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Route 6 Truro and Provincetown Bicycle Lane Extension Study





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Introduction and Background

U.S. Route 6 Route 6 is the primary road corridor serving the Outer Cape Cod towns of Wellfleet, Truro, and Provincetown and is the only road connecting the three communities. It is a popular route for bicycling, due in part to its directness and in part to a lack of alternatives other than Shore Road/Route 6A, which has narrow pavement width and no bicycle accommodations. With high traffic volumes in the summer months, high vehicle speeds, and only partial separation from motor vehicles, Route 6 can be uncomfortable and hazardous for even experienced cyclists. The four-lane section through North Truro and Provincetown, with its minimal shoulders, is particularly stressful.

In 2017 MassDOT installed bike lane symbols, new striping, and associated bicycle signage on Route 6 from Lawrenceville Road in Wellfleet to South Highland Road in North Truro. The northern extent of the bike lanes ends just south of where Route 6 changes from two-lanes to four-lanes. MassDOT provided the new markings in the existing paved shoulder area in response to requests from Outer Cape communities to provide bike lanes on the two-lane section of the highway corridor.

This study examines options for extending bicycle accommodations into the four-lane section of Route 6 from Truro to Provincetown. The 2016 *Outer Cape Bicycle and Pedestrian Master Plan* proposes a fully separated multi-use path on Route 6 as a long term primary route through Truro and Provincetown. This study examines bike lane extension as an interim accommodation that could be implemented without extensive design or construction needs. A primary objective of the study is to learn how people feel about potential alternatives.

STUDY AREA

The study area for this report (shown in Figure 1) consists of the four-lane section of Route 6 from the Route 6/Shore Road (Route 6A) intersection in North Truro to Herring Cove beach in Provincetown. The western extent of the study area, between Shank Painter Road and Herring Cove, is part of project area for the Shank Painter Road/Route 6 redesign project and is under design by the Town of Provincetown. The proposed project includes Route 6 bicycle accommodations between Shank Painter and Herring Cove.

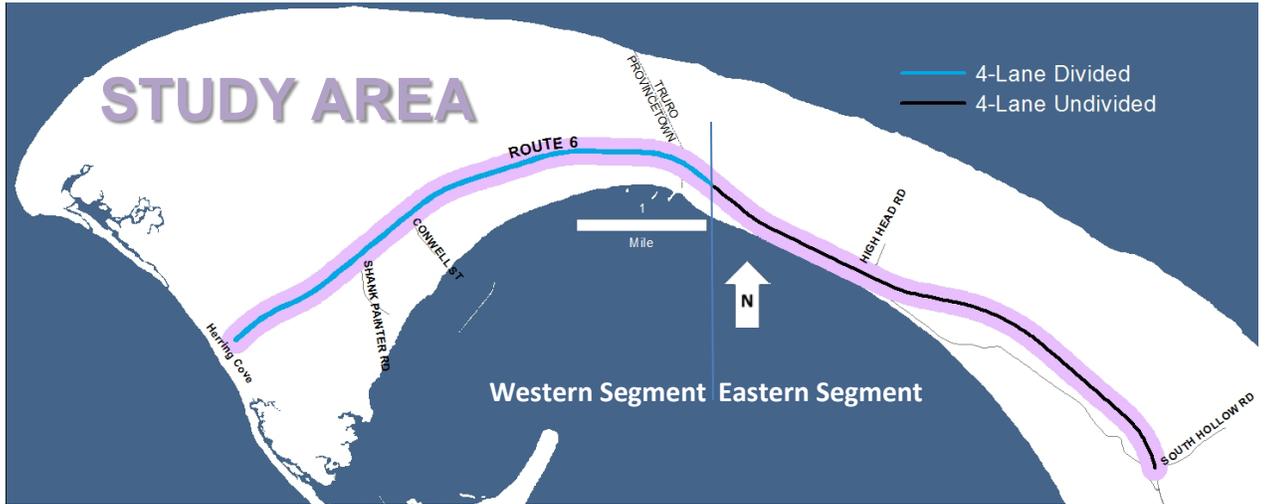


Figure 1 - Study Area

RELATED PLANS/PROJECTS

- The 2016 *Outer Cape Bicycle and Pedestrian Master Plan* proposes a separated multi-use path on Route 6 as a long-term primary route accommodation through Truro and Provincetown. The plan recommends further study in a few locations, including the four-lane section of Route 6 in Truro and Provincetown, to understand whether removal of one or more motor vehicle lanes and re-allocation of the space for bicycle use (i.e. a “road diet”) may be a feasible design alternative. The notion of a road diet came up during development of the plan as a potential way to accommodate a multi-use path in locations where wetlands or steep slopes adjacent to road would preclude/constrain path construction.
- Several bicycle and pedestrian projects are underway or proposed for Route 6 on the Outer Cape, including intersection redesign at the Route 6 and Shank Painter Road in Provincetown; redesign of the Route 6 and Shore Road intersection in North Truro, with extension of bike lanes to South Hollow Road, and redesign of Route 6 and Main Street intersection in Wellfleet. See Figure 2.



Figure 2 - Route 6 projects on the Outer Cape.

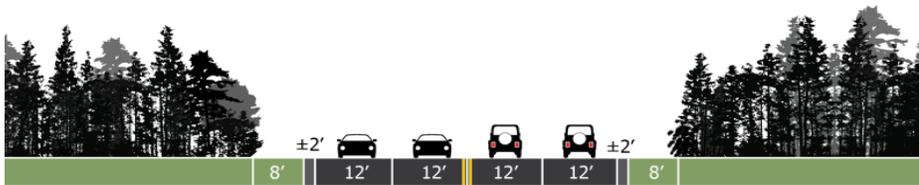


Existing Conditions

U.S. Route 6 in the study area consists of four 12' travel lanes with 2' shoulders on each side of the roadway. The eastern portion of the study area in Truro from Shore Road to the Provincetown town line contains an undivided highway segment. This section is problematic for bicyclists and pedestrians who wish to cross the wide expanse of roadway. The roadside includes approximately 8' of graded natural surface that is often used by pedestrians. In the western portion of the study area, the travel lanes are separated (divided) by a 50' natural median. Side streets are infrequently spaced, and local property access is limited. Route 6 cross-sections are shown in Figure 3.

Route 6 from Shore Road (Route 6A), Truro to Provincetown Town Line

EXISTING CONDITIONS (TYPICAL)



Route 6 from Provincetown Town Line to Shank Painter Road

EXISTING CONDITIONS (TYPICAL)



Figure 3 - Route 6 existing cross sections.

Within the study area, U.S. Route 6 is classified as a Principal Arterial which means that it is considered important for regional mobility and with a lower emphasis on local access. The relative infrequency of driveways and curb cuts is potentially advantageous to bicyclists (assuming bicycle accommodations are provided) since there is less turning traffic to contend with as compared to roads at lower classifications. Roadway classification of study area roads is shown in Figure 4.

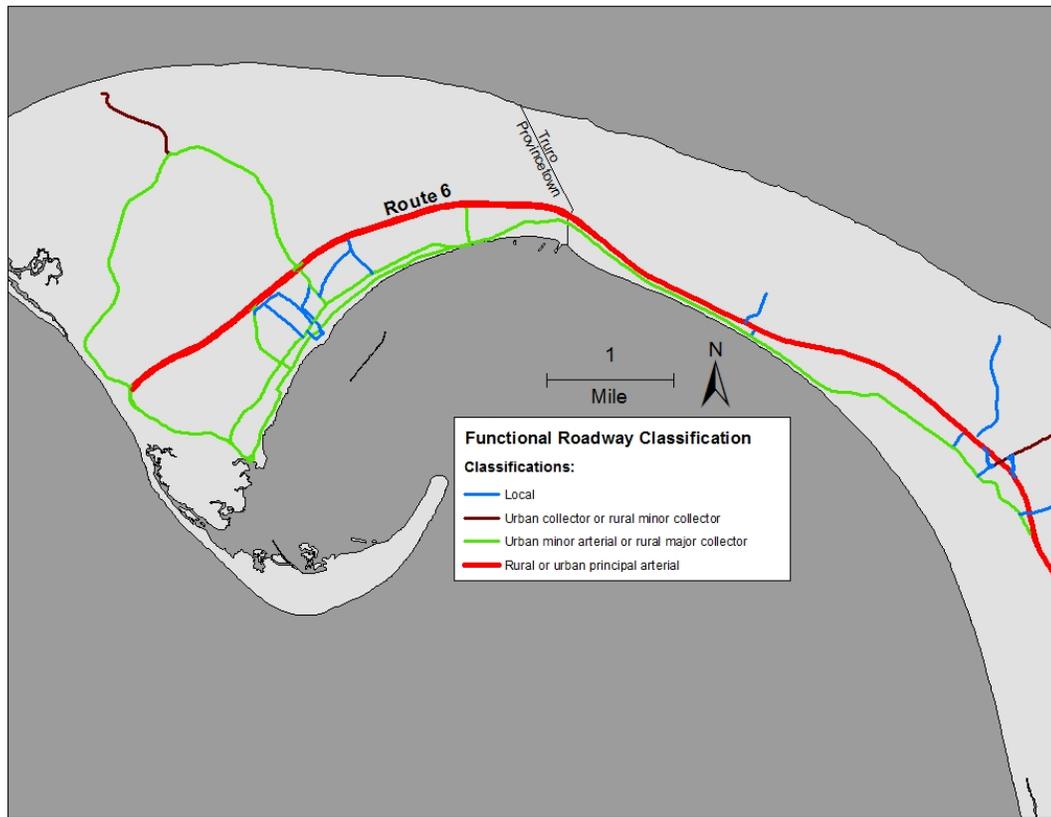


Figure 4 - Roadway classification of study area roads.

Speed limits are generally set higher on roads such as Route 6 in comparison with lower-classified roads and these roads generally carry higher traffic volumes. Figure 5 shows traffic volumes and speed limits on study area roadways. Speed limits on Route 6 through most of the study area are set at 50 MPH except for a short section near Herring Cove where the speed limit lowers to 30 MPH. Vehicle speed is a major factor in bicyclists' comfort and safety. Severity of injury and likelihood of fatality increases dramatically with increases in motor vehicle speed when a collision occurs. While Route 6A provides an alternate route with lower speeds, its lack of bicycle accommodation is also a major concern for bicyclists.

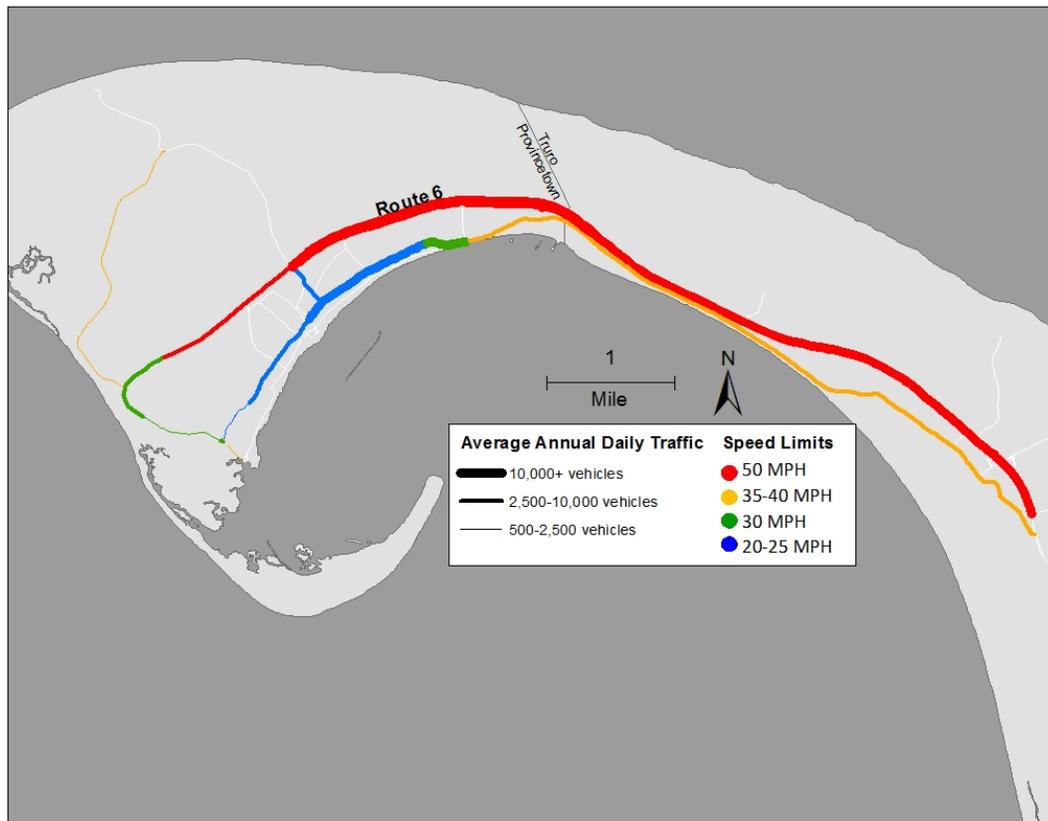


Figure 5 - Traffic volumes and speed limits

Source: MassDOT Roadway Inventory File

Traffic volumes on Route 6 within the study area and in the adjacent area of the eastern/southern portions in Truro indicate that traffic volumes along 2-lane segments in some cases exceed the volumes on some of the 4-lane segments, as shown on the chart in Figure 6. Traffic volumes shown in Figure 5 represent Annual Average Daily Traffic reported by MassDOT. These figures are estimates of the total number of vehicles in a year divided by 365. The Summer Average Daily Traffic shown in Figure 6 show results of Cape Cod Commission/MassDOT traffic counts collected during typical summer weekdays.

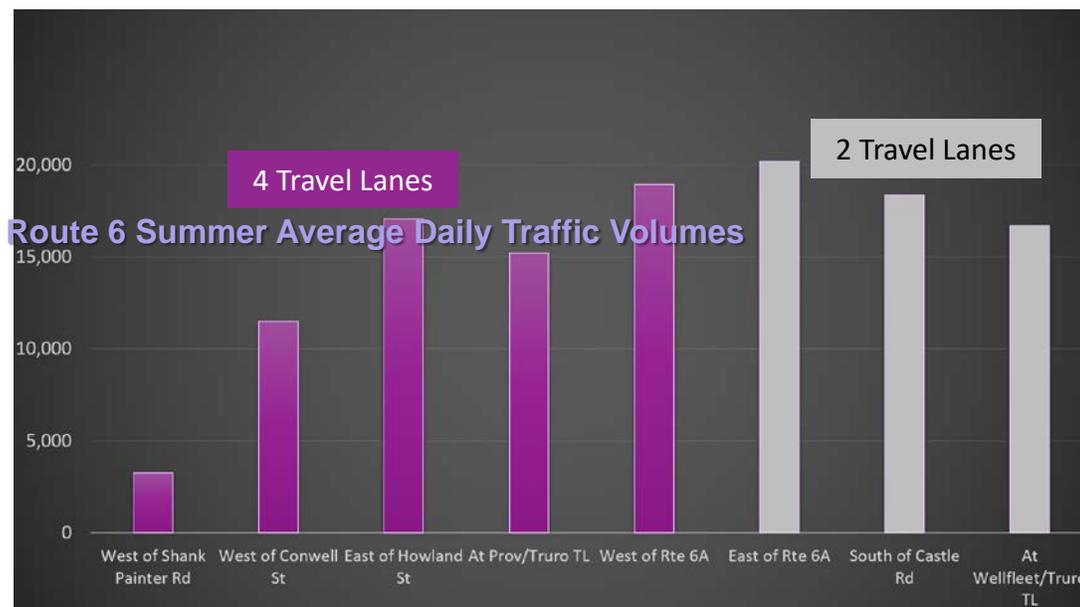


Figure 6 - Route 6 traffic volumes.

Sources: Cape Cod Commission/MassDOT

A review of the most recent 3-years of crash data supplied by the Massachusetts Registry of Motor Vehicles shows that there was a total of 291 crashes in the study area during 2014-2016(0 Fatality, 67 Injury, 205 Property Damage Only). The locations of recorded crashes are shown in Figure 7. There were no bicycle or pedestrian crashes recorded on Route 6 during this period. Most of the crashes were reported for Route 6A or Commercial Street in Provincetown. A bicyclist was killed by a motor vehicle on Route 6 in Provincetown in 2012.

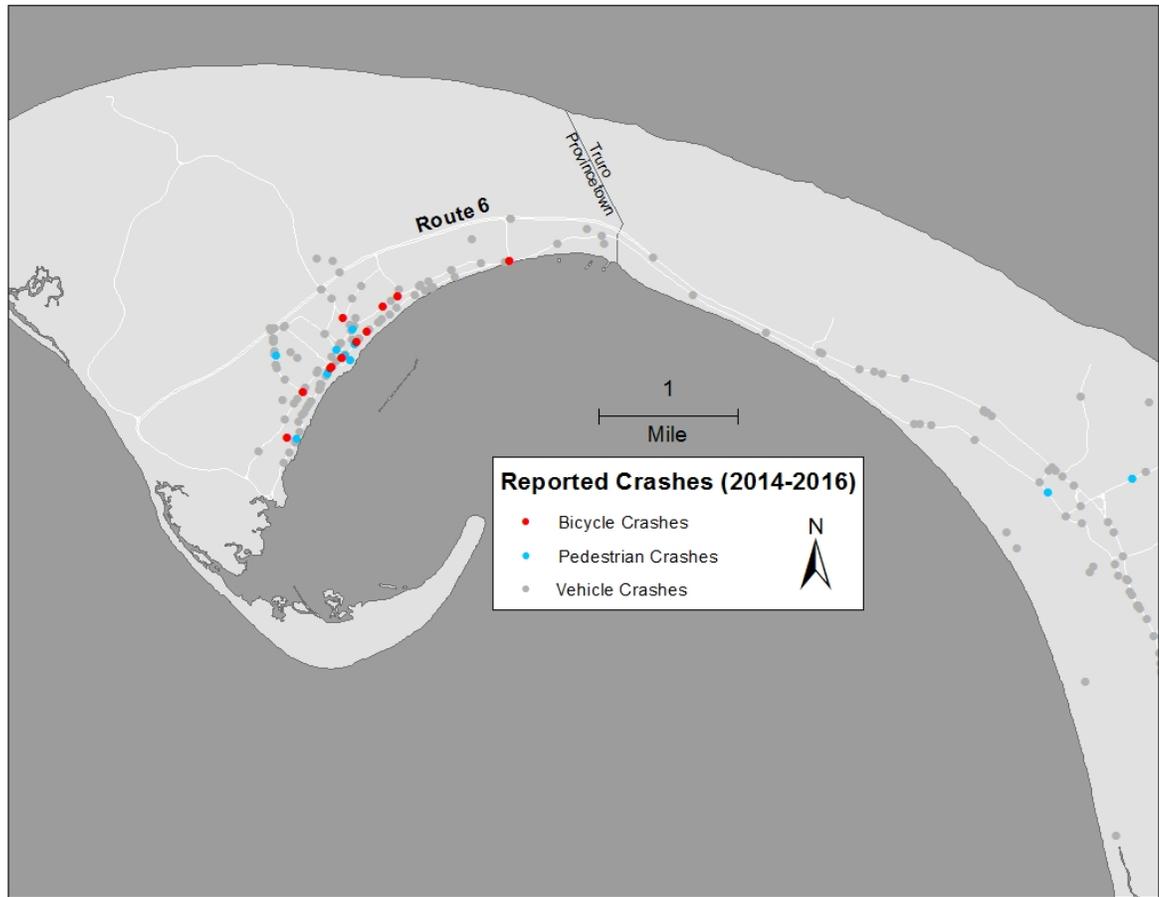


Figure 7 - Crash locations.

Development of Alternatives

The project team developed three concepts for extension of the bike lanes and developed two road cross sections for each alternative – one for the undivided portion of the highway (eastern end) and one for the divided portion (western end). See figures of corresponding cross-sections below.

Alternatives Concepts	
Alternative 1	Widens Route 6 to add bike lanes on both sides
Alternative 2	Removes one westbound lane (towards Provincetown) and repurposes the space as a separated two-way bicycle lane. (repurposing a travel lane is called a “road diet.”) Existing road footprint remains avoiding the need to add more pavement.
Alternative 3	Removes one westbound lane and one eastbound lane and repurposes the space as bike lanes. (repurposing a travel lane is called a “road diet.”) Existing road footprint remains avoiding the need to add more pavement.

CROSS SECTION ALTERNATIVES

While the western extent of the project’s study runs to Herring Cove, the alternatives and cross sections developed for this report end at the Shank Painter Road intersection, which is under redesign by the Town of Provincetown and is anticipated to include Route 6 bicycle accommodations from Shank Painter Road to Herring Cove.



Concept plan of Town of Provincetown’s recommended improvements for Route 6 west of Shank Painter Road. A multi-use path is shown on the south side of the road.

Alternative 1 (cross sections shown in **Figure 8**) includes 6’ of widening on each side of Route 6 to create 1-way bike lanes in each direction. The bicycle lanes would be located

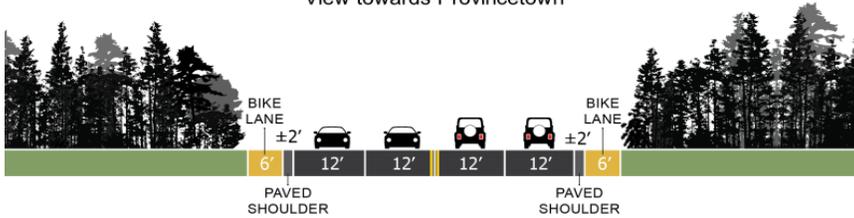


adjacent to the 2' shoulder in order to allow for a small amount of buffer space away from motor vehicles as well as to avoid the need for relocation of existing roadway storm drains.

Route 6 from Shore Road (Route 6A), Truro to Provincetown Town Line

ALTERNATIVE 1

View towards Provincetown



Route 6 from Provincetown Town Line to Shank Painter Road

ALTERNATIVE 1

View towards Provincetown

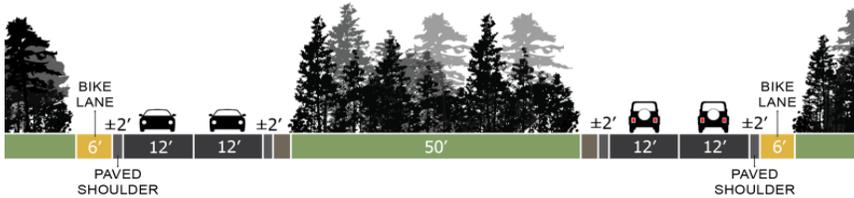


Figure 8 - Alternative 1 cross sections.

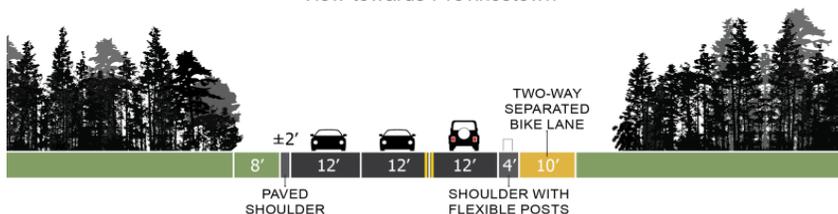
Alternative 2 (cross sections shown in Figure 9) includes the creation of a 10' two-way separated bike lane along the westbound side of Route 6. (This is the righthand side of the road from the viewpoint of motorists traveling towards Herring Cove.) The bicycle lanes would be located adjacent to a 4' buffer area that would include flexible posts to help guide motorists to stay in their lane. To avoid the need for new pavement construction, the space for creation of the separated bike lane would necessitate the removal of the westbound travel lane. A review of traffic volumes at Route 6 locations in and near the study area indicate that remaining lanes are likely to retain sufficient capacity for expected traffic volumes. The technique of repurposing a travel lane is called a "road diet" and has been a successful strategy in improving safety and non-motorized accommodation in Massachusetts and throughout the country.



Route 6 from Shore Road (Route 6A), Truro to Provincetown Town Line

ALTERNATIVE 2

View towards Provincetown



Route 6 from Provincetown Town Line to Shank Painter Road

ALTERNATIVE 2

View towards Provincetown



Figure 9 - Alternative 2 cross sections.

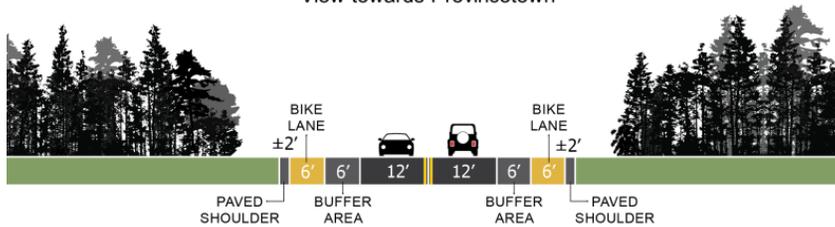
Alternative 3 (cross sections shown in **Figure 10**) includes the creation of 1-way separated bike lanes along each side of Route 6. The bicycle lanes would be located adjacent to a 6' buffer area that could include flexible posts that would help guide motorists to stay in their lane. To avoid the need for new pavement construction, the space for creation of the separated bike lane would necessitate the removal of a travel lane in each direction. A review of traffic volumes at Route 6 locations in and near the study area indicates that remaining lanes are likely to retain sufficient capacity for expected traffic volumes. The technique of repurposing a travel lane is called a “road diet” and has been a successful strategy in improving safety and non-motorized accommodation in Massachusetts and throughout the country.



Route 6 from Shore Road (Route 6A), Truro to Provincetown Town Line

ALTERNATIVE 3

View towards Provincetown



Route 6 from Provincetown Town Line to Shank Painter Road

ALTERNATIVE 3

View towards Provincetown

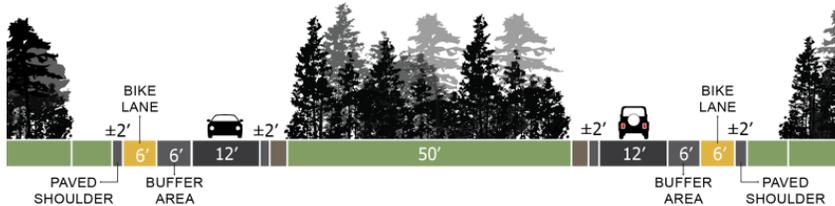


Figure 10 - Alternative 3 cross sections.

PUBLIC OUTREACH AND INPUT

The project team created a web page for the project on the Cape Cod Commission web site where it posted information about the public meeting, including the slide presentation. To help gather public input about the alternatives, the web site provided a link to an on-line survey.

October 17, 2018 Public Workshop

Cape Cod Commission staff held a public meeting in October 17 at the Truro Community Center to hear public input on conceptual design alternatives for extending bike lanes through the four-lane section of Route 6. About 20 people attended. The project team gave a slide presentation with an overview of the alternatives concepts and showed roadway cross sections for the alternatives. The audience asked questions about the alternatives and engaged in an informal discussion. Several people asked about how a road diet would work. Some also asked for clarification about how the bike lanes are related to the OCBPMP proposed multi-use path along Route 6. One attendee expressed concern about investing funds and constructing a short-term accommodation if it would be temporary and additional



funds/construction would be needed for a long-term accommodation. Some attendees felt that the four-lane section of Route 6 needs immediate improvements for bicyclists, but a few suggested Route 6A is a better alternative for bicycling. Following the presentation, the project team provided posters of the cross-sections and asked participants to note their comments, positive and negative on each alternative. Written comments included the following:

Workshop map comments. Participants were asked to provide comments in “+” (positive) and “-“ (negative) categories.

Comments from October 17, 2018 Workshop Map		
	Divided Section (West)	Undivided (East)
Alternative 1	<p>Most realistic.</p> <p>Not enough separation.</p> <p>-Pilgrim Lake constrained.</p> <p>-Crossing to town/6A</p> <p>-Impact on dunes</p> <p>-Doesn't reduce motor vehicle traffic</p> <p>Consider two-way 10' bike lane on bay side, still keeping 2 lanes in and out of town.</p>	<p>Most realistic solution, given opposition from car people.</p> <p>Must deal with people wanting to turn on/off of Route 6 onto Route 6A</p> <p>Don't let state put grooves in pavement that prevent bikes from passing slower bikes.</p> <p>Not enough space separation from vehicles.</p> <p>Not good at Pilgrim Lake.</p>
Alternative 2	<p>Like this. Allows emergency vehicles southbound.</p> <p>Better for emergency vehicles.</p> <p>Better Provincetown support</p> <p>We could do this right now.</p> <p>Pilot project.</p> <p>Crossings to town.</p> <p>Reduce speed limit</p> <p>Car lane too wide</p>	<p>This works. Like the posts.</p> <p>Pilot program</p> <p>Easiest to connect to Provincetown</p> <p>Passing, turning alternatives</p>
Alternative 3	<p>Most bike friendly</p> <p>Too much public opposition.</p> <p>Great for 8 months</p> <p>Not good for 4 months</p>	<p>This is the safest for bikes, encourages bike use.</p> <p>This works too. Look to accommodate emergency vehicles.</p>
Do nothing/no build	<p>Encourages motor vehicle speed.</p> <p>Not safe. Bike riders avoid this section</p>	<p>Need to do something</p> <p>Not safe; most folks will not use.</p> <p>Crash data: head-on injury; bike ped injury</p>

Public Survey



The project team created an on-line survey and posted it on the Cape Cod Commission website at the end of the public workshop. The purpose of the survey was to see the level of community support for extension of the bike lanes and get feedback on the alternatives.

The survey had a low number of respondents – only 33, which is not enough to get a clear sense of public sentiment about a bike lane extension and a preferred design/alternative. Survey participants, like workshop attendees, expressed general support for providing new bicycling accommodations in the study area, but the results do not identify a clear preference for one alternative. A notable difference between the comments from workshop attendees and the survey results was that workshop attendees indicated stronger support for alternatives with a road diet/lane reduction. This may be because the workshop presentation included an explanation of the road diet alternatives and the project team was able to answer questions about the design. Survey respondents might not have received enough information about a road diet to support it. See the attached appendix for detailed survey responses.



Recommendations

The purpose of Route 6 Truro – Provincetown Bike Lane Extension study was to develop alternatives for extending bike lanes into the four-lane section of Route 6 in North Truro and Provincetown and gather feedback from the public. The bike lanes would provide a short-term strategy to accommodate bicycles in the interim period before implementation of the Outer Cape Bicycle and Pedestrian Master Plan proposed multi-use path. The project team created three alternative designs and presented them in a public meeting, on the Cape Cod Commission web site, and in an electronic survey.

While most workshop attendees and survey respondents expressed desire to improve conditions for bicycling in Truro and Provincetown, public feedback was insufficient to determine the level of public preference/support for one alternative over the others. Further input – from community residents, road users (motorists and bicyclists), public safety officials and public works staff - is needed to get a better sense of how to address bicycling safety and planning on Route 6.

In addition, the project team recommends the following steps to help advance improved bicycling safety in the two communities:

- Continue to support the long-range vision of the Outer Cape Bicycle and Pedestrian Master Plan to provide a separated multi-use path on Route 6.
- Conduct more investigation on road diet pilot projects across the Commonwealth. This information would be useful to help communities understand how lane removal projects have worked elsewhere.
- Town bicycle committees should use this study to seek input from community members on their preferences for bike lane extension.
- Obtain more traffic data, particularly at peak season times. While the project team believes a road diet is technically feasible, more summer traffic counts are needed to determine how the road would function operationally at the busiest traffic times. If the communities are supportive, Cape Cod Commission staff should consult with MassDOT on Route 6 data collection.
- Consider a pilot project to implement Alternative 2 or 3 (as these alternatives do not require new pavement construction). The duration of the pilot project could be limited to when the *Outer Cape Bicycle and Pedestrian Master Plan* preferred alternative (Route 6 multi use path) is constructed.



Appendix

Appendix A: Survey Results

Route 6 Bicycle Lane Survey

Q1 Which of the following applies to you? (Check all that apply.)

Answered: 33 Skipped: 0

ANSWER CHOICES	RESPONSES	
I am a Provincetown resident (full time or part-time)	60.61%	20
I am a Truro resident (full-time or part-time)	27.27%	9
I work in Provincetown	9.09%	3
I work in Truro	6.06%	2
I do not live or work in Provincetown or Truro	12.12%	4
Total Respondents: 33		

Q2 Please tell us about how you travel on the 4-lane section of Route 6 in North Truro or Provincetown.

Answered: 33 Skipped: 0

	REGULARLY	SOMETIMES	SELDOM	NEVER	TOTAL	WEIGHTED AVERAGE
I drive a motor vehicle or am a passenger in a motor vehicle	84.85% 28	15.15% 5	0.00% 0	0.00% 0	33	1.15
I ride a bicycle	22.58% 7	32.26% 10	25.81% 8	19.35% 6	31	2.42
I walk	21.43% 6	17.86% 5	17.86% 5	42.86% 12	28	2.82
I take public transit	3.57% 1	14.29% 4	7.14% 2	75.00% 21	28	3.54

#	OTHER (PLEASE SPECIFY)	DATE
1	I bike regularly for transportation purposes but take 6A bc no shoulder on 6	10/18/2018 10:44 AM

Q3 Would you like bicycle lanes on Route 6 in North Truro and Provincetown?

Answered: 33 Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	72.73%	24
No	24.24%	8
I don't know	3.03%	1
TOTAL		33

Q4 Would you bicycle on Route 6 more often if there were bike lanes?

Route 6 Bicycle Lane Survey

Answered: 33 Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	63.64%	21
No	24.24%	8
Maybe	12.12%	4
TOTAL		33

Q5 We are interested in learning what people think of design concepts for providing bike lanes on Route 6 in North Truro and Provincetown. Of the four concepts for the undivided (no median) section, please rank your preferences from 1 to 4, with 1 being your favorite option and 4 being your least favorite..

Answered: 33 Skipped: 0

	1	2	3	4	TOTAL	SCORE
Alternative 1 - Widen Route 6 to create bike lanes	65.63% 21	18.75% 6	9.38% 3	6.25% 2	32	3.44
Alternative 2 - Remove one vehicle lane and create two-way bike lane	14.81% 4	44.44% 12	33.33% 9	7.41% 2	27	2.67
Alternative 3 - Remove one vehicle lane in each direction and create bike lanes	14.81% 4	22.22% 6	37.04% 10	25.93% 7	27	2.26
Do Nothing Option - Existing conditions	13.79% 4	13.79% 4	17.24% 5	55.17% 16	29	1.86

Q6 Which concept do you most prefer for the divided (i.e., median) section? Please rank your preferences from 1 to 4, with 1 being your favorite option and 4 being your least favorite..

Answered: 32 Skipped: 1

	1	2	3	4	TOTAL	SCORE
Alternative 1 - Widen Route 6 to create bike lanes	70.97% 22	16.13% 5	9.68% 3	3.23% 1	31	3.55
Alternative 2 - Remove one vehicle lane and create two-way bike lane	7.69% 2	46.15% 12	30.77% 8	15.38% 4	26	2.46
Alternative 3 - Remove one vehicle lane in each direction and create bike lanes	15.38% 4	19.23% 5	42.31% 11	23.08% 6	26	2.27
Do Nothing Option - Existing conditions	14.29% 4	17.86% 5	14.29% 4	53.57% 15	28	1.93

Q7 Do you have other comments or ideas you would like to share with us?

Route 6 Bicycle Lane Survey

Answered: 13 Skipped: 20

#	RESPONSES	DATE
1	No	10/20/2018 6:50 AM
2	I think this is a great idea and will use this all the time!	10/18/2018 10:38 PM
3	Please make a bike lane!	10/18/2018 7:22 PM
4	Eliminating one lane of traffic in each direction will help minimize excessive vehicle speeding and calm traffic, much better for pedestrians and bicyclists	10/18/2018 4:06 PM
5	I think removal of at least one car lane to provide space for bikes is a great idea. We need to make bike travel safer and more comfortable. It would help ease our summer traffic congestion. Many people want to bike but feel too nervous on Route 6 - with so many drivers texting and all the big trucks and SUVs out there these days. Route 6A isnt a great alternative...	10/18/2018 10:44 AM
6	No	10/18/2018 10:17 AM
7	Bikes on any part of Route 6 are THE most dangerous idea I've ever heard of. Also, in addition to the dangers, the routes are hilly and not for regular people. Provincetown is a remote location, it's not a city where bikes are easily used. Let's stop being foolish with ideas and money and start being realistic.	10/18/2018 8:49 AM
8	This plan starts with misconception there is 8' on either side now. There is maybe 2' with the lip so riders are in traffic lane. Need to cut foliage and widen road to accommodate bike lane(s). Reducing car lanes is very bad idea with summer traffic. The idea should be to allow vehicular and bike traffic comfortably and safely.	10/18/2018 7:54 AM
9	During rush hours traffic on the Cape can be a nightmare and it is hard enough to get working folk to the businesses in Provincetown—worsening the commute by providing bike lanes and losing auto lanes is a terrible idea, and, while the roadside scenery is lovely, auto exhaust and cranky drivers are not good bikers' companions.	10/18/2018 7:29 AM
10	I am not sure why we are encouraging bicycle use on a busy US highway like US Highway 6. If anything, there should be signs along the 4 line stretch in particular which forbid horses, bikes, and pedestrians. Bikes should only be operating on 6A and side roads.	10/18/2018 1:10 AM
11	I have a hard time deciding what could be worse between alternative 2 & 3. Both are so horrid for so many reasons. These reckless ideas inspire me to get more involved.	10/17/2018 10:25 PM
12	Although I don't ride bikes myself, as I am now disabled, there seems to be more cyclists every year, and I just think it would be safer for everyone if bike lanes were to become a reality. Thank you!	10/17/2018 9:48 PM
13	I'm concerned about the intersections and how bikes will safely cross the highway to get to the other side. There also needs to be a solid barrier between speeding cars and the bike lanes.	10/17/2018 5:26 PM

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