 7 State Police barracks, where it ends near the intersection at Veterans Way and Trowbridge Road. [Exhibit 4.3-4](#) depicts the SUP terminus from the Bourne Bridge sidewalk near the intersection at Veterans Way and Trowbridge Road. There is no crosswalk at this intersection to facilitate pedestrian crossing to the sidewalk on Trowbridge Road, which leads to the Bourne Intermediate, Middle, and High Schools.

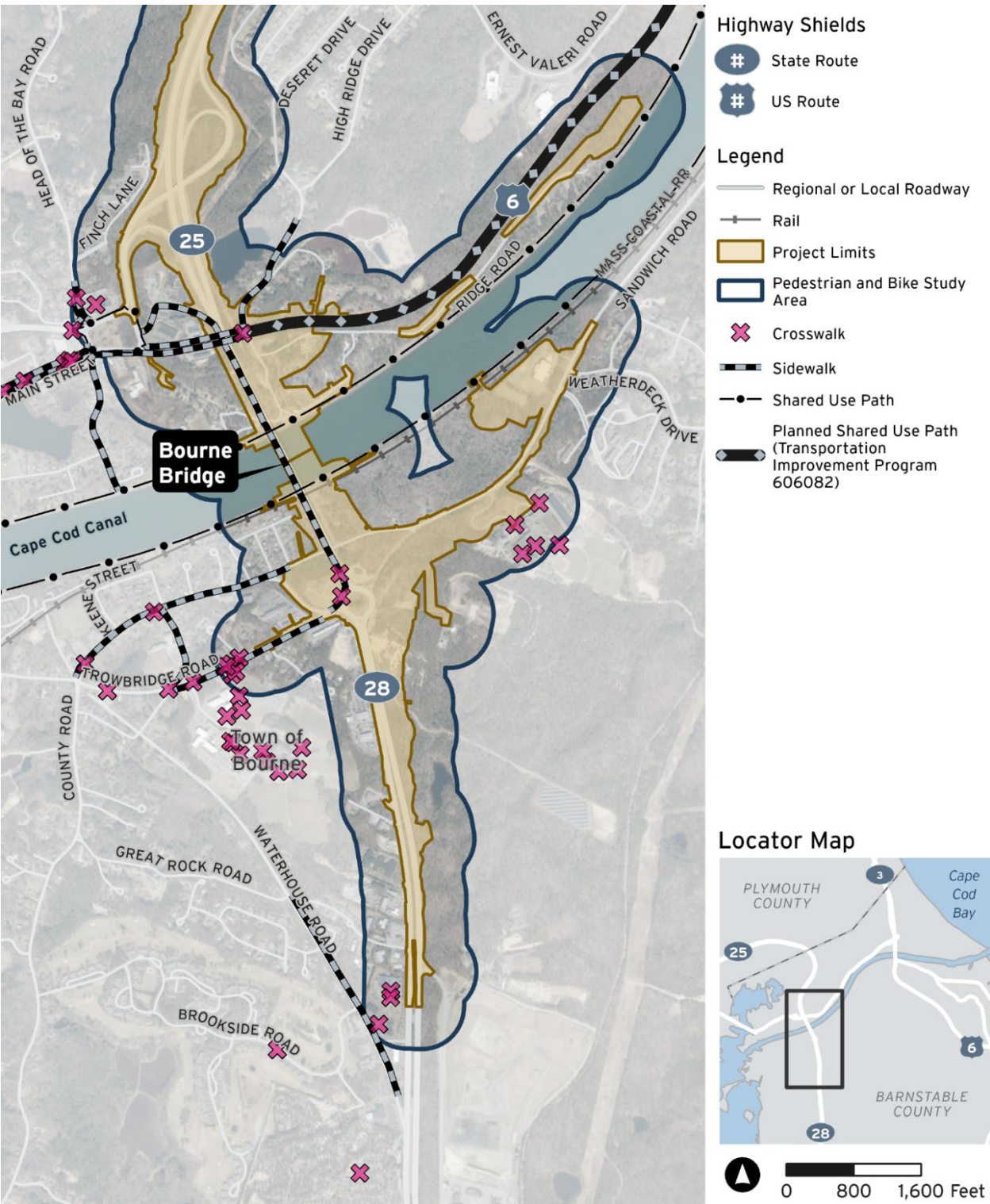
Exhibit 4.3-4. Shared-Use Path Terminus at District 7 State Police Barracks Driveway



Source: Massachusetts Department of Transportation, 2024

As illustrated in [Figure 4.3-7](#), there are gaps in the network of pedestrian facilities from Bourne Bridge to neighborhoods along Sandwich Road and Trowbridge Road, and to the Upper Cape Cod Regional Technical High School at 220 Sandwich Road. Apart from the shared use of the Canal Service Road and the short section of the SUP in the northwest quadrant of the Bourne Rotary that ties into the sidewalk on Bourne Bridge, there is a lack of off-road shared-use facilities in the Bourne South quadrant.

Figure 4.3-7. Existing Pedestrian and Shared-Use Facilities (Bourne South Quadrant)



Source: Massachusetts Department of Transportation, 2025

Pedestrian and Bicycle Crash Records

High traffic volumes, narrow roadways, and gaps in the pedestrian and bicycle network within the Study Areas pose risks to pedestrian and bicyclist safety. According to pedestrian and bicycle crash records from 2018 to 2023, there were four reported incidents of vehicular collisions with pedestrians within the Sagamore Bridge Study Area. [Table 4.3-1](#) provides details of the reported vehicle-pedestrian crashes within the Project Limits in the Sagamore Bridge Study Area. Based on available crash records from 2018 to 2023, there were no reported incidents of vehicular collisions with cyclists in the Sagamore Bridge Study Area during this period. [Figure 4.3-8](#) illustrates the map IDs in [Table 4.3-1](#) that correspond to pedestrian crash locations within the Project Limits in the Sagamore Bridge Study Area.

Table 4.3-1. Vehicle-Pedestrian Crashes, 2018 to 2023 (Sagamore Bridge Study Area)

Map ID	Street Address	Severity	Vehicle Maneuver
24	Commerce Way (near Sagamore Park and Ride Lot)	Nonfatal injury	Backing up
25	778 Sandwich Road (near the intersection with the Mid-Cape Connector)	No apparent injury	Turning left
26	1 Factory Outlet Way at Market Basket Parking Lot	Nonfatal injury	Backing up
27	880 Sandwich Road (near the intersection with Adams Street)	Suspected serious injury	Traveling straight ahead

Source: Massachusetts Department of Transportation, 2024

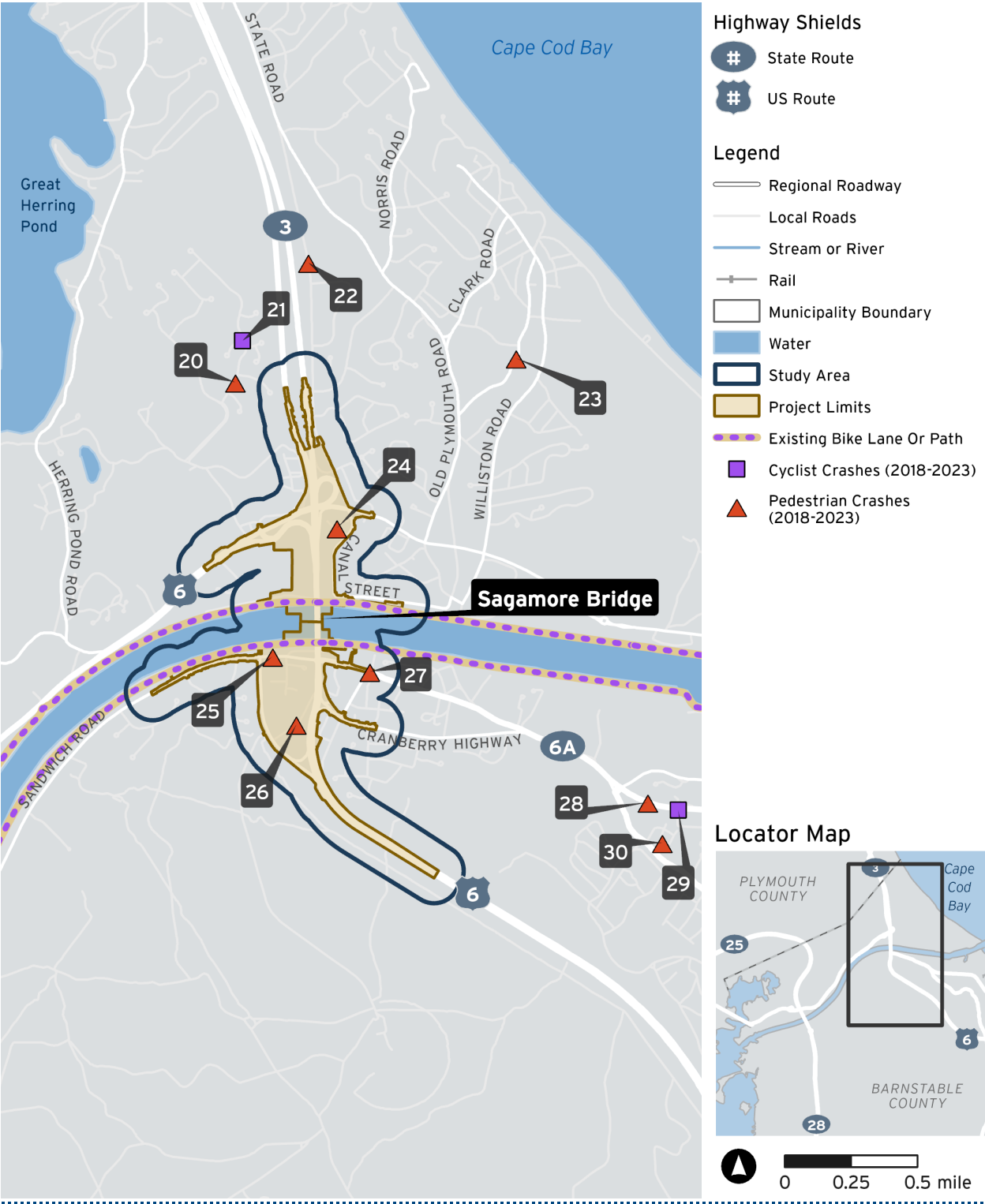
According to pedestrian and bicycle crash records from 2018 to 2023, there were four reported incidents of vehicle collisions with pedestrians and bicyclists from 2018 to 2023, which are listed in [Table 4.3-2](#). [Figure 4.3-9](#) illustrates the map IDs in [Table 4.3-2](#) that correspond to pedestrian and bicyclist crash locations within the Project Limits in the Bourne Bridge Study Area.

Table 4.3-2. Vehicle-Pedestrian and Bicyclist Crashes, 2018 to 2023 (Bourne Bridge Study Area)

Map ID	Street Address	Severity	Vehicle Maneuver
11	East Rotary Route/Route 25 On-Ramp Route	Nonfatal injury	Vehicle traveling straight ahead
13	370 Scenic Highway (near Andy Oliva Drive intersection at Bourne Scenic Park)	Nonfatal injury	Sideswipe with bicyclist
14	105 Trowbridge Road (near Cape Side Convenience store)	Suspected serious injury	Slowing or stopped in traffic; vehicle traveling straight
15	290 McArthur Boulevard (near Harbor Hill Drive)	Suspected serious injury	Angle crash with bicyclist in shoulder

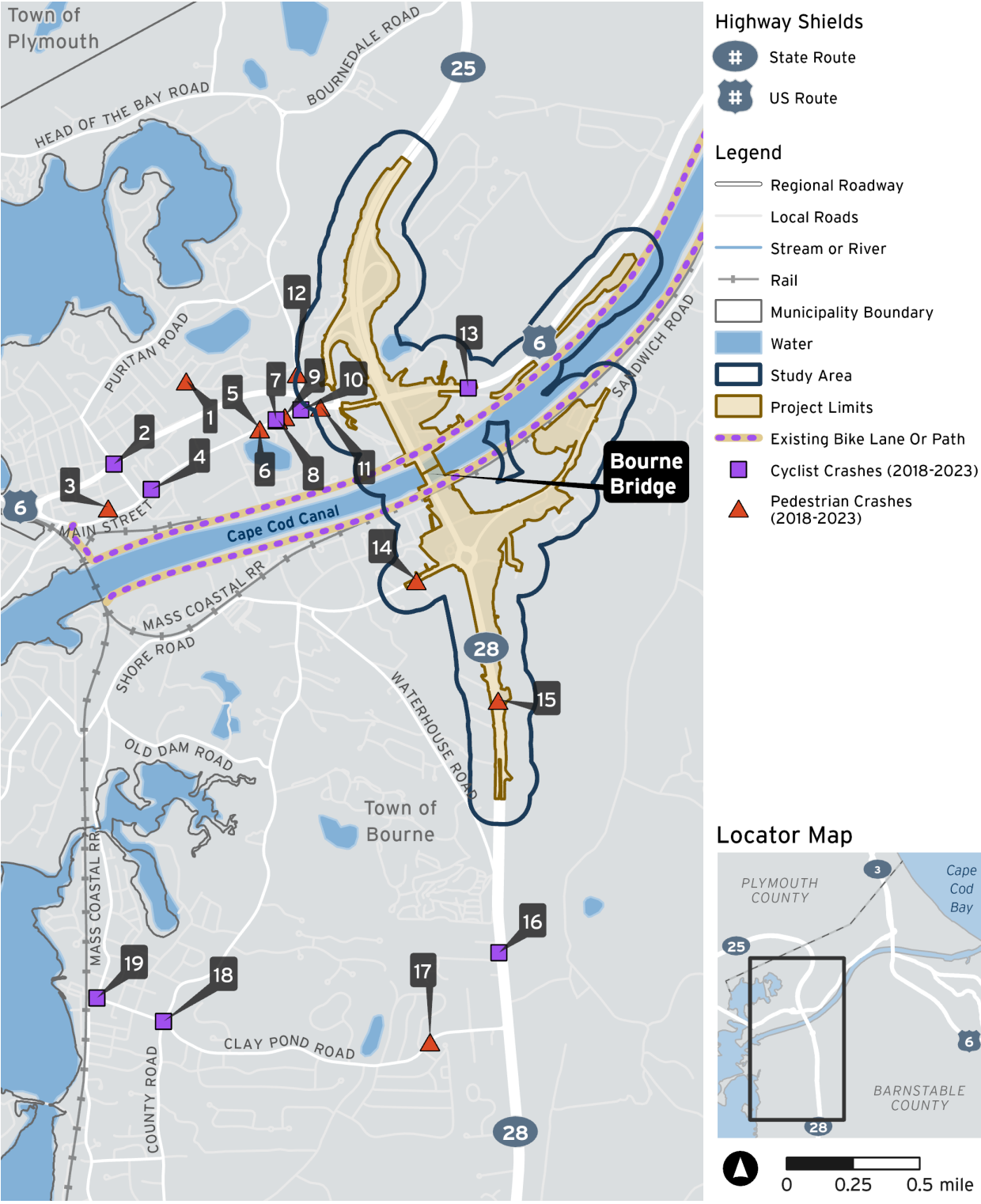
Source: Massachusetts Department of Transportation, 2024

Figure 4.3-8. Vehicle-Pedestrian and Bicyclist Crashes, 2018 to 2023 (Sagamore Bridge Study Area)



Source: Massachusetts Department of Transportation, 2025

Figure 4.3-9. Pedestrian and Bicyclist Crashes, 2018–2023 (Bourne Bridge Study Area)



Source: Massachusetts Department of Transportation, 2025

4.3.3 No Build Alternative

The No Build Alternative would involve continual maintenance and repairs to Sagamore Bridge and Bourne Bridge and their approaches to ensure the safety of the traveling public.

While recently completed and proposed transportation improvement projects on the Transportation Improvement Program (**Chapter 3, Table 3-2**) would improve conditions and expand opportunities for bicycling and walking on Cape Cod, the No Build Alternative would result in continued limitations to pedestrian and bicycle safety and mobility due to geometric and multimodal deficiencies of Sagamore Bridge and Bourne Bridge, which provide the only roadway access points to and from Cape Cod.

The No Build Alternative would not improve pedestrian and bicycle accommodations, mobility, or accessibility across Cape Cod Canal, which fails to satisfy the Cape Cod Bridges Program's purpose and need. Without improvements to pedestrian and bicycle accommodations across the bridges and connections to the local roadway network, the No Build Alternative would fail to satisfy the goals of the Statewide Bicycle and Statewide Pedestrian Transportation Plans, which seek to make walking and biking safe, comfortable, and convenient options for short trips.

4.3.4 Build Alternative

Under the Build Alternative, each replacement bridge would provide designated pedestrian and bicycle infrastructure separated from vehicular traffic. At minimum, there would be 14 feet of separation due to a 12-foot highway shoulder and a 2-foot concrete barrier and at maximum, the separation would exceed 20 feet at the network tied arch. Because Sagamore Bridge and Bourne Bridge serve high traffic volumes (more than 6,000 vehicles per day) with vehicle speeds exceeding 35 mph, separated facilities for bicycle and pedestrian users are proposed to reduce potential conflicts with vehicles.¹⁸ The replacement bridges would provide a 20-foot-wide cross-section for pedestrians and bicyclists along the approach spans. The 20-foot-wide structure width would vary in effective width¹⁹ over the main span.

The cross-section design evaluated the most efficient use of the available width to accommodate the comfort level of the anticipated users and the safety of each mode. The maximum longitudinal grade for all shared-use facilities, including bridge profiles, is 4.5% to meet ADA requirements of 5.0%. According to the AASHTO Guidelines,²⁰ separation is recommended for facilities that anticipate large speed differentials between users. Because the bridge profiles sustain long stretches of 4.0% (Sagamore Bridge) and 4.5% (Bourne Bridge) downgrades on the approaches, increased speeds of 30 mph are anticipated for bicyclists on the descent, and separation between modes is proposed for user safety and comfort.

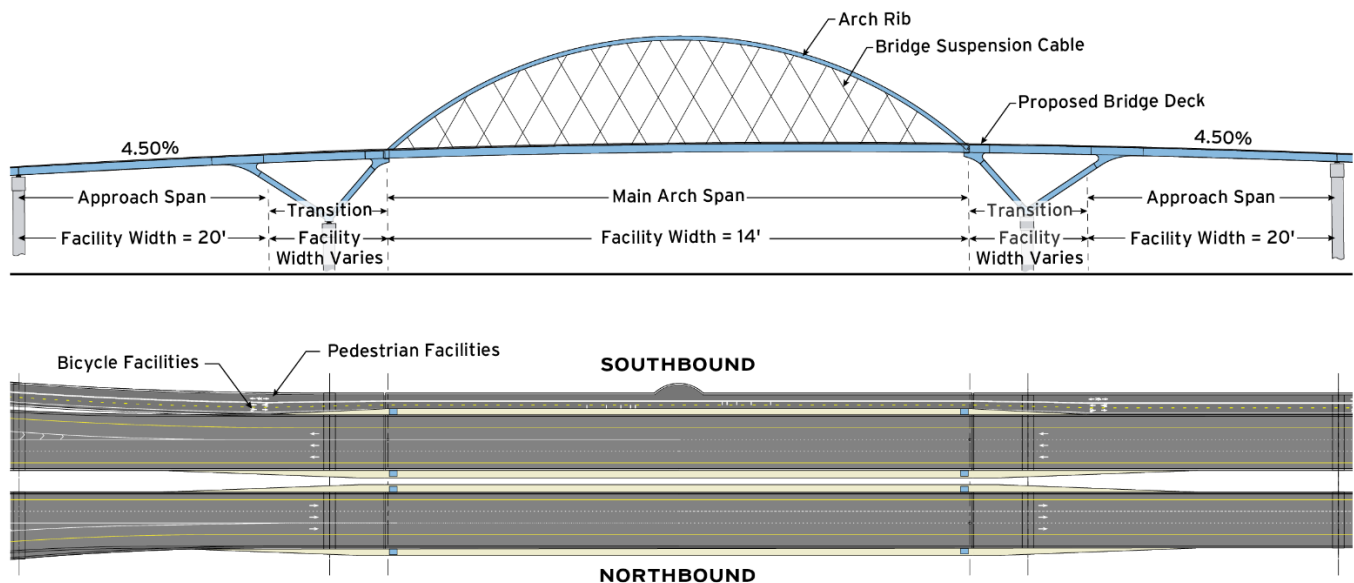
¹⁸ Federal Highway Administration. 2019. [Bikeway Selection Guide](https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf). February. https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

¹⁹ The width of the facility from edge of pavement to edge of pavement defines the effective width.

²⁰ American Association of State Highway and Transportation Officials. 2012. [Guide for the Development of Bicycle Facilities](https://njdotlocalaidrc.com/perch/resources/aashto-gbf-4-2012-bicycle.pdf) (Fourth Edition). <https://njdotlocalaidrc.com/perch/resources/aashto-gbf-4-2012-bicycle.pdf>

There are two cross-sections over the replacement bridges: at the approach span and at the arch span. **Figure 4.3-10** provides a rendering of the bridge main span and the limits of the bridge approaches, the arch span and suspension cables, and the locations of the arch ribs. The approach cross-section uses the full 20-foot effective width because this is where the greatest speed differential is anticipated between pedestrians and bicyclists. The structure width remains 20 feet at the arch span; however, the effective width of the facility narrows to 14 feet due to the presence of the bridge arch ribs and cables required for suspension. As the arch span signifies the crest of the bridge profile, it is anticipated that bicyclists will be beginning their descent or finishing their climb. Therefore, they will be traveling at lower speeds and not require the additional width needed for the approaches.

Figure 4.3-10. Bridge Main Span and Limits of Approach and Arch Spans (Rendering)



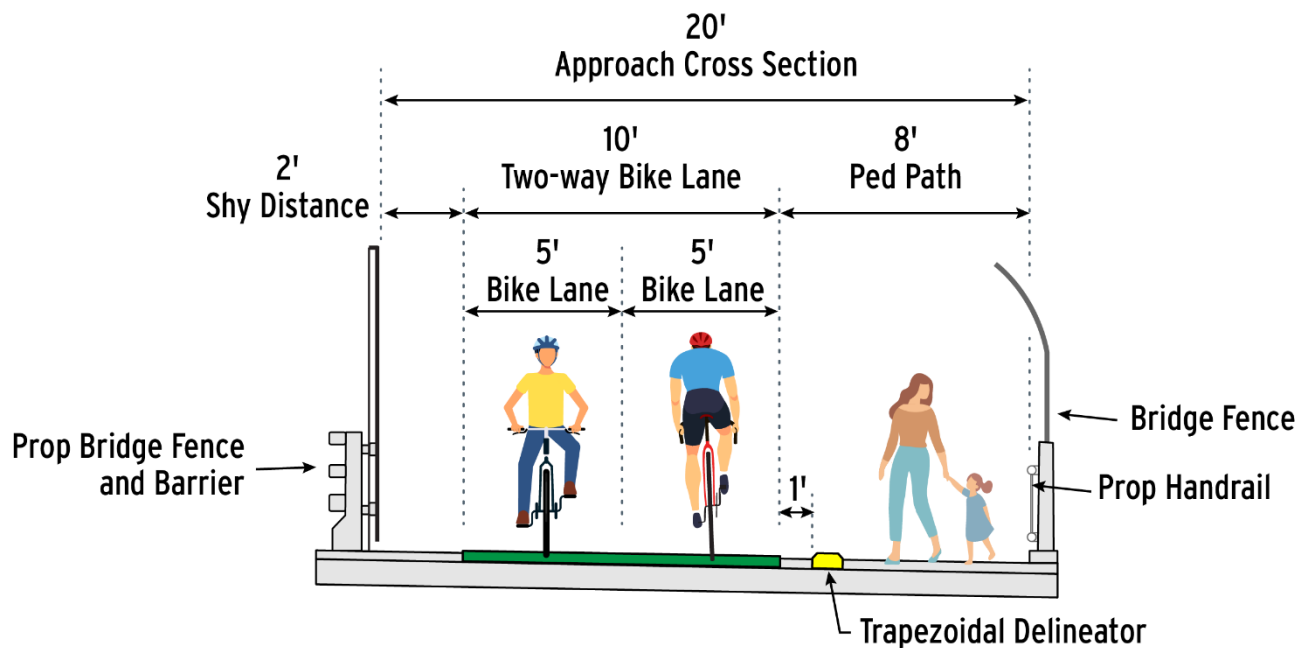
Source: Massachusetts Department of Transportation, 2025

The approach cross-section, using the full effective width of 20 feet, would provide a 10-foot-wide, two-way separated bicycle lane and an 8-foot-wide pedestrian path. The two-way separated bicycle lane would accommodate the recommended width of 5-foot-wide bicycle lanes in each direction and enable passing movements per MassDOT Guidelines.²¹ The bicycle facility would be offset 2 feet from the bridge fence and barrier on the vehicle side to accommodate shy distance. The 8-foot-wide pedestrian path would allow for bidirectional travel and the ability to walk in groups. Bridge fence and railing are proposed on the outside edge of the facility to provide pedestrians with unobstructed views of the canal and aid accessibility for the visually and physically impaired. The proposed design would allow pedestrians to stay on the outside edge of the facility with immediate access to the overlook and views of the canal, while bicyclists would remain on the roadway side of the facility to minimize conflicts of mixed-use lanes and crossing pedestrian traffic. Additionally, the Program would support

²¹ Massachusetts Department of Transportation. 2015. ["Chapter 3, General Design Considerations," Separated Bike Lane Planning & Design Guide](https://www.mass.gov/doc/chapter-3-general-design-considerations/download). <https://www.mass.gov/doc/chapter-3-general-design-considerations/download>

accessible travel along both bridges and approaches by incorporating trapezoidal delineators, a textured strip that can be detected with a cane and helps mark the boundary between the sidewalk and the bike path. These trapezoidal delineators would provide consistent, accessible, and predictable wayfinding for pedestrians with vision disabilities. **Figure 4.3-11** provides a typical cross-section of the approach cross-section, including the placement of the trapezoidal delineators.

Figure 4.3-11. Typical Section of Shared-Use Facility at Approach Span (looking southbound)



Source: Massachusetts Department of Transportation, [2025](#)

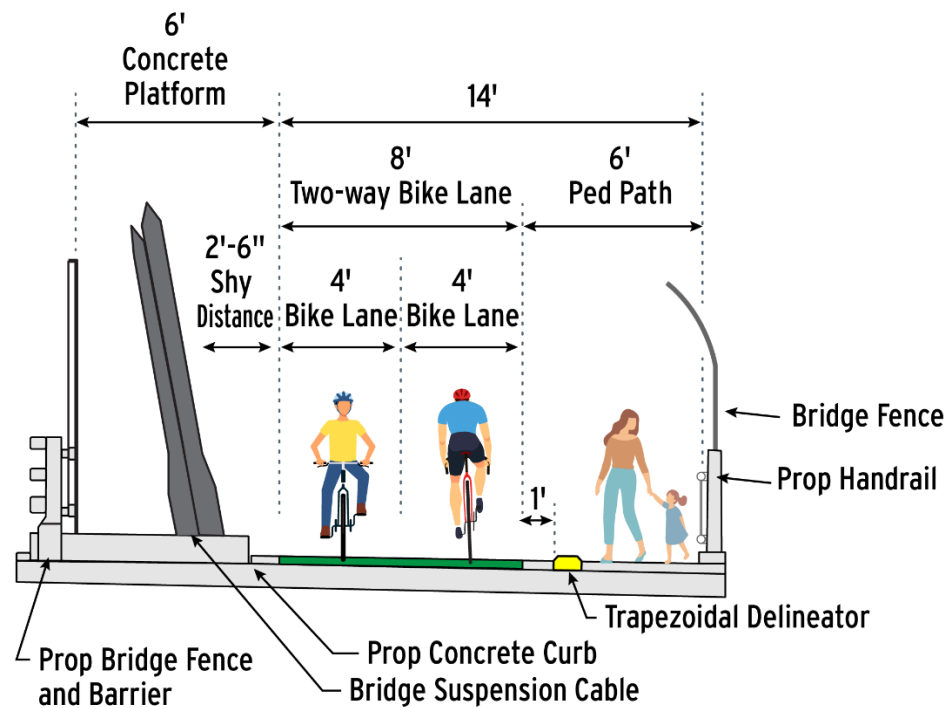
The arch cross-section would narrow its effective width from 20 feet to 14 feet. The alignment of the facilities would remain the same; however, both facilities would be narrowed to meet minimum width requirements and shy distance offsets. The two-way bicycle lane would narrow to 8 feet, which would meet the minimum width for bidirectional bicycle lanes outlined in [MassDOT's Guidelines \(Chapter 3\)](#).²² Although a 10-foot width is preferred for this type of facility, narrowing the facility to 8 feet within the arch span is required due to the constrained width. This would still allow bidirectional movement but would restrict the ability for passing movements. The arch span is expected to maintain lower speeds than the approaches because bicyclists would be reaching the crest of the bridge profile or just starting their descents. The pedestrian path would narrow to 6 feet wide and would remain on the outside of the facilities to maintain continuity and provide uninterrupted views of the canal over the bridges. The proposed shy distances and offsets to vertical objects and obstructions would meet [MassDOT Guidelines \(Chapter 11\)](#).²³ **Figure 4.3-12** provides a typical cross-section of the [arch span](#)

²² <https://www.mass.gov/doc/chapter-3-general-design-considerations/download>

²³ <https://www.mass.gov/info-details/pddg-chapter-11-shared-use-paths>

cross-section. **Figure 4.3-13** provides a rendering of the proposed shared-use facility at the arch span on the replacement bridge.

Figure 4.3-12. Typical Section of 14-foot-wide Shared-Use Facility on Arch Span (Southbound)



Source: Massachusetts Department of Transportation, [2025](#)

Figure 4.3-13. Shared-Use Facility on Replacement Bridge (Rendering)



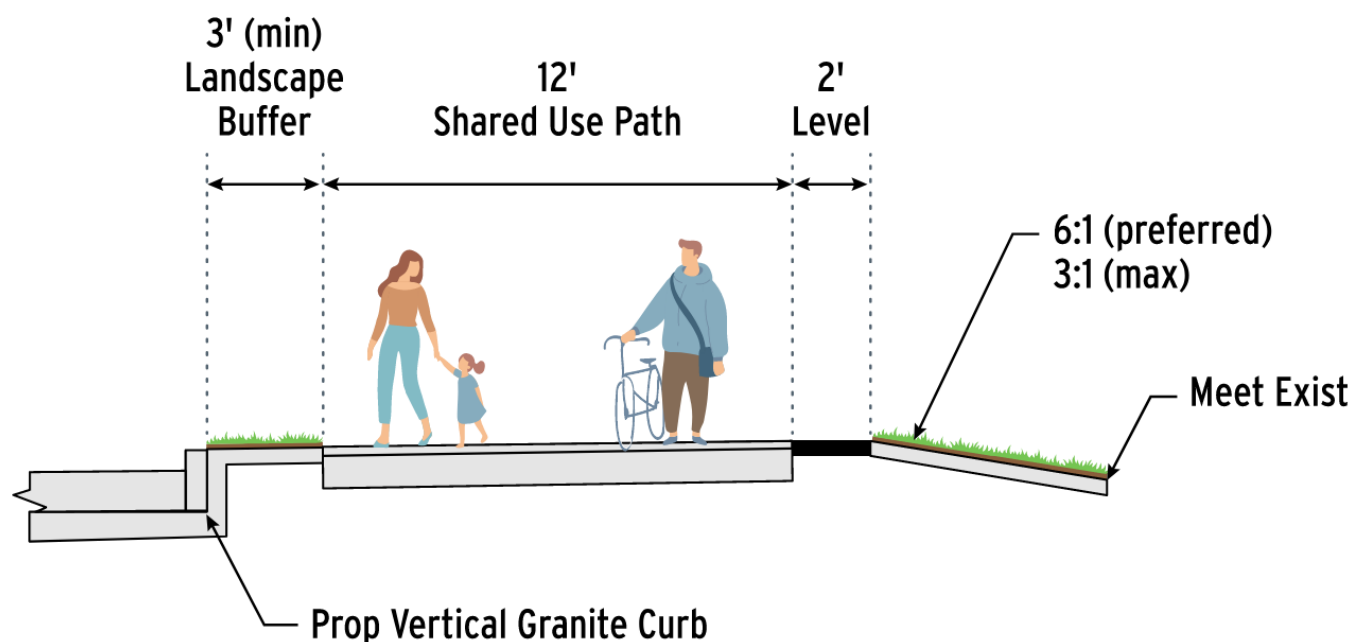
Source: Massachusetts Department of Transportation, 2024

The addition of the shared-use facilities along the replacement bridge main spans and interchange approaches would provide connections to local roadways and to the [shared-use](#) Canal Service Roads in all four Study Area quadrants (i.e., Sagamore North, Sagamore South, Bourne North, and Bourne South). [Wayfinding and interpretive panels are planned throughout the Project Limits to help users navigate the SUP network, learn about their surroundings, and enhance the overall multimodal experience. Wayfinding signs would provide directions, destinations, and approximate distances to key locations, including the bridges, schools, community centers, scenic viewpoints; and connections to existing facilities, including the shared-use Canal Service Road. For additional information on wayfinding, refer to Section 4.15, Visual Resources.](#)

Off the main spans and the structure, designated space for bicycles and pedestrians would also be accommodated within the typical section for local roadways. Once off the bridge, the local roadway profiles would follow the landscape, and the differential between design speeds for pedestrians and bicyclists would not be significant enough to justify separation of modes. Additionally, the lack of bridge barrier, curbing, and fencing off-structure would allow for the ability to share space without needing to accommodate shy distance for obstructions. The facility off-structure would provide a consistent 12-foot-wide SUP with a minimum 3-foot-wide landscaped buffer on the roadway side and a minimum 2-foot-wide level area on the opposite side. [Figure 4.3-14](#) provides a typical section of the SUP applied off-structure for the rest of the Project Limits and local roadways.

[Additionally, bicycle signals are proposed at signalized crossings within the Sagamore North and Sagamore South Project Limits to accommodate SUP movements across signalized intersection roadways per the Manual on Uniform Traffic Control Devices. The preliminary design does not currently propose signalized crossings within the Bourne North or Bourne South Project Limits.](#)

Figure 4.3-14. Typical Section of 12-foot-wide Shared-Use Path Off-Structure



Source: Massachusetts Department of Transportation, 2025

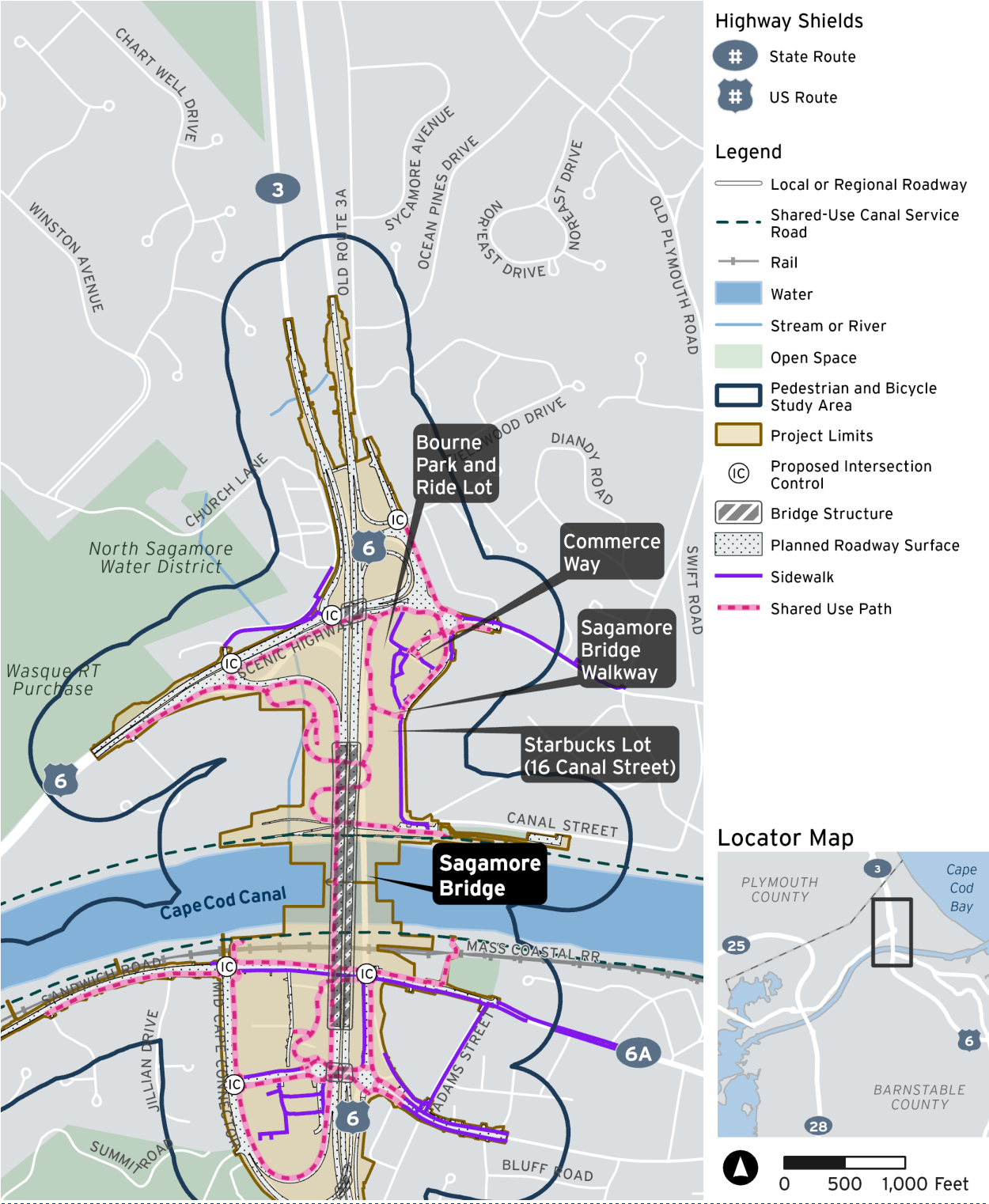
4.3.4.1 Sagamore North Quadrant

As described in the previous section, a 20-foot-wide shared-use facility would be provided along the eastbound side of U.S. Route 6 on the Sagamore Bridge approach. The 20-foot-wide elevated facility would narrow to a 12-foot-wide SUP along the eastbound on-ramp and the south side of Scenic Highway. The Build Alternative proposes new pedestrian and bicycle connections from Sagamore Bridge to all four quadrants of the interchange. [Figure 4.3-15](#) depicts the conceptual layout of proposed SUP facilities and sidewalks in the Sagamore North quadrant, [and Figure 4.3-16 provides a detailed view. Additionally, refer to Appendix 3.2, Construction Approach Technical Report, and Attachment 2, Proposed Conditions Plans.](#)

[As depicted in Figure 4.3-15 and Figure 4.3-16, the SUP approach alignments to the east and west sides of the replacement Sagamore Bridge allow pedestrians and bicyclists to access the bridge from either direction. The east and west approach paths merge before ascending the bridge along the approach spans, providing an effective 18-foot-wide separated pedestrian and bicycle facility along the bridge's west approach span. Refinements since the Draft Environmental Impact Statement have improved how each of these connecting paths transition from the bridge main span to the bridge approach span and then to local roadway networks. On the west side, the 18-foot-wide separated pedestrian and bicycle facility and the 12-foot-wide SUP have been redesigned while still meeting ADA accessibility requirements. The facility continues to be 18 feet wide until shortly before reaching Scenic Highway, where it transitions to a 12-foot-wide path. On the east side, the SUP now provides a more linear route prior to its connection point at the Sagamore Bridge walkway, transitioning from an 18-foot-wide to a 12-foot-wide path in front of the existing Starbucks parcel \(16 Canal Street\) before tying into the walkway. These refinements simplify routing, improve accessibility, and enhance continuity with surrounding pedestrian and bicycle facilities.](#)

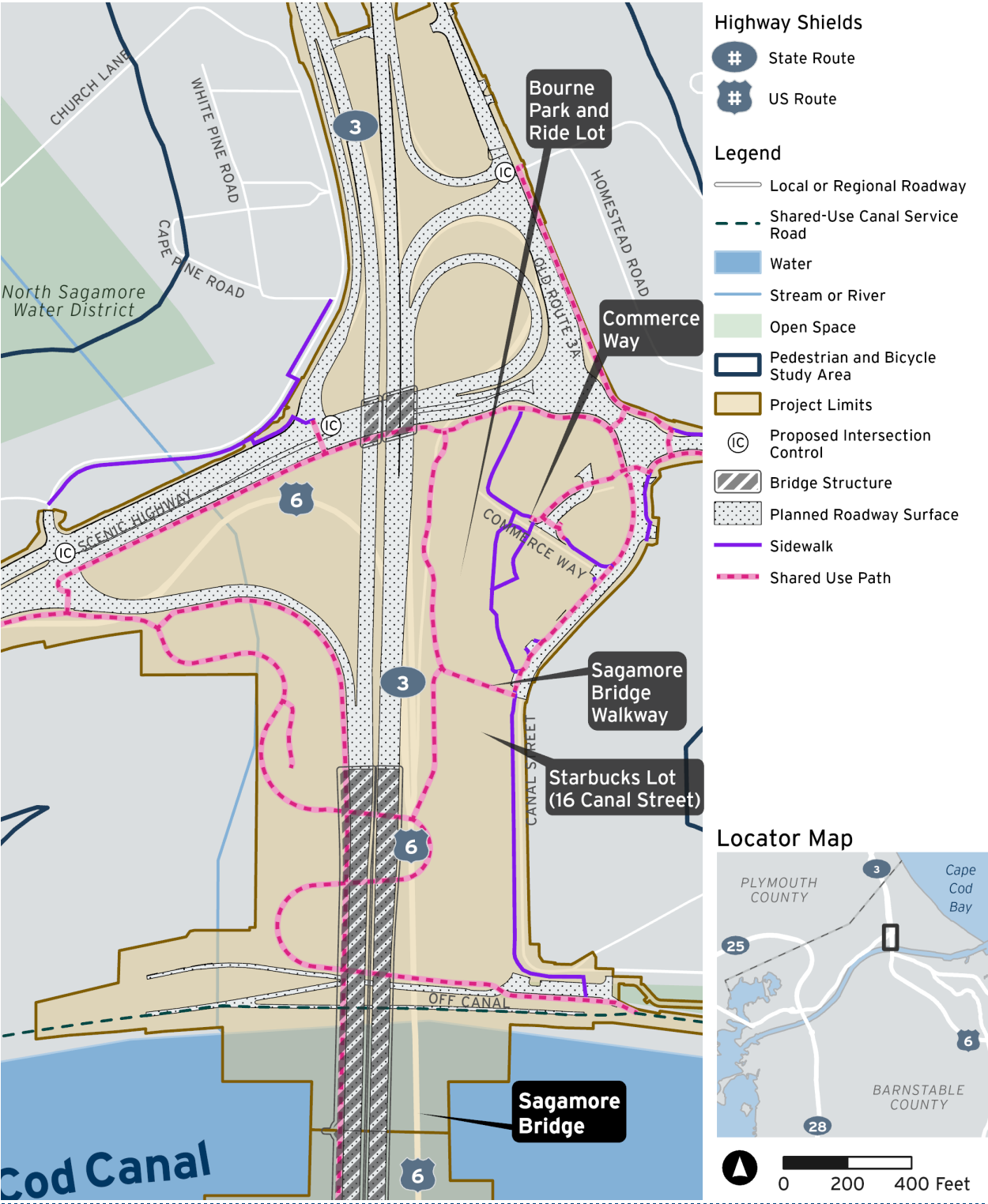
[As presented on Figure 4.3-16, at the SUP's connection to the Sagamore Bridge walkway, the path splits and expands to provide southeast and northerly routes along the perimeter of the Bourne Park and Ride lot, maintaining a width of 12 feet throughout. The SUP loops around the entire property, improving existing facility needs. Along Commerce Way, the SUP continues to be 12 feet wide, providing access to the transportation hub and improving multimodal circulation and connection.](#)

Figure 4.3-15. Existing and Proposed Pedestrian and Shared-Use Facilities (Sagamore North Quadrant)



Source: Massachusetts Department of Transportation, 2025

Figure 4.3-16. Existing and Proposed Pedestrian and Shared-Use Facilities (Sagamore North Quadrant), Detailed View



Source: Massachusetts Department of Transportation, 2025

4.3.4.2 Sagamore South Quadrant

A 20-foot-wide shared-use facility would be provided along the eastbound side of U.S. Route 6 on Sagamore Bridge, which continues along the eastbound off-ramp and along a portion of Mid-Cape Connector before transitioning to a 12-foot-wide SUP just prior to the intersection of Cranberry Highway. Two new at-grade SUP railroad crossings are proposed as part of preliminary design, connecting to the south-side shared-use Canal Service Road: one located across from the Mid-Cape Connector and Sandwich Road intersection, and another located east of the bridge adjacent to Keith Field Recreation Area. **Figure 4.3-17** depicts the conceptual layout of proposed pedestrian and bicycle facilities in the Sagamore South quadrant, and **Figure 4.3-18** provides a detailed view. For additional information, refer to **Appendix 3.2, Construction Approach Technical Report**, and **Attachment 2, Proposed Conditions Plans**.

MassDOT continues to evaluate proposed SUP railroad crossings. As currently proposed, the SUP railroad crossings would provide continuous off-road multimodal connections between Sandwich Road and the shared-use Canal Service Road during construction, and they would remain part of the permanent multimodal network upon completion of the Program. The SUP railroad crossing at Keith Field Recreation Area is proposed to be a 12-foot-wide connection and would use approximately 0.32 acres of the property. The SUP would be located along the western edge of the property adjacent to the existing fenced baseball field. This SUP was originally developed as a preliminary design concept to maintain pedestrian and bicycle access to the shared-use Canal Service Road during construction. Under the current design, it would function in coordination with the reconstructed SUP connection east of the Mid-Cape Connector and Sandwich Road intersection to provide access to the shared-use Canal Service Road while the existing route beneath Sagamore Bridge is temporarily closed.

As all SUP railroad crossings continue to be designed, their feasibility, location, and design are subject to continued analysis and approvals by the Federal Railroad Administration, Massachusetts Coastal Railroad, and USACE. Additional stakeholder involvement would include MassDOT Rail and Transit Division, the Cape Cod Commission, and the Town of Bourne. If implemented, the SUP railroad crossings would incorporate Manual on Uniform Traffic Control Devices-compliant signage and pavement markings, detectable warning surfaces, appropriate lighting, visual and auditory warning devices, and gate crossing arms to ensure safe pedestrian and bicycle access to the shared-use Canal Service Road.

Additional multimodal improvements have also been incorporated, including a new SUP connection from Cranberry Highway Extension extending along the east side of Eleanor Avenue toward Sandwich Road (**Figure 4.3-17** and **Figure 4.3-18**). The sidewalk and SUP configuration along Cranberry Highway in front of the Market Basket property has been refined from what was presented in the Draft Environmental Impact Statement. The sidewalk is now proposed along the north side of Cranberry Highway, with the SUP proposed along the south side. For additional details, refer to **Appendix 3.2, Construction Approach Technical Report**, and **Attachment 2, Proposed Conditions Plans**.

Highway Shields

- # State Route
- # US Route

Legend

- Local or Regional Roadway
- Shared-Use Canal Service Road
- Rail
- Water
- Stream or River
- Open Space
- Pedestrian and Bicycle Study Area
- Project Limits
- IC Proposed Intersection Control
- Bridge Structure
- Planned Roadway Surface
- Sidewalk
- Shared Use Path

Locator Map

PLYMOUTH COUNTY

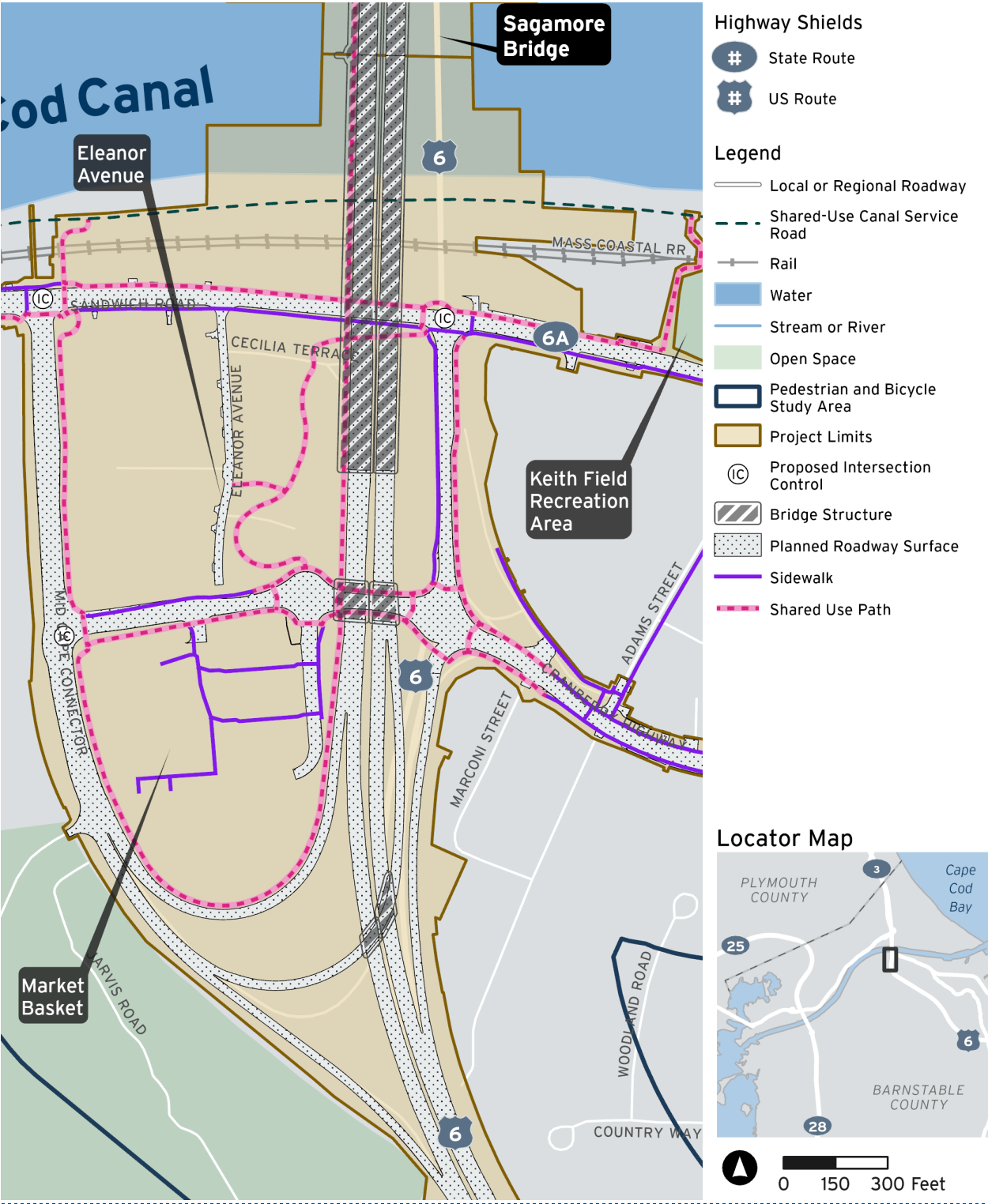
BARNSTABLE COUNTY

Cape Cod Bay

0 500 1,000 Feet

Cape Cod Bridges Program FEIS – Chapter 4, Section 4.3 Pedestrian and Bicycle Facilities

Figure 4.3-18. Existing and Proposed Pedestrian and Shared-Use Facilities (Sagamore South Quadrant), Detailed View



Source: Massachusetts Department of Transportation, 2025

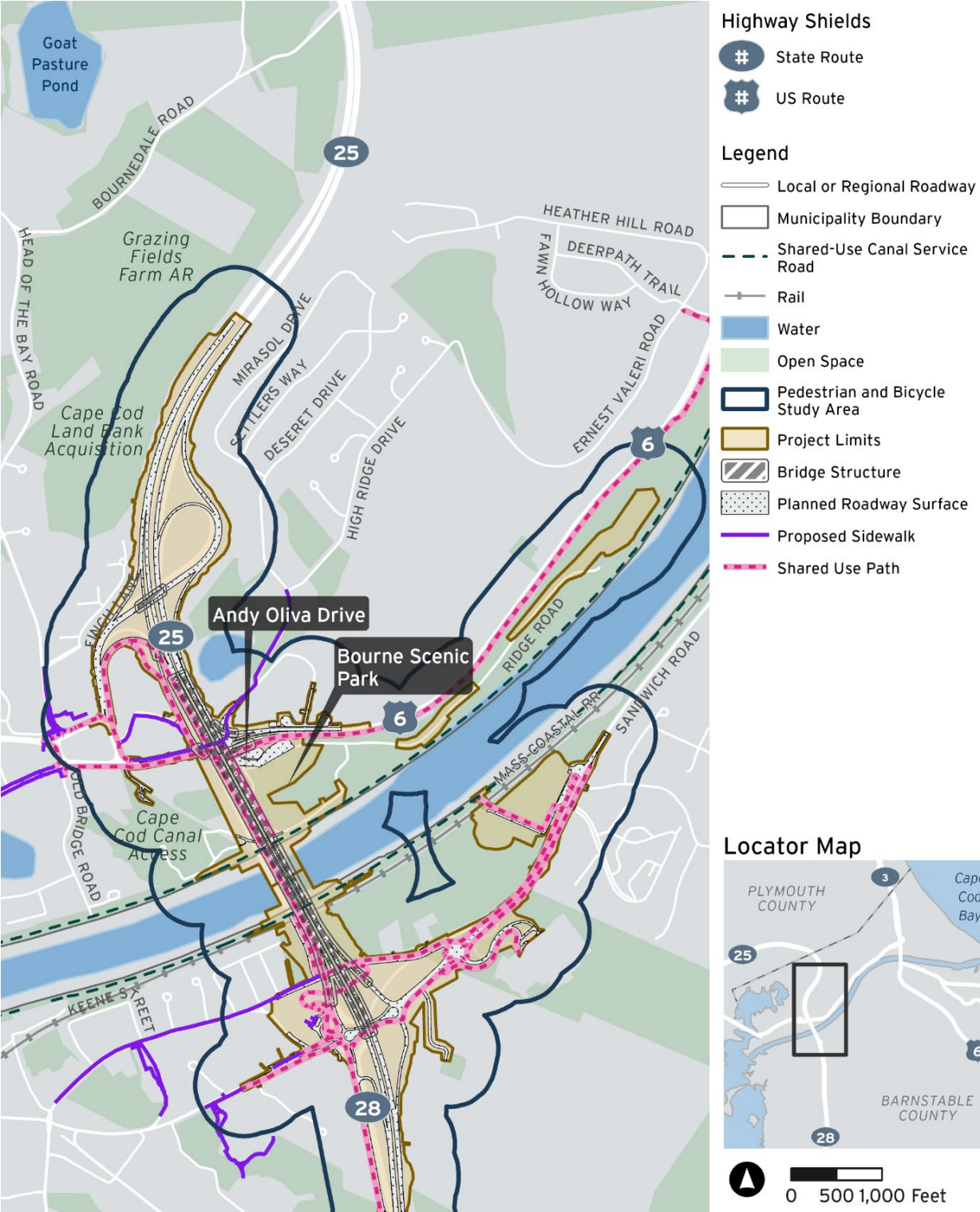
4.3.4.3 Bourne North Quadrant

A 20-foot-wide shared-use facility would be provided on the approach spans and off-structure along the southbound side of State Route 28 over Bourne Bridge and would continue along the eastbound off-ramp toward Belmont Circle. Once off-structure, the shared-use facility would transition to a 12-foot-wide SUP that would connect Belmont Circle to U.S. Route 6 (Scenic Highway). The SUP would connect to the 12-foot-wide SUP constructed along the south side of Scenic Highway from Nightingale Road to Edgehill Road as part of MassDOT Project No. 606082. A sidewalk and bicycle ramps to shoulder bicycle lanes are proposed connections to the existing facilities on Nightingale Road.

Figure 4.3-19 depicts the conceptual layout of proposed SUPs and sidewalks in the Bourne North quadrant, and **Figure 4.3-20** provides a more detailed view. Additionally, more information is provided in **Appendix 3.2, Construction Approach Technical Report** and **Attachment 2, Proposed Conditions Plans**.

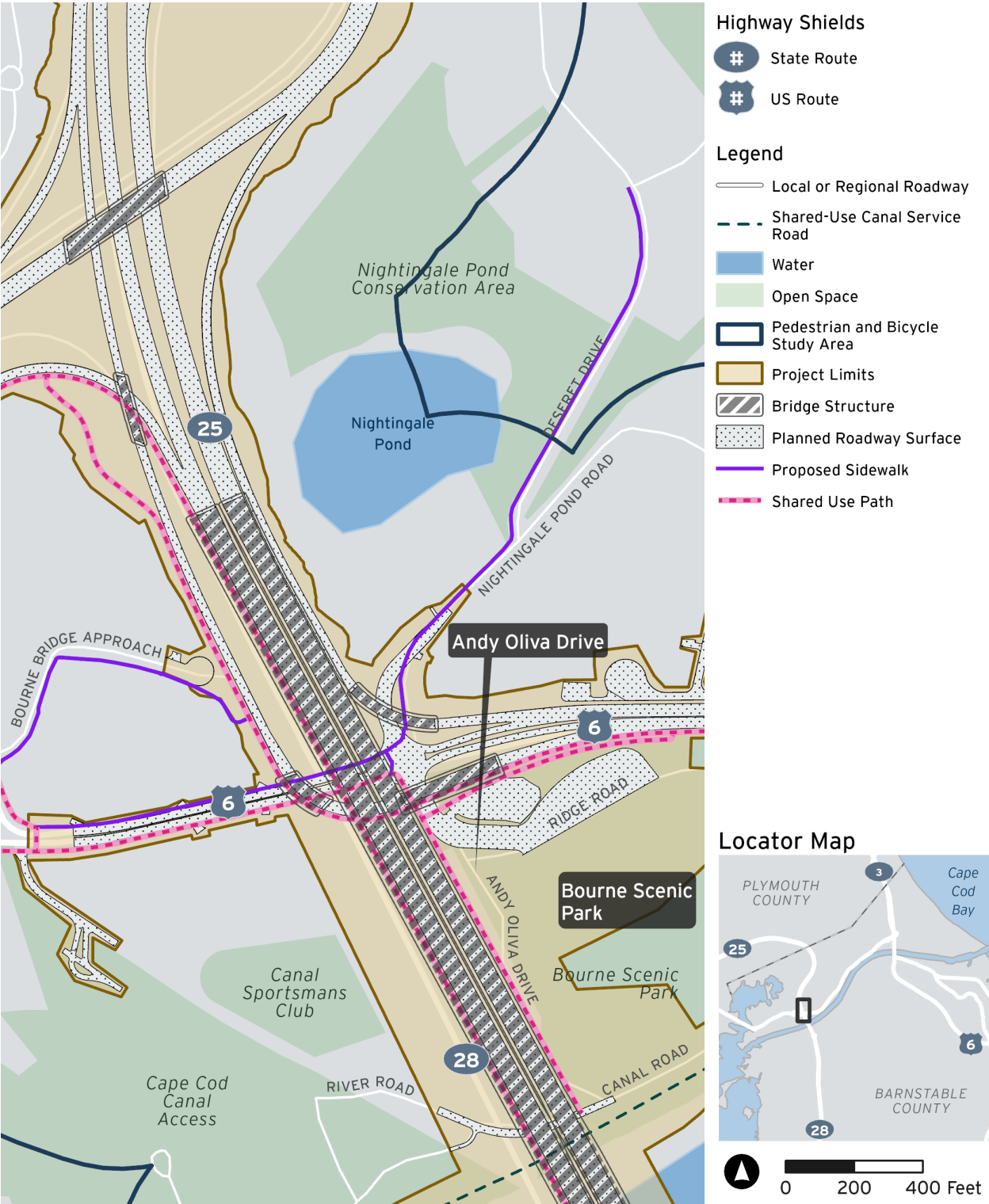
In the Bourne North quadrant, the Project Limits have been refined and expanded to the west to accommodate a new west entrance to Bourne Scenic Park, which was incorporated as part of the Section 4(f) avoidance and minimization measures. The westward expansion of the Project Limits does not result in impacts to existing pedestrian and bicycle facilities. Refinements have also been made to the SUP along Andy Oliva Drive within Bourne Scenic Park. The SUP has been shifted farther west to reduce potential impacts to the Bourne Recreation Authority-owned Bourne Scenic Park and minimize Article 97 and Section 4(f) impacts. The updated alignment results in a more direct and linear SUP connection along Andy Oliva Drive between the shared-use Canal Service Road and Scenic Highway.

Figure 4.3-19. Existing and Proposed Pedestrian and Shared-Use Facilities (Bourne North Quadrant)



Source: Massachusetts Department of Transportation, [2025](#)

Figure 4.3-20. Existing and Proposed Pedestrian and Shared-Use Facilities (Bourne North Quadrant), Detailed View



Source: Massachusetts Department of Transportation, [2025](#)

4.3.4.4 Bourne South Quadrant

A 20-foot-wide shared-use facility would be provided along the southbound side of State Route 28 over Bourne Bridge and would continue along the southbound off-ramp toward the District 7 State Police barracks. At this transition from on-structure to off-structure, a mixing zone with wayfinding signs and landscape features would be provided. The shared-use facility would transition to a 12-foot-wide SUP at the mixing zone. With the proposed design, residents within the Bourne South quadrant would have safe, comfortable, and separated facilities to access the local schools, bus depot, businesses, and recreational facilities.

In the Bourne South quadrant, the Project Limits have been refined and expanded eastward to encompass the Gallo Ice Arena parcel and the proposed relocation of the Bourne Recreation Area. **Section 4.17, Public Parks, Recreational Facilities, and Open Space**, provides more information on the background and improvements to Gallo Ice Arena and Bourne Recreation Area. **Figure 4.3-21** depicts the conceptual layout of the proposed shared-use facilities and sidewalks in the Bourne South quadrant, and **Figure 4.3-22** provides a detailed view.

The proposed relocation of Bourne Recreation Area created opportunities to improve pedestrian and bicycle connections. Two new at-grade SUP railroad crossings are currently proposed as part of the preliminary design, connecting to the south side shared-use Canal Service Road: one located adjacent to Bourne Bridge, and another located at the proposed relocated Bourne Recreation Area. The two proposed SUPs are presented on **Figure 4.3-21** and illustrated in more detail on **Figure 4.3-22**. Both SUP crossings would provide continuous off-road multimodal connections between Sandwich Road and the shared-use Canal Service Road during construction, and they are proposed to remain part of the permanent multimodal network upon completion of the Program.

As mentioned in **Section 4.3.4.2**, all SUP railroad crossings would incorporate Manual on Uniform Traffic Control Devices-compliant signage and pavement markings, detectable warning surfaces, appropriate lighting, visual and auditory warning devices, and gate crossing arms to ensure safe pedestrian and bicycle access to the shared-use Canal Service Road. As design continues to advance, MassDOT will continue coordination with the Federal Railroad Administration, Massachusetts Coastal Railroad, USACE, Cape Cod Commission, and Town of Bourne regarding the location and features of the SUP railroad crossings.

In addition to the two new SUP connections proposed in the Bourne South quadrant, two new 12-foot-wide SUPs along both sides of Sandwich Road are proposed and would extend along Sandwich Road from Bourne Bridge to the eastern entrance of the Gallo Ice Arena parcel. The SUPs along Sandwich Road would include pedestrian-scale lighting and provide a safe and accessible connection between Gallo Ice Arena and the Upper Cape Cod Regional Technical High School for students and event attendees.

With the addition of the SUP between Gallo Ice Arena and Upper Cape Cod Regional Technical High School, the Program addresses the recommendations of a previous MassDOT Road Safety Audit

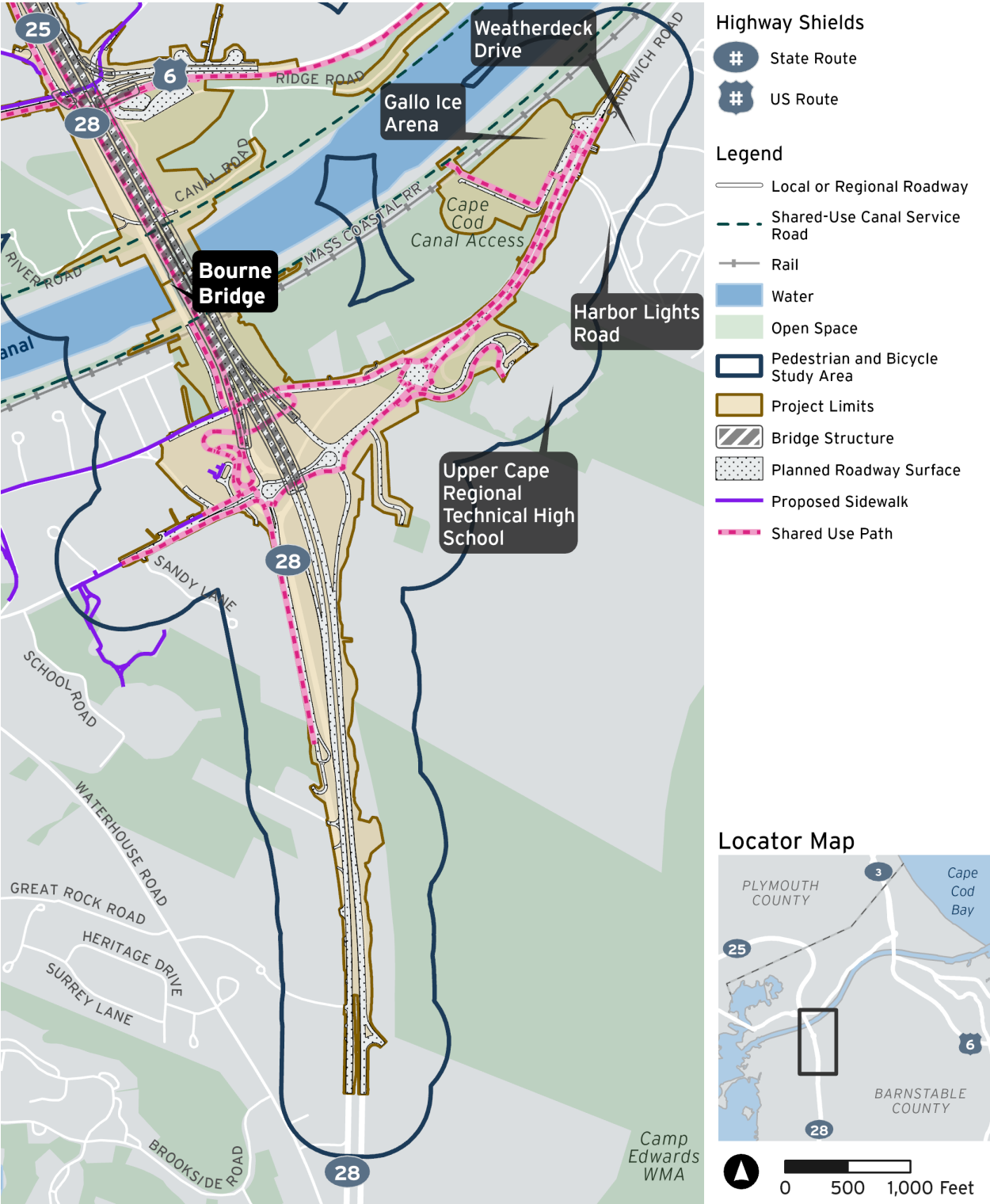
(June 2022)²⁴ to include pedestrian and bicycle facilities. Additional multimodal improvements in this area that are currently under consideration include SUP access to and from the Gallo Ice Arena property and connections to the Harbor Lights and Weather Deck Road residential neighborhoods on the south side of Sandwich Road. On the north side of Sandwich Road, the SUP is proposed to continue along Sandwich Road, consistent with existing conditions.

Additional traffic safety and operational improvements are also being evaluated as part of the preliminary design, including traffic-calming median islands, signage, dedicated left-turn lanes, and a rectangular rapid-flashing beacon about midway along this corridor segment to support safe pedestrian and bicyclist crossings between the north and south sides of Sandwich Road.

MassDOT reevaluated the proposed at-grade SUP crossing east of Bourne Bridge in response to public comments requesting consideration of a grade-separated multimodal overpass. The reassessment found that constructing an overpass would require two substantial retaining walls along the north side of Sandwich Road to achieve required approach grades, in addition to the overpass structure itself, resulting in higher construction and long-term maintenance costs. By comparison, the at-grade crossing met all applicable sight distance, stopping sight distance, and FHWA safety countermeasure criteria for Sandwich Road's two-lane configuration and could be equipped with enhanced safety features, such as high-visibility markings, nighttime lighting, warning signage, and rectangular rapid-flashing beacons. Based on these findings, MassDOT determined that a grade-separated option is not reasonable at this location and that an improved at-grade crossing remains the appropriate design.

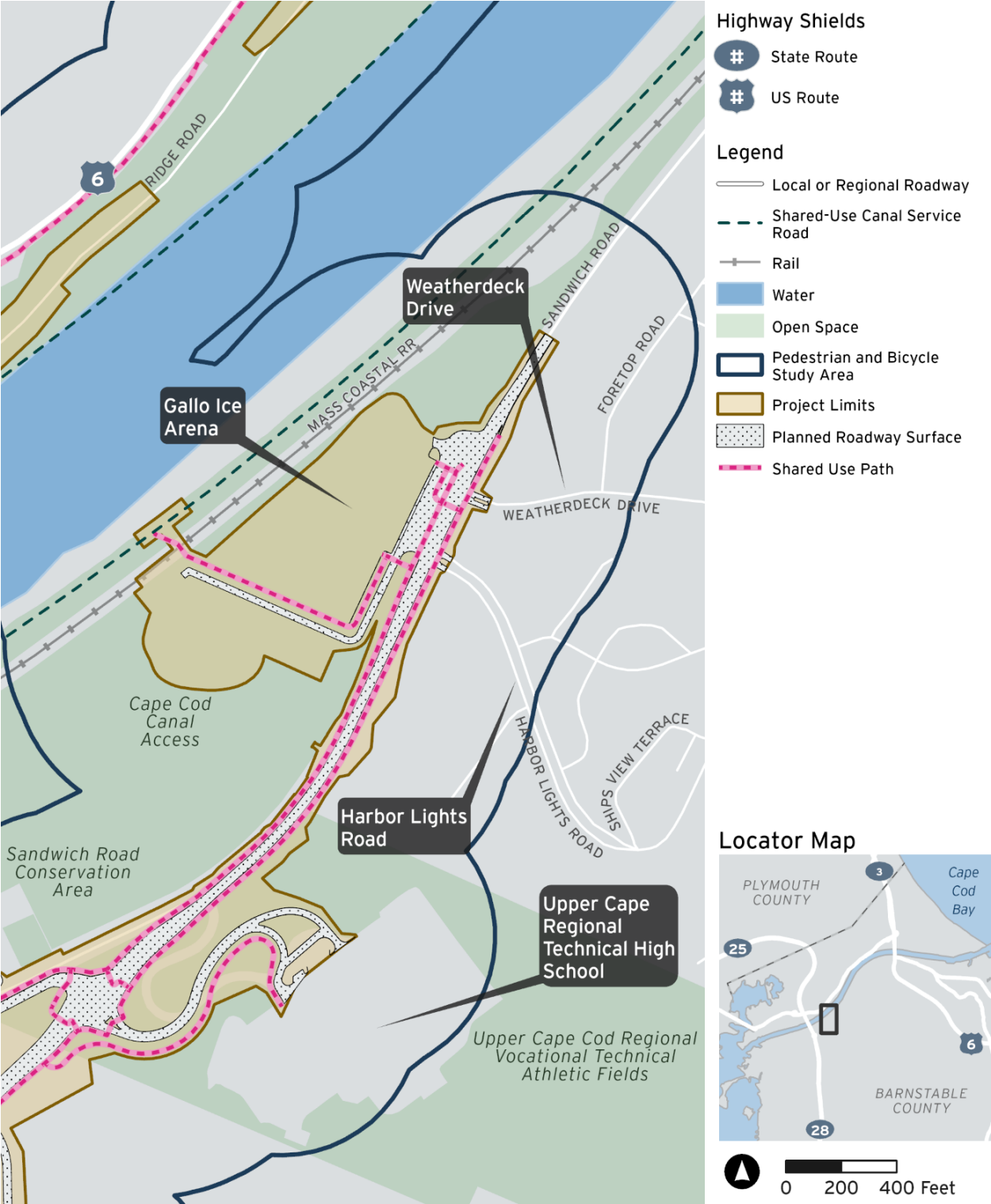
²⁴ Massachusetts Department of Transportation. Road Safety Audit: Scenic Highway, between Belmont Circle and East of Nightingale Pond Road; Sandwich Road, between East of Bourne Rotary and West of Midway Recreation Area; Cranberry Highway, between U.S. Route 6 Westbound Exit 55 and East of Adams Street. June 21, 2022. <https://gis.massdot.state.ma.us/arcgis/rest/services/Roads/RoadSafetyAudits/MapServer/0/59772/attachments/60924>

Figure 4.3-21. Existing and Proposed Pedestrian and Shared-Use Facilities (Bourne South Quadrant)



Source: Massachusetts Department of Transportation, 2025

Figure 4.3-22. Existing and Proposed Pedestrian and Shared-Use Facilities (Bourne South Quadrant), Detailed View



Source: Massachusetts Department of Transportation, [2025](#)

4.3.4.5 Operational Effects

The Build Alternative would provide pedestrians and bicyclists with safe and comfortable connections to schools, jobs, essential services, recreational areas, and other destinations within the Study Areas. The provision of off-road SUPs and facilities would reduce potential conflicts with pedestrians, bicyclists, and motorists by providing physically separated travel areas for nonmotorized road users. Connected networks of walking and bicycling infrastructure would provide long-term public health benefits due to increased opportunity for active transportation and improved air quality by reducing reliance on motor vehicles for short trips.

The Build Alternative would improve accommodations, mobility, and accessibility for pedestrians and bicyclists, consistent with the Cape Cod Bridges Program's purpose and need. Proposed SUP connections from the replacement bridges and adjacent roadways to the [shared-use](#) Canal Service Roads would support bicycle-pedestrian connections to recently completed and future planned regional SUP projects.

The Build Alternative would expand and close gaps in the bicycle and ADA-accessible sidewalk networks, consistent with the goals of the Cape Cod Regional Transportation Plan.²⁵ These infrastructure improvements would make walking and biking more convenient, comfortable, and safer options for short trips than driving, which are consistent with the goals of MassDOT's Massachusetts Pedestrian Transportation Plan and Bicycle Transportation Plan.²⁶

Upon completion of construction, MassDOT would be responsible for the long-term operation and maintenance of the SUPs, including paths located on USACE property. Final commitments will be refined as part of the ongoing USACE Section 408 permitting and review process.

4.3.4.6 Construction-Period Effects

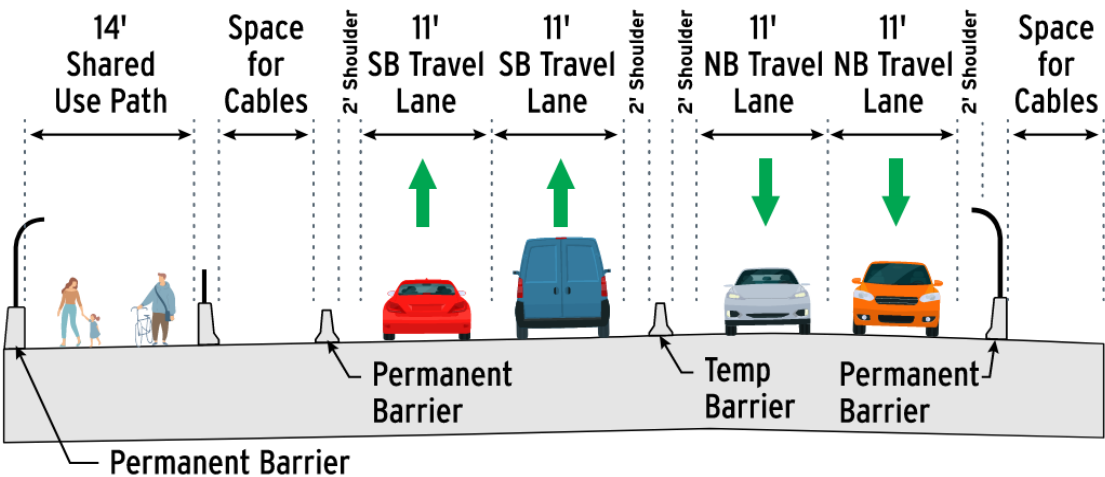
Maintaining pedestrian and bicycle connectivity throughout construction is a Program priority, and improving accommodations for pedestrians and bicyclists is a core element of the Program's Purpose and Need. The replacement of Sagamore and Bourne Bridges would be phased to maintain continuous access for all road users, including pedestrian and bicyclists, throughout construction. For Sagamore Bridge and Bourne Bridge, existing and temporary connections on each side of the bridges would be used. Crossing the canal via Sagamore Bridge, pedestrian and bicycle accommodations would use the existing bridge during construction of the new southbound bridge. Once the new southbound bridge is constructed, the proposed shared-use facility discussed in [Section 4.3.3](#) would be open for use ([Figure 4.3-23](#)). Crossing the canal via Bourne Bridge, pedestrian and bicycle accommodations would use the existing bridge during construction of the new northbound bridge. Once the new northbound

²⁵ Cape Cod Commission. 2023. [Cape Cod 2024 Regional Transportation Plan \(2024–2044\)](https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/tr/Transportation%20Plans/RTP/2024_RTP/Report/FINAL%20PDF/Cape%20Cod%202024%20Regional%20Transportation%20Plan_Endorsed%2007242023.pdf). July.
https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/tr/Transportation%20Plans/RTP/2024_RTP/Report/FINAL%20PDF/Cape%20Cod%202024%20Regional%20Transportation%20Plan_Endorsed%2007242023.pdf

²⁶ Massachusetts Department of Transportation. 2019. [Massachusetts Pedestrian Transportation Plan](https://www.mass.gov/info-details/pedestrian-plan). May.
<https://www.mass.gov/info-details/pedestrian-plan>; [Massachusetts Bicycle Transportation Plan](https://www.mass.gov/info-details/bicycle-plan). May.
<https://www.mass.gov/info-details/bicycle-plan>

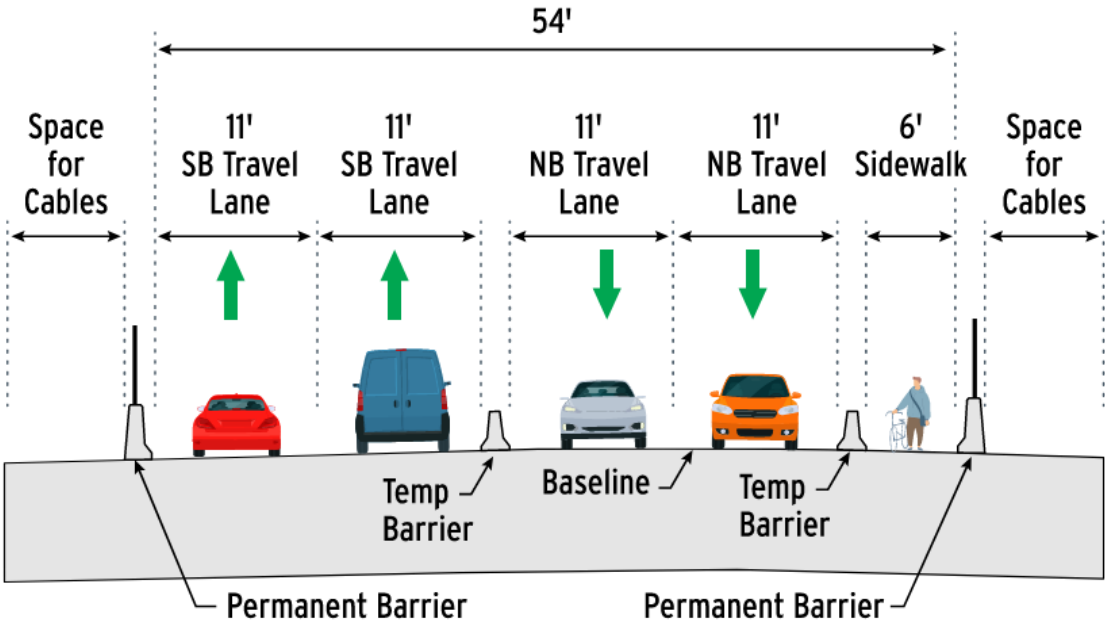
bridge is constructed, temporary pedestrian and bicycle facilities would use the new northbound bridge outside shoulder, westbound on-ramp for the Bourne North quadrant and the new northbound on-ramp for the Bourne South quadrant via a barrier separation (Figure 4.3-24). Once the new southbound bridge is constructed, the shared-use facility discussed in Section 4.3.4 would be open for use.

Figure 4.3-23. Temporary Typical Main Span Section (Sagamore Bridge Southbound Crossing, looking north)



Source: Massachusetts Department of Transportation, 2025
NB = northbound, SB = southbound

Figure 4.3-24. Temporary Typical Main Span Section (Bourne Bridge Northbound Crossing, looking north)



Source: Massachusetts Department of Transportation, 2025
NB = northbound, SB = southbound

While the new Sagamore and Bourne Bridges are being built, some temporary, localized closures and rerouting of pedestrian and bicycle facilities would be required, primarily beneath the bridges and along portions of Scenic Highway, Sandwich Road, and the shared-use Canal Service Roads. These temporary closures would be necessary to facilitate bridge construction and demolition activities within the work zones at both crossings. The duration of closures is still to be determined, but closures could range from several weeks to seven or eight years, depending on location and proximity to construction of the main span structures and the design-build contractor's means and methods. Additional details regarding potential temporary pedestrian and bicycle access are provided in Chapter 3, Appendix 3.2, Attachment 4, Construction Schematics.

4.3.5 Mitigation

4.3.5.1 Operational Effects

As described in Section 4.3.4, the Build Alternative would provide long-term improvements to bicycle and pedestrian facilities within the Study Areas through the construction of shared-use facilities on the new bridge approach and arch spans with connections to new SUPs (off-structure). Therefore, no long-term mitigation measures would be required.

4.3.5.2 Construction-Period Effects

Based on coordination with USACE, MassDOT will be required to deploy signage warning of service road closure and distance to closure at all official trailheads. Fencing and barricades will be used to prevent pedestrian access into unsafe areas within the construction work zones. The Transportation Management Plan, described in Section 4.2, Transportation, Traffic, and Safety, will define the detours and temporary connections to maintain continuity of pedestrian and bicycle facilities during all phases of work. Pedestrian and bicycle movements will be maintained to the extent feasible, and access to adjacent properties will be maintained during construction. Where existing movements cannot be maintained, clearly signed alternate routes will be provided. MassDOT, in coordination with its design-build contractor, will implement a comprehensive Public Information and Outreach program as part of the Transportation Management Plan to keep the public informed about upcoming closures, detours, and changes in access during construction.