



CAPE COD
COMMISSION

2024 REGIONAL TRANSPORTATION PLAN

Technical Appendix F: Bicycle & Pedestrian

FINAL JULY
2023



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Technical Appendix F: Bicycle & Pedestrian

This appendix presents an overview of bicycle and pedestrian planning on Cape Cod, including discussion of crash and road safety data, existing facilities, safety and planning studies, and planning efforts related to bicycles and pedestrians on Cape Cod.

CAPE COD BICYCLISTS AND PEDESTRIANS

Bicycling is popular throughout Cape Cod, both as a transportation mode and a recreational activity. Cape residents and visitors alike bicycle and walk along area roads and off-road paths to reach local shops and services, town centers, workplaces, beaches, and other destinations. Bicycling and pedestrian improvements are underway in all Cape Cod communities. The regional bicycle and pedestrian facility network is growing, particularly with the extension of the Cape Cod Rail Trail through Yarmouth and continued future extensions westward to Barnstable and eastward through Outer Cape communities. Ten towns have designated committees that are working to address bicyclist and pedestrian needs in their communities and several non-profit bicycle advocacy groups are active on Cape Cod. MassDOT and the Cape Cod Commission are working with local communities to address deficiencies and encourage “Complete Streets” projects. The American League of Bicyclists designated both Provincetown and Falmouth “Bike Friendly Communities.” Additionally, *People For Bikes*, rated Provincetown the #1 small city for biking in the United States in both 2021 and 2022.

Despite the popularity of bicycling and walking and recent improvements to the bicycle/pedestrian facility network, many areas are hazardous and uncomfortable to bike or walk to due to roads with high traffic volumes and speeds and no bicycle or pedestrian accommodations. Identifying and addressing gaps in the network is important for encouraging healthy transportation options on Cape Cod.

EXISTING CONDITIONS

VEHICULAR CRASH RECORDS

The following sections provide discussions of vehicular crash records that involve bicyclists or pedestrians.

Non-Motorist Crash History

Vulnerable roadway users, such as bicyclists and pedestrians, face challenges navigating the transportation network on Cape Cod. The mixture of narrow roadways, high traffic volumes, and pleasant summer weather create difficult vehicle-non-motorist interactions. Cape Cod's summer weather brings bicyclists onto roadways at the time when vehicular traffic is at its peak. As a healthy transportation mode that provides pollution-free travel, improving roads and providing facilities that are comfortable for cyclists and pedestrians is a critical goal for Cape Cod communities. All reported non-motorist crashes are shown in the figure on the following page. There were 406 reported crashes, with 392 being geolocated on the below figure. 237 of the crashes involved a cyclist and 155 of the crashes included a pedestrian.

Table 1 includes a town-by-town breakdown of non-motorist fatalities and serious injuries for the years 2012-2021. With 112 reported crashes over the three-year period, Barnstable had the greatest number of bicyclist-vehicle crashes (Falmouth was second with 63 crashes). The 4 non-motorist (all pedestrians) fatalities occurred along the Route 28 corridor.

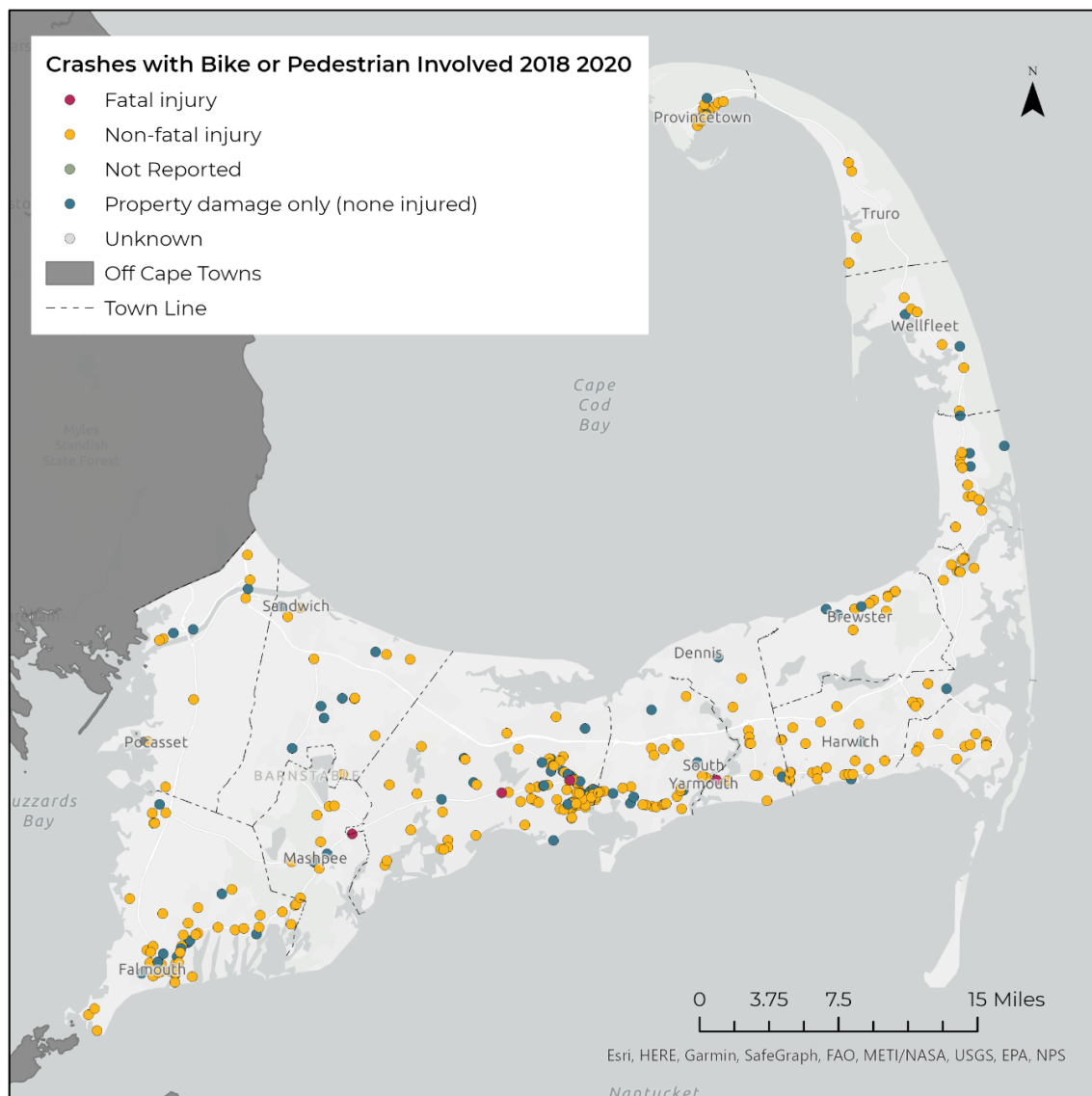


FIGURE 1. Non-Motorist Vehicular Crashes

TABLE 1. Non-Motorist-Vehicle Crash History (2012-2021)

TOWN	FATALITIES (10-YEAR TOTAL)	SERIOUS INJURIES (10-YEAR TOTAL)
SANDWICH	2	11
BOURNE	2	9
MASHPEE	3	8
FALMOUTH	3	46
BARNSTABLE	7	59
YARMOUTH	7	25
DENNIS	3	8
BREWSTER	1	7
HARWICH	1	10
CHATHAM	2	3
ORLEANS	0	2
EASTHAM	2	7
WELLFLEET	1	5
TRURO	0	1
PROVINCETOWN	1	7
Total	35	208

(Source: MassDOT)

ROADWAY SAFETY AUDITS – BICYCLE/PEDESTRIAN RECOMMENDATIONS

MassDOT oversees Road Safety Audits (RSAs), a process that brings together a multi-disciplinary group of state and community officials and other stakeholders in an intensive review of high-crash locations' operational and geometric deficiencies. Each audit includes a review of traffic and crash information and onsite field review. The audits include analysis of bicyclist and pedestrian safety. The RSA team looks at crossing conditions, accessibility, bicyclist and pedestrian comfort; vehicle conflicts; visibility; and other bicycle/pedestrian safety factors. Improvement recommendations might include installing curb ramps; repainting crosswalks and lanes; installation of an island for bicyclist/ pedestrian refuge; shoulder widening or bike lane; bicycle detection; advance pedestrian/bicyclist warning signage; etc.

For further information on individual RSA's, please refer to the Safety Appendix of this document. In addition to RSA's Cape Cod Commission staff also conduct location-specific safety studies throughout the region, upon request by a town or MassDOT. These studies and the full list of the RSA's are available at: www.capecodcommission.org/safety.

BICYCLE AND PEDESTRIAN PLANNING

The following sections provide discussion on types of bicyclists; references to bicycle and pedestrian facility design guidelines, discussion of the regional network vision; descriptions of the Cape's existing bicycle and pedestrian infrastructure and a summaries of recent bicycle/pedestrian studies and plans.

The Commission is currently involved in bicycle/pedestrian planning efforts with several Cape Cod communities. It is anticipated that recommendations from these studies will yield projects for inclusion in the Regional Transportation Plan.

Types of Bicyclists

Bicyclists with different levels of experience, confidence, and purpose for riding have varied accommodation needs. A strong and effective bicycle plan meets the needs of bicyclists with varied abilities through a combination of facility types, both on and off-road. Transportation planners/designers also consider their levels of comfort and stress. A new bicyclist typology has emerged over the last decade that helps planners understand the facility needs of the different types of cyclists.¹

- Strong and fearless – people willing to ride with limited or no bike infrastructure

¹ Jennifer Dill and Nathan McNeil, "Revisiting the Four Types of Cyclists: Findings from a National Survey," Transportation Research Record: Journal of the Transportation Research Board, 2587: 90-99, 2016.

- Enthused and confident – people willing to ride if some bike infrastructure is provided
- Interested but concerned, wants to ride and would if they felt safer on the roadways—if cars were slower and less frequent, and if there were more quiet streets with few cars and paths without any cars at all.
- “No way, now how” – people who are unwilling to ride under any circumstance

In both nation-wide and local surveys, most respondents identified as “interested but concerned.” Such riders want to bicycle more and would if they felt safer – either by accessing low-speed roads or using bicycle infrastructure. Designing bicycle networks for this type of rider would encourage more everyday riding. While the typologies are based on surveys and responses from urban riders, they are likely applicable for bicyclists on Cape Cod.

TYPES OF BICYCLE AND PEDESTRIAN FACILITY

There are three general types of facilities to accommodate bicycles and pedestrians:

- **Mixed Traffic Facilities** such as yield roadways, bike boulevards, and advisory shoulders.
- **Visually Separated Facilities** such as paved shoulders and traditional bike lanes.
- **Physically Separated Facilities** such as shared-use paths, sidepaths, sidewalks, and protected bike lanes.

On Cape Cod, we have a mix of multimodal facilities. Multimodal accommodations can be shared within or adjacent to a roadway or along the region’s network of shared use paths alignments, such as the Cape Cod Rail Trail. Additional multimodal facilities are being designed and constructed in our region thanks to MassDOT’s GreenDOT Implementation Plan and their Healthy Transportation Policy Directive. These MassDOT initiatives ensure all MassDOT projects are designed and implemented in a way that there are safe and comfortable healthy transportation options on all MassDOT facilities. Additionally, MassDOT’s Complete Streets Program has furthered implementation of improved multimodal facilities to assist the municipalities with funding complete streets projects.

MassDOT has developed the following guides which assist in the design of bicycle and pedestrian facilities in the Commonwealth.

- [MassDOT Project Development and Design Guide](#)
- [MassDOT Separated Bike Lane Planning and Design Guide](#)
- [MassDOT Bike Wayfinding Design Guide](#)

REGIONAL VISION & GOALS

Cape Cod's "Vision 88" proposes a continuous shared-use path network of 88 miles from Woods Hole to Provincetown. The route will consist of existing facilities such as the Cape Cod Rail Trail, the Shining Sea Bikeway, and the Cape Cod Canal bike path. Newer segments are in various stages of planning and design. As an overall framework, the following figure represents an overall vision for bicycle path connections to and within Cape Cod. The segments shown in green represent existing bicycle paths. Orange line segments represent generalized routes; detailed alignments are to be defined. This figure represents the Cape Cod Commission's vision for expansion of the Cape's bicycle path infrastructure.

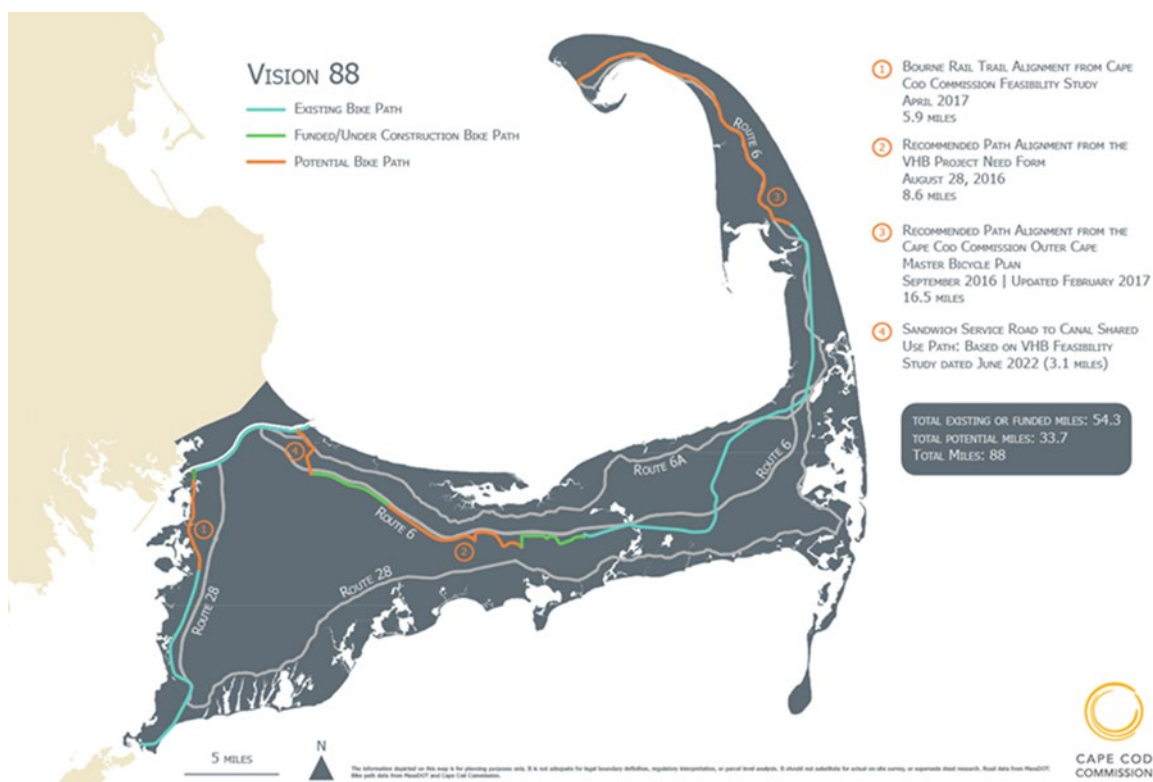


FIGURE 2. Shared Use Path Vision Map

In addition to Vision 88's goal of providing a bicycle facility network "spine" from Falmouth to Provincetown, a long-term goal is to support connections from Bourne with adjacent bicycle paths planned in the adjacent regions of southeastern Massachusetts. The Southeastern Planning and Economic Development District (SRPEDD) has a shared use path vision that will end in Wareham and it is envisioned that a connection via the Cape Cod Canal path can be constructed to connect to towns northwesterly of Cape Cod. Similarly, the Old Colony Planning Council (OCPC) has a goal to provide bicycle connections to the Cape Cod region via Plymouth and will likely connect on State Road (Route 3A) or Herring Pond Road.

EXISTING BICYCLE AND PEDESTRIAN FACILITY NETWORK

The following subsections include text, figures and tables that define and describe the bicycle and pedestrian infrastructure of Cape Cod. This information forms the baseline of the existing system and helps planners identify gaps and opportunities to improve bicycling and walking on Cape Cod

Shared Use Paths

A multi-use path is a path or trail that is physically separated from motor vehicle traffic located either within the road right-of-way or within an independent right-of-way. Also referred to as multi-use paths, they include bicycle paths, rail-trails or other facilities built for bicycle and pedestrian traffic and allowing other non-motorized travel modes such as skateboards, rollerblades and strollers. Path width and surface materials may vary depending on local conditions. In areas with sensitive resources and character, designers might opt for a narrower path and non-asphalt treatment to minimize impacts to habitat and rural character.

Shared Use Path Dimensions

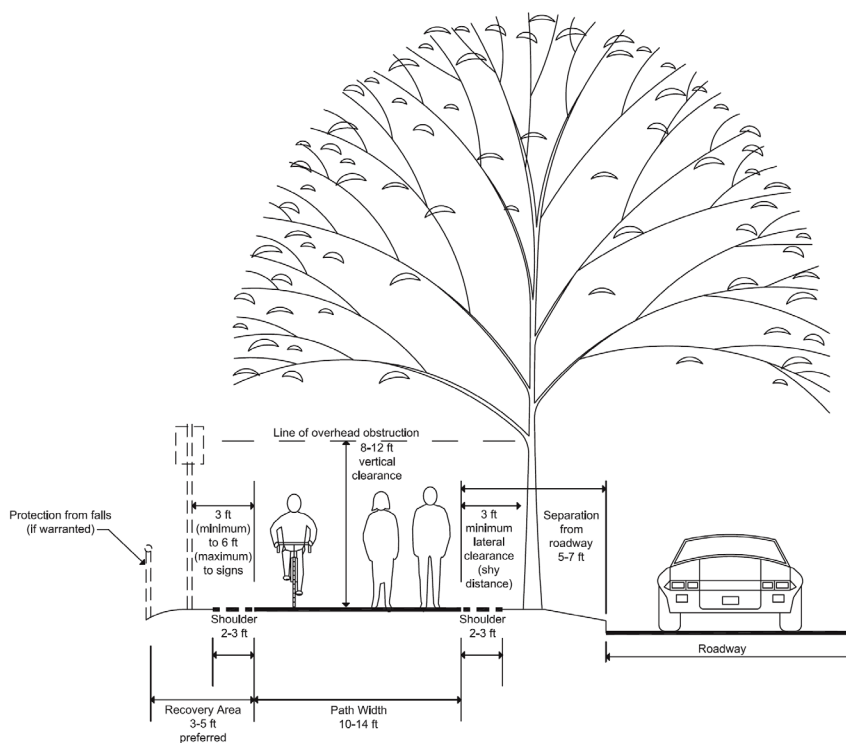


FIGURE 3. MassDOT Shared Use Path Dimensions

(Source: MassDOT Project Development and Design Guide)

Region-wide Shared-use Paths

Cape Cod is home to a growing network of shared use paths, as seen in Figure 4.

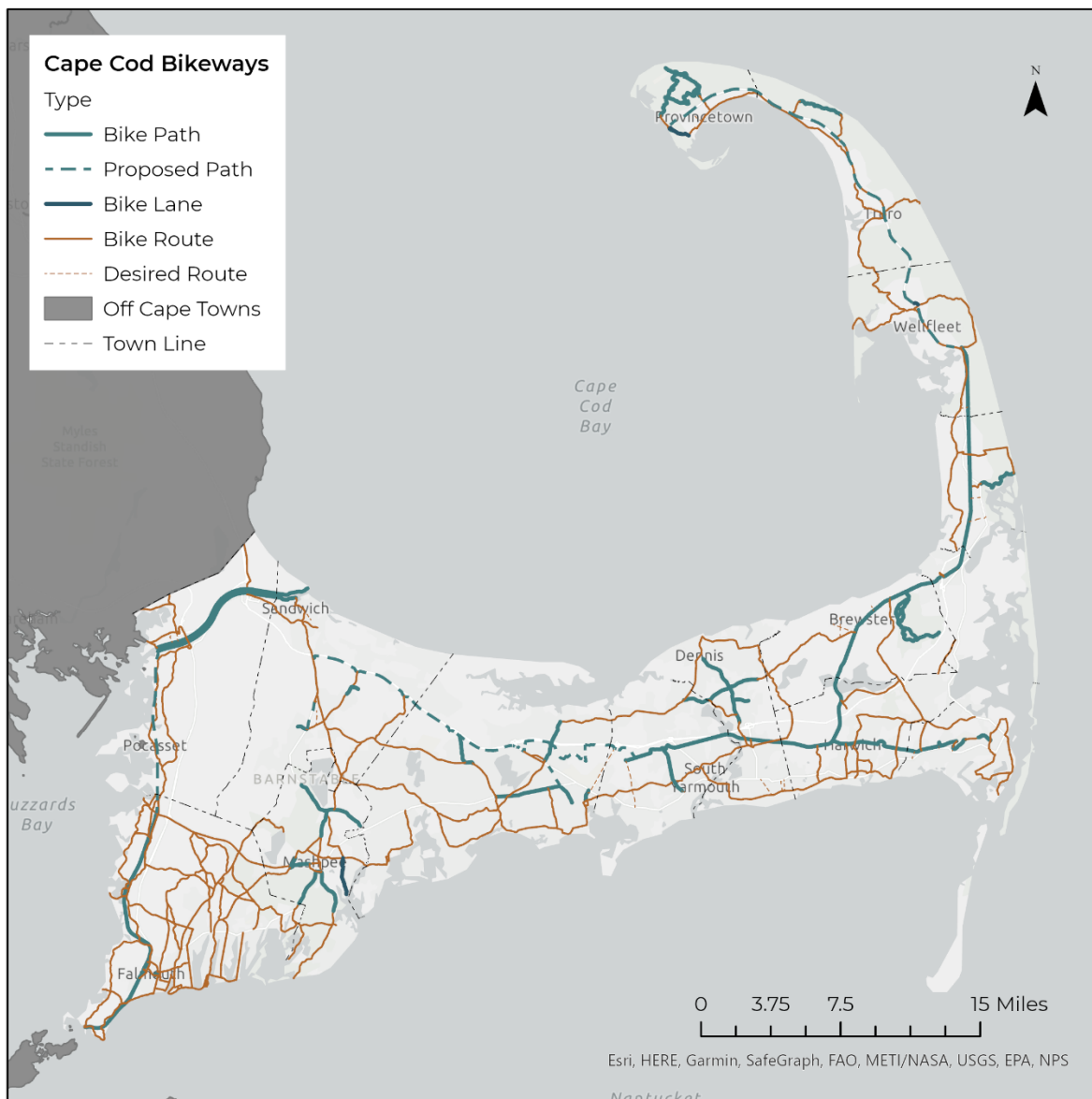


FIGURE 4. Bike Paths and Routes on Cape Cod

CAPE COD RAIL TRAIL

The Cape Cod Rail Trail was constructed in the 1970s from the out of service Cape Cod Line rail right-of-way. Several additions, including bridges over Route 6 and a tunnel beneath it, have been completed since then, with more extensions planned westward through Barnstable and Sandwich and eastward from the current terminus in Wellfleet to Provincetown. The Massachusetts Department of Conservation and Recreation (DCR) owns and is responsible for maintaining the Rail Trail.



FIGURE 5. Bicycle Roundabout on the Cape Cod Rail Trail, Harwich

Cape Cod National Seashore Bike Paths

PROVINCE LANDS TRAILS AND HERRING COVE BEACH PATH

The 7.6 miles of Province Lands Trails are located at Race Point in Provincetown. They provide a path from near Route 6 to the Provincetown beaches and the Provincetown Municipal Airport. Travelers primarily use the Province Lands Trails for recreation rather than commuting. The Park Service rehabilitated/repared the path in 2014 to address safety concerns. The 0.1 miles long Herring Cove Beach Path serves as a connection between the Herring Cove Beach parking lot and Province Lands Road. It also connects to the Province Lands trails through the parking lot. In 2023 the Park Service programmed rehabilitation/reconstruction of the Race Point Road bike path segment from Beech Forest to the transfer station, as identified in the Outer Cape Bicycle and Pedestrian Master Plan. NPS also plans to provide a shared use path connection in the former Route 6 layout to Herring Cove Beach parking lot, also part of the OCBPMP, that eventually will link to the Town's construction of a shared use path on the south side of Route 6 as part of the Shank Painter roundabout project.



FIGURE 6. Province lands Trail at the Race Point Visitors Center, Facing West

HEAD OF THE MEADOW TRAIL

The 2-mile Head of the Meadow Trail in Truro runs from Head of the Meadow Road to High Head Road in Pilgrim Heights. As part of the OCBPMP, the National Park Service repaired and rehabilitated the trail in 2019 and added a connector piece from Highland Road along Old King's Highway. The new segment is notable for its hardened yet non-asphalt surface treatment that preserves the rural and unspoiled character of the surrounding area.



FIGURE 7. Head of the Meadow Trail in Truro

NAUSET TRAIL

The 1.9-mile Nauset Trail in Eastham runs between Salt Pond Visitor Center and Coast Guard Beach.



FIGURE 8. Nauset Trail from Coastguard Beach Parking Lot in Eastham

CAPE COD CANAL BIKE PATHS

The Cape Cod Canal Bike Paths run along both sides of the Cape Cod Canal between Bourne and Sandwich. The Army Corps of Engineers owns and maintains the paths as frontage roads for the Cape Cod Canal. Both sides have benches and sitting areas and are lit at night. The southern-side path is 6.5 miles long, 8 feet wide and has 2 roadway crossings. The mainland-side path is 7 miles long, 8 feet wide and has 7 roadway crossings.



FIGURE 9. Southern-Side of the Canal Bicycle Path, East of Sagamore Bridge



FIGURE 10. Mainland-Side of the Canal Bicycle Path, East of Railroad Bridge



FIGURE 11. Shining Sea Bicycle Path in North Falmouth



FIGURE 12. Shining Sea Bicycle Path at Palmer Ave., Falmouth

SHINING SEA BIKE PATH

The Shining Sea Bike Path, located in Falmouth, was constructed from a portion of the out-of-service Woods Hole Branch rail right-of-way. The first phase of construction, which runs from the Steamship Authority terminal in Woods Hole to the Falmouth Bus Depot on Depot Street, was completed in 1976. The bike path has been extended northward over a series of phases to its current terminus at County Road (Route 151). The trail is currently 10.7 miles long. The Cape Cod Commission completed a feasibility study in 2017 for extending the bike path into Bourne, eventually connecting to the Cape Cod Canal bike path. The 6.5-mile proposed Bourne Rail Trail extension project is in planning stages with Phase 1 expected to begin construction in 2025. The Towns of Bourne and Falmouth are jointly planning Phase 4 of the Bourne Rail Trail to connect to the current terminus of the Shining Sea Bikeway in North Falmouth.

SETUCKET ROAD AND DENNIS PATHS

Several bike paths exist in Dennis, creating a network for bicyclists and pedestrians. The longest path runs along Old Bass River Road from just south of Bob Crowell Road. The Old Bass River Road Path is 3.1 miles long. The 3.2-mile Setucket Road Path begins in Yarmouth at Route 6A and ends west of Airline Road. The path crosses Route 134 and Old Bass River Road. The third path in Dennis is the 0.7-mile Old Chatham Road path between Old Bass River Road and Route 134. These paths are owned and maintained by the Town of Dennis except for the section in Yarmouth, which is owned and maintained by that town.



FIGURE 13. Setucket Road Path East of North Dennis Road, Looking East



FIGURE 14. Setucket Road Path East of North Dennis Road, Looking West

NICKERSON STATE PARK TRAILS

Several bicycle paths are located within Nickerson State Park in Brewster, in addition to the Cape Cod Rail Trail, which runs adjacent to and through the park. These local paths are used for recreation, offering a scenic ride through the park. They are owned by DCR, with a total of 6.8 miles of bicycle path, with six roadway crossings.

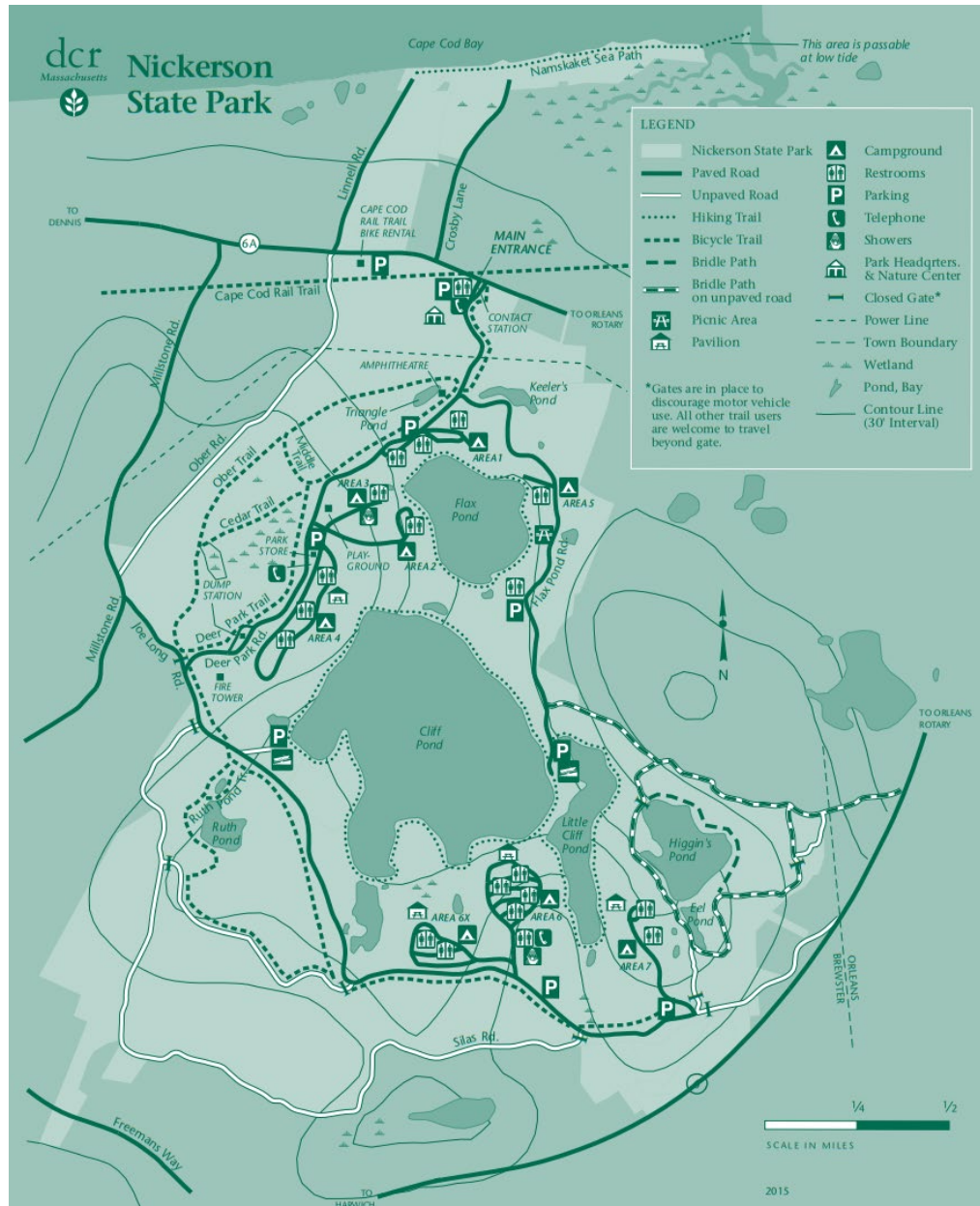


FIGURE 15. Map of Nickerson State Park Trails
(Source: Massachusetts Department of Conservation and Recreation)

ROUTE 28 PATH

The 2.5-mile Route 28 Path runs along Route 28 in Barnstable from Bearses Way to Old Stage Road. The path was constructed in 1980 by the Town of Barnstable as a safe route to the middle and high schools, but sections of the path were not designed to bicycle path standards, with narrow pavement, insufficient shoulders, and inadequate roadway crossings. The path is used primarily for commuting, as it connects residences, businesses, schools and other points of interest. The Cape Cod Commission is currently conducting a side path inventory report which includes this section of Route 28 and will identify areas needed for improvement.

ROUTE 130 PATH

The 2.4 miles Route 130 path runs along Route 130 from Heritage Memorial Park to just north of Route 28 in Mashpee. The path is owned by the town of Mashpee.



FIGURE 16. Looking North on Route 130 Bicycle Path at Lovells Lane, Mashpee



FIGURE 17. Looking South on Route 130 Bicycle Path at Lovell's Lane, Mashpee

HIGGINS CROWELL PATH

The Town of Yarmouth is constructing a 10-foot wide shared use path on Higgins Crowell Road in various segments to provide improved access to adjacent schools, recreation areas and the future extension of the Cape Cod Rail Trail. The path will extend 7,700 feet from the Higgins Crowell Road roundabout to Buck Island Road. Phase 1 of the project as sen in Figure x was constructed in 2021. Phase 2 will be completed in Summer 2023 and Phase 3 is scheduled for Fall and Winter 2023. Funding assistance is being provided through the MassTrails grant program. More details about future trail connections in Yarmouth are available at <https://www.yarmouth.ma.us/1904/Shared-Use-Path>



FIGURE 18. Phase 1 constructon of the Higgins Crowell Shared Use Path

OLD TOWNHOUSE ROAD PATH

The 2 mile long Old Townhouse Road shared use path runs from near Station Avenue, along Old Townhouse Road, behind the Bayberry Hills Golf Course, to Higgins Crowell Road in Yarmouth. The trail will be upgraded and become part of the Cape Cod Rail when the CCRT is extended from Peter Homer Park to Barnstable, which is expected to begin construction in 2024.



FIGURE 19. Old Townhouse Road Path at the Bayberry Golf Course in Yarmouth



FIGURE 20. Old Stage Road Path at the Service Road in Barnstable

OLD STAGE ROAD PATH

The 1.9 miles Old Stage Road Path begins at Route 149 in Barnstable, continues along the Service Road, and turns down Old Stage Road. The path ends at Oak Street, where travelers can continue by sidewalk to Route 28 and Centerville shopping areas. The path was constructed in the early 1980s and is owned by the Town of Barnstable. It is used for both recreation and commuting, connecting West Barnstable and Centerville.

FOREST ROAD PATH

The 1.4 miles Forest Road Path runs from Old Townhouse Road to Winslow Gray Road in Yarmouth. Continuing south on Forest Road, users can reach South Yarmouth and Route 28.



FIGURE 21. Forest Road Path, Looking South

ROUTE 151 PATH

The 1.1 miles Route 151 Path runs along Route 151 from Mashpee Commons to Old Barnstable Road in Mashpee and is owned by the town. At Old Barnstable Road, 2 forks turn south to access Mashpee High School. Currently, the Town of Mashpee has a Route 151 corridor improvement in various stages of design and construction from the Falmouth town line to Mashpee Rotary. Phase 1 of the project is reconstructing the existing shared use path and extending the path to Mashpee Commons. Phase 2 of the project will extend the path westerly from its current terminus at Mashpee High School to the Falmouth town line.

HYANNIS TRANSPORTATION CENTER PATH

The 0.4 Hyannis Transportation Center Path runs from Route 28 in Barnstable to Main Street

FORESTDALE SCHOOL PATH

The 0.4 Forestdale School Path in Sandwich connects Route 130 to the Forestdale School. The shared-use path serves the needs of students traveling to and from the school.

DOWNTOWN FALMOUTH PATH

The 0.2 mile Downtown Falmouth Path is located on Hamlin Street in Falmouth, between Dillingham Avenue and Katherine Lee Bates Road and is owned by the Town of Falmouth. As a connection to downtown Falmouth, the path is used to access town hall, the library, and businesses. The Downtown Falmouth Path is 0.2 miles long and has no roadway crossings

TABLE 2. Bicycle Path Mileage by Path

PATH NAME		LENGTH IN MILES	WIDTH IN FEET
Cape Cod Canal Bike Path	Total Mileage both Sides	13.6	8
Cape Cod Rail Trail	Main Path	27	8.5 / 10
Cape Cod Rail Trail	Harwich-Chatham Ext.	6.9	8.5
Downtown Falmouth Path		0.2	-
Forest Road Path		1.4	8.5
Forestdale School Path		0.4	10
Head of the Meadow Trail (with 2020 rehab)		1.9	8.5 -10
Higgins Crowell Road Path		1.4	10
Hyannis Transportation Center Path		0.4	10
Nauset Trail		1.9	8
Nickerson State Park Trails		6.8	-
Old Stage Road Path		1.9	8
Old Townhouse Road Path		2.0	8
Provincelands Trail		7.6	8-10
Herring Cove Beach Path		0.1	8
Route 130 Path		2.4	8
Route 151 Path		1.3	-
Route 28 Path		2.6	8
Setucket Road and Dennis Paths		7.0	8.5
Shining Sea Bikeway		10.6	8.5

Bicycle Lanes

MassDOT upgraded the paved shoulders on Route 6 in Truro and Wellfleet to stripe bicycle lanes in 2017 with bike lane symbols, signage and lane striping. It is currently conducting an analysis of bike lane extension into the 4-lane section of North Truro and Provincetown. The National Park Service also installed an unprotected bike lane on Province Lands Road Bradford Street and Herring Cove beach in 2011. Additionally, as part of MassDOT's Healthy Transportation Directive, small sections of bicycle lanes have been constructed as part of recent Transportation Improvement Projects (TIP) at Route 28 at Bearses Way in Barnstable, Route 28 at Jones Road in Falmouth, Route 28 at Osterville-West Barnstable, in Barnstable.



FIGURE 22. Bicycle lanes on Route 28 (North of the Jones Road Intersection) in Falmouth

Bicycle Routes

A bicycle route is any road, path, or trail that has been designated for bicycle use. These may be on side streets with low volumes of traffic or on roads with wide shoulders. Local bicycle routes are mapped and signed in towns such as Falmouth, Sandwich, Harwich, and Chatham.

CLAIRE SALTONSTALL BIKEWAY

In 1978 the Massachusetts General Court established the Claire Saltonstall Memorial Bikeway (also known as “Mass Bike Route 1” and the “Boston to Cape Cod Bikeway”) as a memorial to Claire Saltonstall, daughter of Senator William Saltonstall, who died in a bicycle accident in 1974. The bike route consists of a series of interconnected on-road segments and multi-use paths beginning in Boston and ending in Provincetown. A secondary leg extends from Bourne to Falmouth. Overall, the Claire Saltonstall Bikeway is about 165 miles long.

The route for Cape Cod was recently revised/updated by MassDOT to maximize use of shared-use paths and more comfortable road segments where available. MassDOT is also



FIGURE 23. Existing Signage on State Bicycle Route 1. A new design is underway.

redesigning the Claire Saltonstall Bikeway signage and locations to improve wayfinding. New signage is scheduled to be installed in 2023/2024.



FIGURE 24. Claire Saltonstall Bikeway – Map showing recommended revised route that will be updated with new maps and signage

LOW VOLUME ROADS

Bicyclists and pedestrians can utilize low volume roads with minimal automobile conflicts. Cape Cod has over 450 miles of major roads with summer average daily volumes (ADT) of 5,000 vehicles per day or less, and over 90 miles of major roads with 1,000 vehicles per day or less. For reference, an ADT of 5,000 is equivalent to about one vehicle every seven seconds during daylight hours. An ADT of 1,000 is equivalent to about 1 vehicle every 35 seconds during daylight hours. Low volume roads are an important piece of a bicycle network, as many bicyclists are comfortable using them without a separated bicycle accommodation. Trips usually begin or end on side streets or in low traffic residential neighborhoods where they provide readily available route connections.

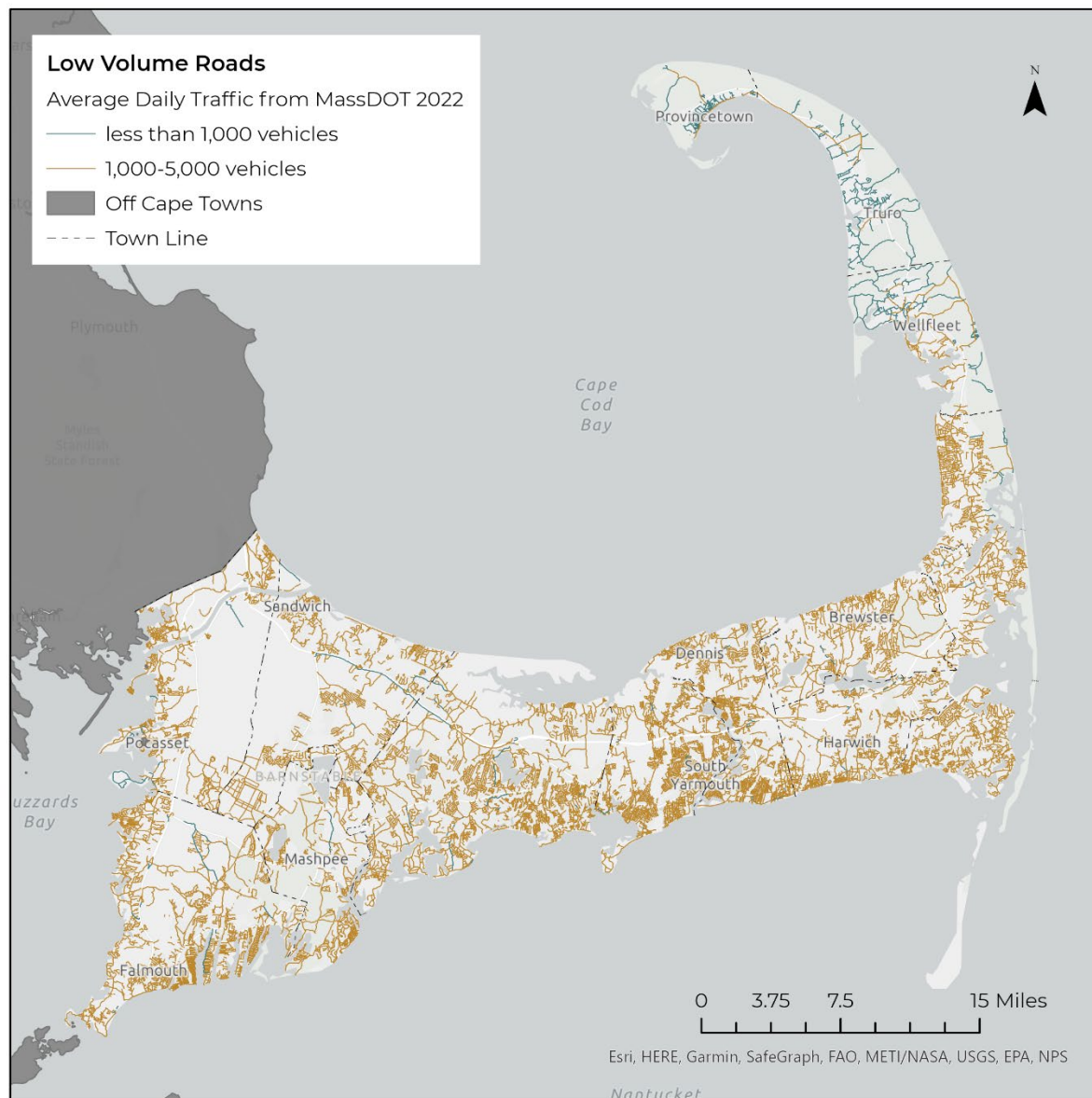


FIGURE 25. Low Volume Roads

Sidewalk Network

Sidewalks are paved surfaces, usually adjacent to roadways, which are designed primarily for pedestrian usage. Sidewalks are typically 4 to 6 feet wide, made with slabs of concrete, paved asphalt, bricks, or other hard substances. The Americans with Disabilities Act requires sidewalk curb cuts to be large enough and shallow enough for wheelchair usage. Telephone poles, road signs, and other architectural barriers must also be removed to create an unobstructed path for

walking. In Massachusetts, bicyclists may ride on sidewalks outside business districts unless otherwise prohibited by local ordinances.

Over 90% of Cape Cod roadways do not have sidewalks. While many of these streets are low volume and residential, some are not and do warrant sidewalks. On a street without sidewalks, pedestrians must walk in the shoulders or on private property. Expanding the existing sidewalk network and correcting improperly designed sidewalks will help to encourage pedestrian usage in, around, and between business and population centers.

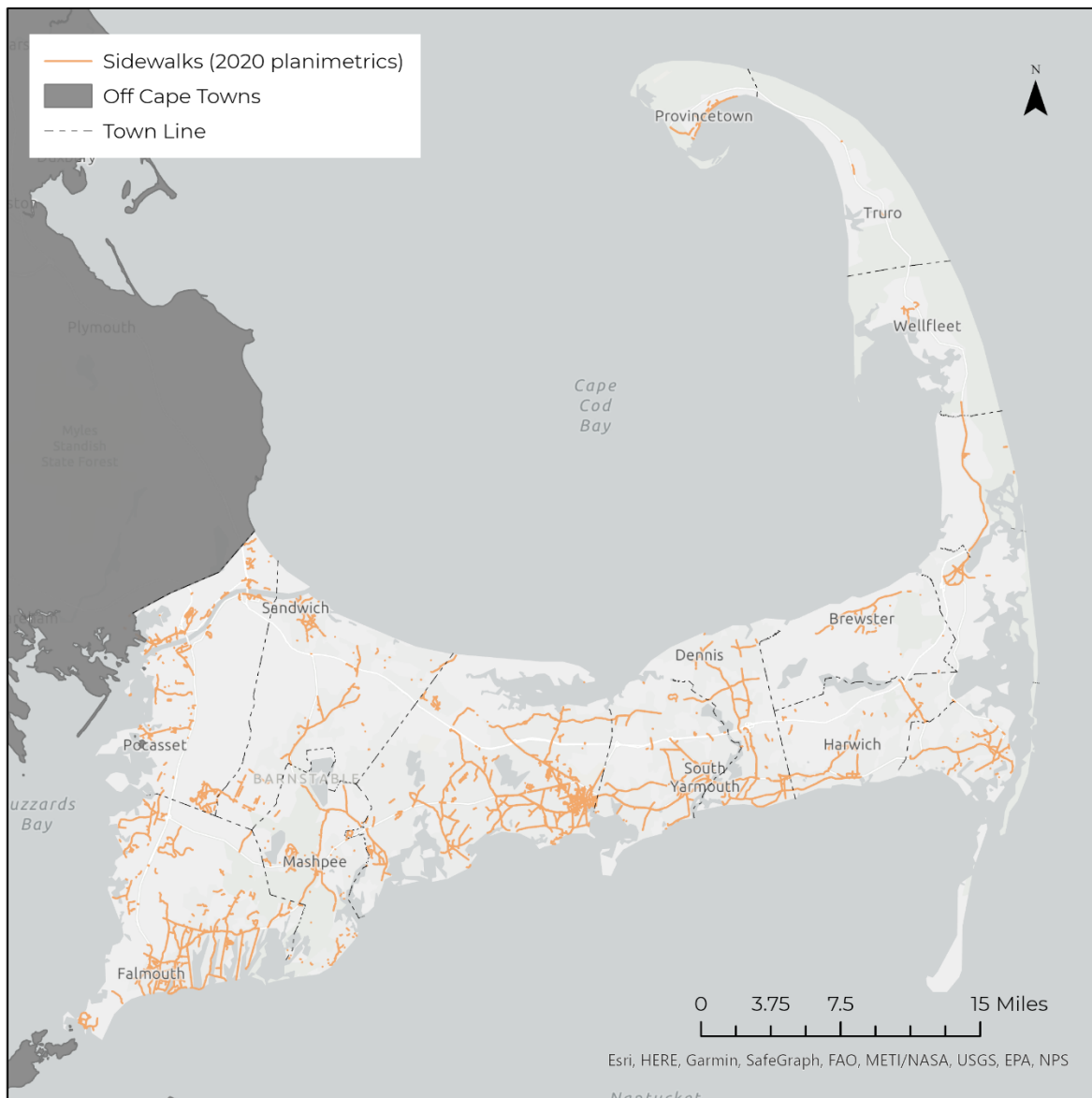


FIGURE 26. Sidewalk Network

The sidewalk network also includes crosswalks. Crosswalks provide a safe means for pedestrians and other sidewalk users to cross roadways. All crosswalks are marked on the roadway surface by white paint. Generally, crosswalks located on lower volume roads have no traffic control devices but many crosswalks have crossing signals that stop traffic, allow pedestrians to cross, and warn pedestrians when traffic is about to resume. Additionally, rectangular rapid flashing beacons (RRFB) have been installed in the region at crosswalks to provide a higher level of visibility for the vulnerable users. Several examples are seen along the region's shared use path network. An example of an RRFB installation on Great Neck Road South in Mashpee is shown below in Figure 27.



FIGURE 27. Rectangular Rapid Flashing Beacon located at the intersection of Great Neck Road South at Donna's Lane in Mashpee

Typically, crossing signals are located with traffic signals at roadway intersections but several pedestrian signals on Cape Cod are located outside of intersections. In recent years, there have been installations of Pedestrian Hybrid Beacons (PHB) which are a new traffic signal system intended to allow for a protected signalized outside of a stan. Figure 28. shows a recent PHB installation on Route 28 in Falmouth. The PHB in Falmouth provides a new safe crossing for non-motorists to access Goodwill Park and the Shining Sea Bikeway. Table 3 presents a list of PHBs located on Cape Cod.

TABLE 3. Pedestrian Hybrids on Cape Cod

PEDESTRIAN HYBRID BEACON LOCATION	TOWN	YEAR INSTALLED
Route 6 (south of Governor Prence Road)	Eastham	2020
Belmont Circle	Bourne	2022
Route 28 at Goodwill Park	Falmouth	2023



FIGURE 28. Pedestrian Hybrid Beacon located on Route 28 in Falmouth which provides a connection between the Shining Sea Bikeway and Goodwill Park

Ensuring that crosswalks are located at high pedestrian areas throughout Cape Cod will help to improve safety as well as access. Access can also be improved by ensuring that crosswalks accommodate all users, including the elderly and disabled. Properly designed curb cuts that are usable by wheelchairs, tones at crosswalk signals for the blind, and other amenities can significantly improve sidewalk access for people with mobility challenges.

Bicycle and Pedestrian Amenities

Beyond bicycle and pedestrian infrastructure, various amenities address the needs of the traveler. Employers and businesses usually have enough automobile parking. The same does not always hold true for bicycles. Bicycle racks allow the traveler to securely park their property without

fearing that it will be stolen or damaged. Water fountains, vending machines or nearby cafes provide the traveler with nourishment after their ride or walk. Fix-it repair stations allow bicyclists access to make quick repairs during their journey. The repair tool kits usually include items to change a flat tire or adjust brakes. The Cape Cod Commission's Bike Rack program² has allowed municipalities and other governmental agencies to install bike racks and repair stations in the region at a reduced cost through this reimbursable grant program. The program is made available from Transportation Improvement Program (TIP) funds from MassDOT and the Federal Highway Administration. Public restrooms are also useful to both pedestrians and bicyclists. Showers and locker facilities allow employees to change into clean clothes. These amenities help to encourage non-motorized transportation.



FIGURE 29. Bike repair station installed at a CCRTA bus stop located on Highland Road in Truro

According to the Massachusetts State Bicycle Plan, all such amenities address the “destination barriers” that bicyclists and pedestrians perceive, such as not being able to safely park their bicycle, showing up to work sweaty, or arriving at their workplace hungry and thirsty. By making non-motorized travel more attractive to potential users, more people will be inclined to ride a bicycle and walk to work.

² <https://www.capecodcommission.org/our-work/bike-rack-program/>

Bicycle and Pedestrian Facility Accessibility and Mobility

Not everyone can ride a bicycle or walk as their primary mode of transportation. Users must live relatively close to where they work and shop to ensure a reasonable travel time. The low density of Cape Cod development is in this way not conducive to bicycle travel. Moreover, a certain level of fitness is necessary to deal with the physical exertion. On Cape Cod, where many residents are elderly, bicycling or walking may not be practical for some travelers. Despite these barriers, potential users who can be targeted and encouraged to travel by bicycling or walking for its positive environmental, physical, and economic benefits. Bicycle paths and routes can be made more accessible by providing adequate entry points, safe roadway crossings, and proper signage.

Cape Cod Commission Transportation Staff recently performed a Rail Trail Crossing Inventory³ and identified potential safety, accessibility and uniformity improvements for the 95 rail trail crossings. As a follow up study, staff are currently performing a side path inventory to similarly identify paths that are adjacent to the region's roadways that are in need of improvement for safety and accessibility.

Bicycle transportation can help to connect users to other modes of transportation. Because bicycles are small and lightweight, they are portable and easy to transfer from mode to mode. Bus services, such as the CCRTA, Plymouth and Brockton, and Peter Pan Bus Lines, can accommodate cyclists with racks and storage areas. The Steamship Authority and other ferry services allow passengers to bring their bicycles for a fee. Special reservations can also be made with air carriers to transport bicycles.

BICYCLE IMPROVEMENT PROJECTS

The following is a comprehensive list of ongoing or recent bicycle improvement projects on Cape Cod that are currently in conceptual planning, engineering design or in construction.

RECENTLY COMPLETED PROJECTS

Cape Cod Rail Trail Bass River Bridge construction (Dennis/Yarmouth)
Cape Cod Rail Trail extension Dennis/Yarmouth (over Route 134 & Station Ave)
Head of the Meadow Trail extension/rehabilitation (Truro)
Adams Street Bike Lane (Bourne)
DCR Cape Cod Rail Trail extension (Wellfleet)
Conwell Street Bike Lanes (Provincetown)
Belmont Circle Multi-Modal Improvements (Bourne)

³ <https://www.capecodcommission.org/our-work/rail-trail-crossing-inventory/>

PROJECTS UNDER CONSTRUCTION

Cape Cod National Seashore Shared Use Path (Provincetown - Beech Forest to Transfer Station)
Cape Cod National Seashore Shared Use Path (Provincetown - Herring Cove)
Service Road Shared Use Path (Sandwich)
Phase 1 Route 151 Shared Use Path reconstruction (Mashpee)

PROJECTS UNDER DESIGN AND FUNDED

Upper Cape

Bourne Rail Trail Phase 1
Phase 2 Route 151 Shared Use Path extension (Mashpee)

Mid Cape

Cape Cod Rail Trail Phase 3 Extension (Yarmouth/Barnstable)
Higgins Crowell Road Shared Use Path (Yarmouth)
Bearses Way Shared Use Path (Barnstable)
Route 28 Shared Use Path construction (Yarmouth)

Lower Cape

Outer Cape

Route 6 Shared Use Path construction (Wellfleet)
Shank Painter Road/Route 6 Shared Use Path (Provincetown)

PROJECTS IN PLANNING STAGE/NOT CURRENTLY FUNDED

Bourne Rail Trail Phase 2
Bourne Rail Trail Phase 3
Bourne Rail Trail Phase 4/Falmouth Shining Sea Bikeway Extension
Cape Cod Rail Trail Extension Phase 4 (Barnstable)
Mashpee Rotary Shared Use Path
Airport Rotary Shared Use Path (Barnstable)
Route 6 Shared Use Path (Wellfleet to Provincetown)
Sandwich Shared Use Path (Route 130 to Canal)
Route 6 Modernization Project (Truro to Provincetown)

RECENT & ONGOING BICYCLE/PEDESTRIAN PLANNING EFFORTS

This section summarizes recent and ongoing bicycle & pedestrian studies and planning efforts underway by MassDOT, the Cape Cod Commission and/or Cape Cod towns. More information about these studies as well as links to previous studies/plans is available at:

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

Massachusetts Bicycle Transportation Plan

The 2019 Bicycle Transportation Plan is the State's roadmap to make biking a safe, comfortable and convenient option for everyday travel. <https://www.mass.gov/service-details/bicycle-plan>

Massachusetts Pedestrian Transportation Plan

The 2019 Pedestrian Transportation Plan is the State's roadmap to make walking a safe, comfortable and convenient option for short trips for all people. <https://www.mass.gov/service-details/pedestrian-plan>

Massachusetts Municipal Resource Guide for Bikeability

The Municipal Resource Guide for Bikeability provides an introduction to the core concepts of bikeability and outlines additional resources available on each topic.

https://www.mass.gov/files/documents/2019/06/13/2019_Municipal_Resource_Guide_for_Bikeability.pdf

Complete Streets Program

The MassDOT Complete Streets Funding Program addresses critical gaps in transportation networks by giving Massachusetts municipalities tools and funding to advance Complete Streets projects in their community. Currently, 10 Cape towns have an approved Complete Streets policy, three have an approved Complete Streets Prioritization Plan and have received a Tier 3 construction grant. <https://www.capecodcommission.org/our-work/complete-streets/>

MassTrails Impacts of Shared Use Paths

MassDOT and its consultant Kittleson & Associates, Inc. explored, measured and analyzed the impacts of shared use paths in respect to health, social well-being, the environment, transportation, safety and the economy. The project studied four shared use paths in Massachusetts, including the Cape Cod Rail Trail. The study, finalized in 2021, found that the Cape Cod Rail Trail generated the greatest economic output with \$9.2 million in economic output with \$1.5 million in local/state taxes collected and 99 jobs created or sustained.

Cape Cod Route 28 Corridor Study

MassDOT and its consultant Kittleson Associates completed a Complete Streets evaluation of Route 28 on Cape Cod in 2020 to identify short- and long-term recommendations to improve multimodal conditions. The report serves as a comprehensive guide for future corridor development.

Route 6 Truro and Provincetown Bicycle Lane Extension Study

This 2017 Cape Cod Commission study presents alternatives for accommodating bicycles on the four-lane section of Route 6 between North Truro and Provincetown as an interim step until full

implementation of the Outer Cape Bicycle and Pedestrian Master Plan, which recommends a separated multi-use path adjacent to Route 6.

Cape Cod Safe Routes to Schools Bicycle/Pedestrian Network Facility Connections

This 2017 Cape Cod Commission study provides recommendations for improved connectivity between schools and the bicycle and pedestrian facility network.

Shining Sea Extension Feasibility Study

This 2017 Cape Cod Commission study presents potential alternatives for extending the Shining Sea Bikeway from its terminus in North Falmouth to the Cape Cod Canal bike paths.

Outer Cape Bicycle and Pedestrian Master Plan

This 2017 study provides a recommended alternative for extending the Cape Cod Rail Trail from South Wellfleet to Truro and Provincetown. It also provides recommendations for bicycle and pedestrian connections to destinations in the three communities and Cape Cod National Seashore. The project was funded by the National Park Service who contracted with the Cape Cod Commission to write the plan, in partnership with the three Outer Cape towns. A steering committee comprised of two representatives from each community (town staff and bicycle committee member) plus CCNS and CCC staff guided development of the plan. The map below presents the primary route and secondary route recommendation. Several recommendations have been implemented, including extension of the Cape Cod Rail Trail along the railroad bed (though DCR did not extend to new segment to Old County Road/OKH) and improvements to Head of the Meadow Trail and the additional connection to Highland Road on Old Kings Highway. Currently programmed projects include extension of the Beech Forest Path on Race Point Road to the transfer station; construction of a bike path along the old Route 6 right of way to Herring Cove beach parking lot, construction of a bike path along the southern lanes of Route 6 between Shank Painter Road and Herring Cove. In addition, MassDOT is exploring shared use path design needs along Route 6 from Wellfleet to Provincetown.

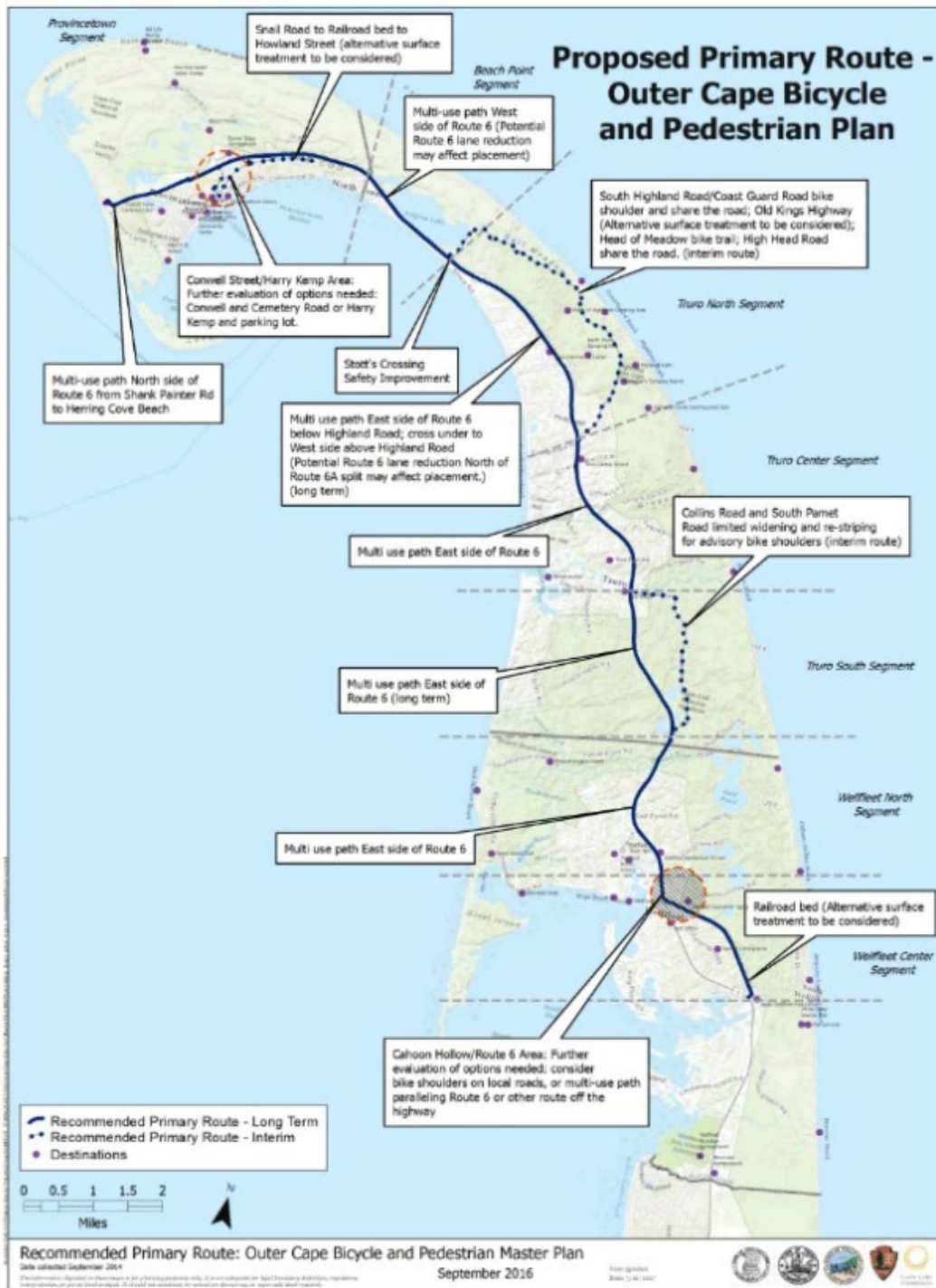


FIGURE 30. Proposed Primary Route for Outer Cape Bicycle and Pedestrian Plan

CAPE COD COMMISSION

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