



CAPE COD
COMMISSION

Mashpee Rotary Corridor Study

FINAL REPORT

JUNE 2020

Prepared by Cape Cod Commission Staff.



Mashpee Rotary Study

FINAL REPORT | JUNE 2020

CAPE COD COMMISSION PROJECT TEAM

Project Coordinator: Colleen Medeiros, Transportation Engineer
Project Coordinator: Steven Tupper, Transportation Program Manager
David Nolan, Transportation Planner
Lev Malakhoff, Transportation Planner
Chloe Schaefer, Chief Planner
Madden Bremmer, GIS Analyst
Danielle Donahue, Special Projects Coordinator

TOWN OF MASHPEE STAFF

Town Project Manager: Catherine Laurent, Director, Department of Public Works
Wayne E. Taylor, Assistant Town Manager
Evan Lehrer, Town Planner

PROJECT FUNDING

This project was funded by the Massachusetts Department of Transportation and the Federal Highway Administration under the Federal Fiscal Year 2019 Unified Planning Work Program.

The information depicted on the maps and figures in this report are for planning purposes only. They are not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. They should not substitute for actual on-site survey, or supersede deed research. Unless otherwise noted, the source for road data and information for maps and figures in this report is the Massachusetts Department of Transportation (MassDOT) (2015) and Cape Cod Commission planimetric data (2014). Unless otherwise noted, parcel data is from a Cape Cod Commission regional parcel data set (2018).

CAPE COD COMMISSION

3225 Main Street • P.O. Box 226 • Barnstable, MA 02630

508-362-3828 • Fax: 508-362-3136 • Email: frontdesk@capecodcommission.org

www.capecodcommission.org

CONTENTS

Executive Summary.....	6
Short to Mid-Term Recommendations.....	6
Long-Term Recommendations.....	7
Next Steps.....	7
Introduction	9
Study Goals.....	10
Study Area.....	10
Previous and Ongoing Studies and Plans.....	11
Study Process.....	12
Outreach.....	13
Existing Conditions	14
Site Visits.....	14
Zoning and Land Use	16
Historic Areas, Wetland, and Open Space.....	19
Bicycle and Pedestrian Accommodations.....	21
Transit	23
Speed Limits	24
Crash History.....	26
Traffic Volumes.....	29
Alternative Development	32
Existing Traffic Operations	32
Future Traffic Volumes	32
Roadway Safety Audit Recommendations.....	33
Listening Session	34
Alternative Identification.....	35
Alternative Screening.....	37
Public Review of Alternatives	38
Summary of Alternatives.....	40
Alternative Refinement.....	40
Mashpee Rotary.....	42
Great Neck Road North at Old Barnstable Road	48
Great Neck Road South at Donna’s Lane.....	51
Route 28 at Job’s Fishing Road/Donna’s Lane.....	54
Route 28 At Meetinghouse Road.....	57
Route 28 at Quinaquisset Avenue.....	59
Pedestrian and Bicycle Accommodation Alternatives.....	59
Transit Alternatives	61
other Alternatives	63

Recommendations and Next Steps.....	65
Short to Mid-Term Recommendations.....	65
Long-Term Recommendations.....	65
Next Steps.....	66

APPENDICES

Appendix A.....	68
Appendix B.....	198
Appendix C.....	219
Appendix D.....	326

FIGURES

Figure 1: Study Area.....	10
Figure 2: Study Process.....	12
Figure 3: Outreach Materials for Public Meetings.....	13
Figure 4: Mashpee Site Visit.....	15
Figure 5: Existing Zoning.....	16
Figure 6: Existing Land Use.....	17
Figure 7: Open Space, Wetland, and Historic Sites.....	20
Figure 8: Pedestrian, Bike, and Transit Accommodations.....	21
Figure 9: Speed Limits.....	24
Figure 10: Crash Analysis I (2012-2016).....	26
Figure 11: Crash Analysis II (2012-2016).....	27
Figure 12: Mashpee Rotary crash analysis 2012-2016.....	28
Figure 13: 2018 Traffic Count Locations.....	30
Figure 14: Origin-Destination Patterns Around Mashpee Rotary.....	31
Figure 15: Rotary Retrofit Alternative and Anticipated Impacts.....	43
Figure 16: Two-Lane Roundabout Alternative and Anticipated Impacts.....	44
Figure 17: Route 28 Overpass Alternative and Anticipated Impacts.....	45
Figure 18: Figure 15: Traffic Signal Option A Alternative.....	46
Figure 19: Traffic Signal Option B Alternative.....	47
Figure 20: Traffic Signal Option C Alternative.....	47
Figure 21: Traffic Signal Alternative Options A-C Anticipated Impacts.....	48
Figure 22: Great Neck Road North Traffic Signal and Anticipated Impacts.....	49
Figure 23: Great Neck Road North Roundabout and Anticipated Impacts.....	50
Figure 24: Improved Directional signage.....	51
Figure 25: Donna's Lane Right Turn Lane Alternative.....	52
Figure 26: Donna's Lane Roundabout and Anticipated Impacts.....	53
Figure 27: Donna's Lane Traffic Signal and Anticipated Impacts.....	54
Figure 28: Turn Lane enhancements for Route 28 at Job's Fishing Road/Donna' Lane..	56
Figure 29: Route 28 at Meeting-house Road Left Turn Lane Alternative.....	58
Figure 30: Future sidewalk and bicycle connections.....	61

TABLES

Table 1: Traffic Volumes.....	29
Table 2: Summary of Alternatives0.....	41

Executive Summary

The Mashpee Rotary is a five-leg, major regional transportation node with the intersections of Route 28, Route 151, Great Neck Road North, and Great Neck Road South. The Massachusetts Department of Transportation (MassDOT) owns and maintains the rotary and Route 28, while the Town of Mashpee owns and maintains the remaining approach roadways, Route 151, Great Neck Road North and Great Neck Road South. The Mashpee Rotary and its approach roadways have been identified as a priority for investigation as due to existing congestion, safety and multi-modal issues. The purpose of this study is to develop alternatives that will improve safety, while reducing congestion and accommodating all users, including vehicles, pedestrians, bicyclists and transit riders.

A detailed review of existing conditions and a safety analysis was performed for the existing five approach roadways and eight study area intersections. Extensive data was collected, including traffic counts and a comprehensive inventory of the roadways and existing zoning and land uses of the surrounding area. In addition, a Roadway Safety Audit (RSA) was performed for the Mashpee Rotary in June 2019 to identify potential short- and long-term solutions improve safety at this high crash location.

A comprehensive public outreach plan was executed to solicit input on the existing issues in April 2019 and again in December 2019 to obtain feedback on potential alternatives. Public feedback on the alternatives placed an emphasis on maintaining the circular intersection with minor signage and striping improvements along with incorporating multi-modal accommodations, known as the Rotary Retrofit alternative.

Based on a technical review, in consultation with Town staff, and feedback from a public review of the alternatives, the improvements options were refined and organized into the following sets of key short- and long-term recommendations. Further details on timeframe, cost and potential benefits for each of the recommendations are listed on the following pages.

SHORT TO MID-TERM RECOMMENDATIONS

- **Install a shared use path around Mashpee Rotary (High Priority)**
- **Implement rotary retrofit improvements at Mashpee Rotary (High Priority)**
- **Install Route 28 directional signage on Donna's Lane for retail traffic (High Priority)**
- Implement signage and striping improvements at the intersection of Great Neck Road North and Old Barnstable Road
- Construct right-turn lane on Donna's Lane at the Great Neck Road South intersection
- Implement lane designation striping on Job's Fishing Road at the Route 28 intersection
- Implement signage and striping improvements at the intersection Route 28 and Quinaquisset Avenue

LONG-TERM RECOMMENDATIONS

- **Plan for multi-modal accommodations on Route 28 between Mashpee Rotary and Quinaquisset Avenue (High Priority)**
- Plan for transit service enhancements with the CCRTA
- Plan for a roundabout at Great Neck Road North and Old Barnstable Road
- Install eastbound left turn lane at Route 28 and Meetinghouse Road intersection
- Construct additional sidewalk and shared use paths to close network gaps
- Install pedestrian accommodations at Route 28 and Orchard Road traffic signal

Understanding that transportation and land use planning are inextricably linked, it may be appropriate to refine or revise long-term recommendations as additional information about redevelopment activities in the area becomes available. The Cape Commission is available to discuss long-term recommendations with MassDOT, the Town, and other stakeholders in the area including the business community. Ultimately, major transportation investments should both benefit the travelling public and serve to support and enhance the vitality of the community.

NEXT STEPS

The next steps would focus on collaboration between the Town of Mashpee and MassDOT to prioritize implementation of the short-term improvements to improve safety of the Mashpee Rotary and the other study area intersections. Plans for long-term improvements can also be initiated to begin the planning process. Staff of the Cape Cod Commission are available to assist in these efforts. A future meeting between MassDOT, the Town and Commission staff will be set up in the near future to discuss next steps for implementation and funding strategies for the recommendations from this study.



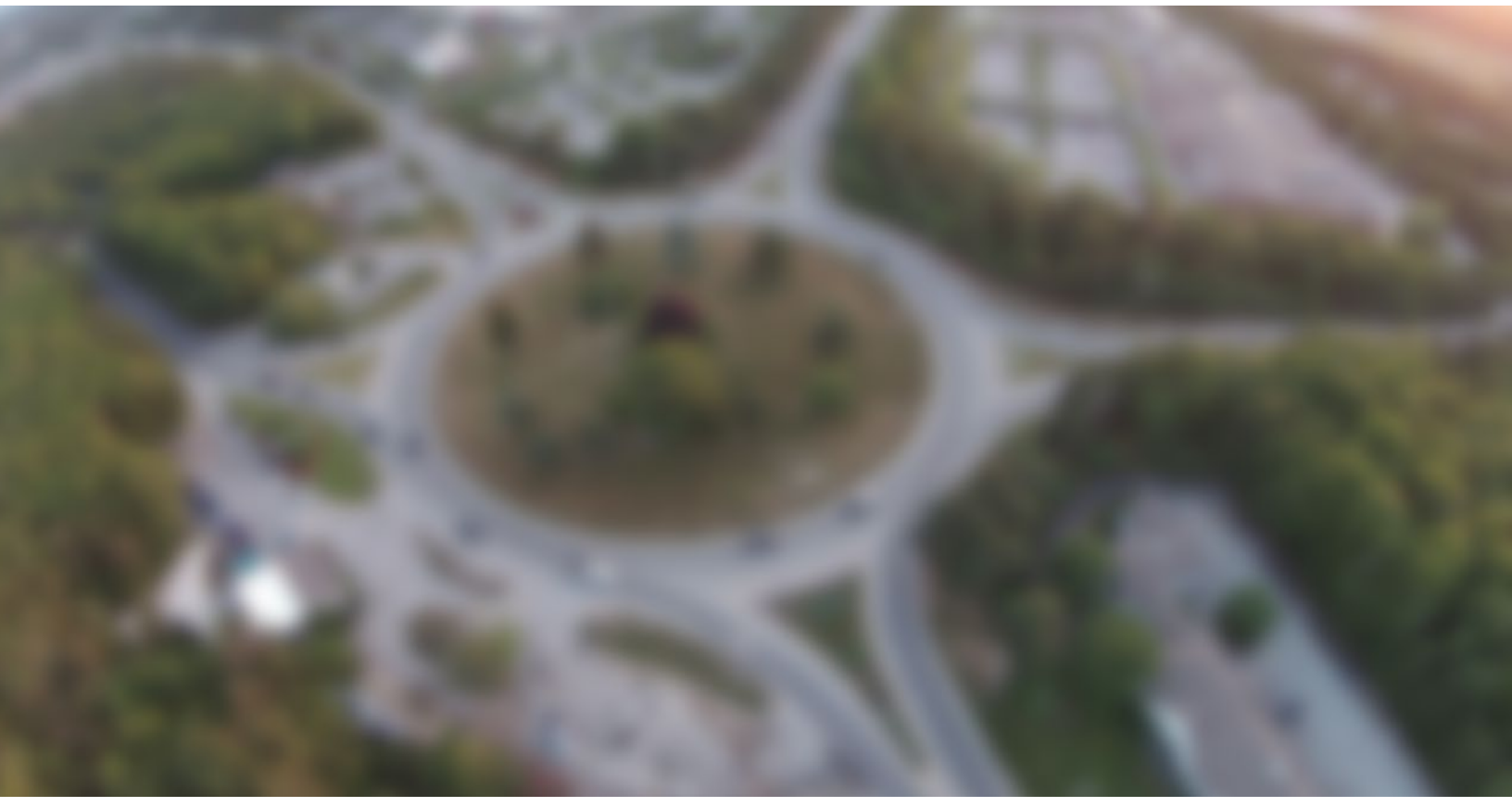
Summary of Alternatives

	TIME FRAME	COST	ANTICIPATED IMPACT				
			SAFETY	CONGESTION	BICYCLE/ PEDESTRIAN	PRIVATE PROPERTY	COMMUNITY CHARACTER
MASHPEE ROTARY							
Rotary Retrofit	Mid	\$	●●●●	●●●●	●●●●	●●●●	●●●●
Two-Lane Roundabout	Long	\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
Route 28 Overpass	Long	\$\$\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
Traffic Signal	Long	\$\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
GREAT NECK ROAD NORTH AT OLD BARNSTABLE ROAD							
Installation of Traffic Signal	Long	\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
Installation of Roundabout	Long	\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
GREAT NECK ROAD SOUTH AT DONNA'S LANE							
Installation of Traffic Signal	Long	\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
Installation of Roundabout	Long	\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
ROUTE 28 AT JOB'S FISHING ROAD/DONNA'S LANE							
Turn Lane Enhancements	Mid	\$\$	●●●●	●●●●	●●●●	●●●●	●●●●
ROUTE 28 AT MEETINGHOUSE ROAD							
Route 28 Left Turn Lane	Long	\$	●●●●	●●●●	●●●●	●●●●	●●●●
CORRIDOR CONCEPTS							
PEDESTRIAN CONCEPTS	BICYCLE CONCEPTS	TRANSIT CONCEPTS	OTHER CONCEPTS				
<ul style="list-style-type: none"> • Close sidewalk and shared use path gaps within study area • Install shared use path around Mashpee Rotary 	<ul style="list-style-type: none"> • Expanded shoulders where possible for bicycle accommodation • Prioritize Route 28 section towards Barnstable for bicycle accommodations 	<ul style="list-style-type: none"> • Bus pull-outs • Local circulator route • Review existing routes/stops to increase efficiency • Small transportation center 	<ul style="list-style-type: none"> • Improved stormwater management and treatment • Improved vegetation management • Speed management on Route 151 				

Introduction

The Mashpee Rotary is a five-leg, major regional transportation node with the intersections of Route 28, Route 151, Great Neck Road North, and Great Neck Road South. The Massachusetts Department of Transportation (MassDOT) owns and maintains the rotary and Route 28, while the Town of Mashpee owns and maintains Route 151 and Great Neck Road North and Great Neck Road South. The Mashpee Rotary has been identified as a priority for investigation as part of UPWP 2019 due to existing congestion, safety and multi-modal issues. The rotary is often congested, particularly in the summer months and creates a barrier to reliable inter-regional access between the towns of Falmouth and Mashpee to Barnstable and other towns on the eastern portions of Cape Cod. Listed as a high-crash location by MassDOT and the Cape Cod Commission, the intersection presents challenges to users navigating this large, high-speed circular intersection. Finally, the rotary is a major barrier to regional pedestrian and bicycle access not only in the town of Mashpee, but within the overall regional roadway network. The study area is a heavily used corridor for non-motorized users looking to access jobs and retail destinations from their neighborhoods.

The Mashpee Rotary Corridor Study takes a comprehensive look at this major regional intersection and its surrounding roadways to develop alternatives that will provide safe and convenient access for all roadway users within the study. The study will serve as a continuation of the January 2018 Route 28 study in Eastern Mashpee that included the Route 130/Route 28 intersection through the Orchard Road/Route 28 intersection.



STUDY GOALS

The purpose of this study is to develop alternatives that will **improve safety**, while **reducing congestion and accommodating all users**, including vehicles, pedestrians, bicyclists and transit riders.

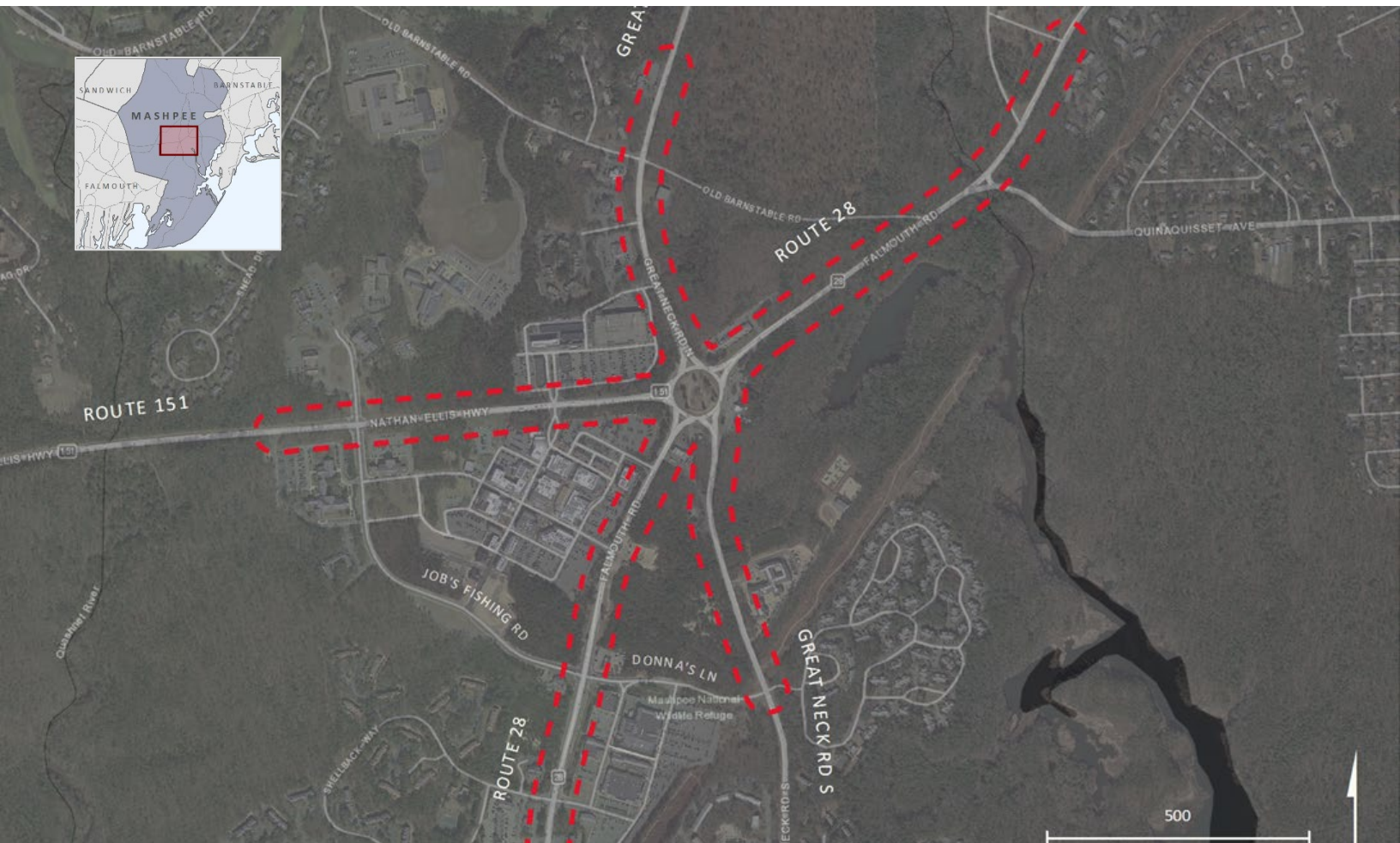
STUDY AREA

As shown in

Figure 1, the study area includes the Mashpee Rotary and each of its five approach roadways. The limits of the study area include the next major intersection. For analysis purposes, the following study area intersection were included:

- Mashpee Rotary
- Route 28 at Job's Fishing Road/Donna's Lane
- Route 151 at Market Street
- Great Neck Road South at Donna's Lane
- Route 151 at Job's Fishing Road
- Great Neck Road North at Old Barnstable Road
- Route 28 at Quinaquisset Avenue
- Route 28 at Meetinghouse Road

Figure 1: Study Area



PREVIOUS AND ONGOING STUDIES AND PLANS

A comprehensive look at previous and on-going studies was performed during the existing conditions review. As part of this review, the following studies and plans were reviewed:

- Mashpee Commons Job's and Whitings Neighborhood Traffic Impact and Access Study – November 2005
- Roadway Safety Audit (RSA): Great Neck Road North/Old Barnstable Road – June 2009
- Roadway Safety Audit (RSA): Route 151 at Job's Fishing Road/Frank E Hicks Drive – April 2018
- MassDOT Route 28 at Job's Fishing Road/Donna's Lane 100% Design Plans – October 2018
- MassDOT Route 151 25% Design Plans – March 2019

The MassDOT Route 151 Corridor Improvement Project, which is currently at the 75% design phase and funded for a potential construction start of Fall 2021, will address several safety and congestion issues at the Route 151 intersections of Job's Fishing Road/Frank E Hicks Drive and Market Street. New traffic signal systems and upgraded pedestrian and bicycle accommodations will be installed at these two intersections and along the corridor. In addition, a new eastbound right turn lane will be constructed on Route 151 to reduce congestion and improve efficiency. Therefore, alternatives for these two study area intersections were not developed.

STUDY PROCESS

The study began with the development of a project scope in the winter of 2017 for consideration of funding under the Cape Cod Unified Planning Work Program for Federal Fiscal Year 2019. The project scope and funding, from the Massachusetts Department of Transportation, was approved in May 2018. Following data collection and background research, the project kicked off with a meeting with Town of Mashpee staff in the winter of 2019. In addition, a public participation plan was developed for this study with goals of:

- Gathering input from community stakeholders and the public to establish a vision for the corridor
- Soliciting feedback of potential alternatives

As formalized in the public participation plan, the study process included two public meetings as shown in *Figure 2*.

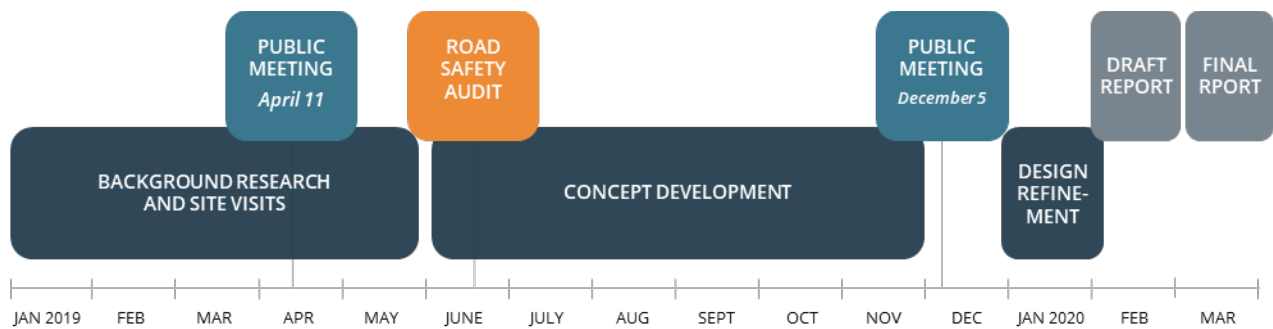


Figure 2: Study Process

OUTREACH

To solicit input and to alert stakeholders to the public meetings on the project, Commission staff conducted targeted outreach campaigns. These included press releases and posting flyers about the two listening sessions and two alternatives presentations, creation and maintenance of a webpage about the project, and email updates about the project. In addition, Commission staff attended the Board of Selectman meeting on March 11, 2019 to give a project update and announce the first public listening sessions scheduled for April 2019. Prior to the listening sessions, Commission staff offered a separate meeting opportunity for interested stakeholder groups to discuss their unique perspective on challenges or potential changes to the rotary. A separate advance meeting was requested in April 2019 and held with Mashpee Commons. For stakeholders that could not attend the public meetings, materials were made available on the website. Commission staff also spoke on the phone, in person, and via email with stakeholders that could not attend the meetings but wanted to provide comments and input on the project. *Figure 3* shows an example of the outreach materials.



MASHPEE ROTARY STUDY

FUTURE ALTERNATIVES

PUBLIC MEETING



Presentation of Alternatives - Thursday, December 5, 2019
2:00 PM AND 5:30 PM
Mashpee Public Library
64 Steeple Street, Mashpee

Learn about potential concepts, ranging from striping improvements to rotary replacement, that have been developed as part of the Mashpee Rotary Corridor Study. The Town of Mashpee and the Cape Cod Commission want your feedback on draft alternative concepts which aim to reduce congestion and improve pedestrian/bicyclist accommodations. Feedback from this meeting will be used to finalize the short and long term recommendations and the final report to improve this regional intersection.

For more information, please visit:
www.capecodcommission.org/MashpeeRotary or call 508.362.3828



This meeting is accessible to people with disabilities. The Cape Cod Metropolitan Planning Organization (MPO) provides reasonable accommodations and/or language assistance free of charge upon request (including, but not limited to, interpreters in American Sign Language and languages other than English, assistive listening devices and alternate material formats, such as audio tapes, Braille and large print, as available). For accommodations or language assistance please contact the Cape Cod MPO by phone at (508) 362-3828, fax (508) 362-3135, Telecommunications Relay Services (TRS), dial 711 or email frontdesk@capecodcommission.org. Title VI Notice of Nondiscrimination: The Cape Cod MPO complies with Title VI of the Civil Rights Act of 1964 and related federal and state statutes and regulations. It is the policy of the Cape Cod MPO to ensure that no person or group of persons shall on the grounds of Title VI protected categories, including race, color, national origin, or under additional federal and state protected categories including sex, age, disability, sexual orientation, gender identity or expression, religion, creed, ancestry, veteran's status (including Vietnam-era veterans), or background, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity administered by the Cape Cod MPO. To request additional information about this commitment, or to file a complaint under Title VI or a related nondiscrimination provision, please contact the MPO's Title VI Coordinator by phone at (508)362-3828, Telecommunications Relay Services (TRS), dial 711, fax (508) 362-3135 or by e-mail at mhvener@capecodcommission.org. If this information is needed in another language, please contact the MPO's Title VI Coordinator by phone at (508)362-3828. Caso estas informações sejam necessárias em outro idioma, por favor, contate o Coordenador de Título VI do MPO pelo telefone 308-344-1295.

Figure 3: Outreach Materials for Public Meetings

Existing Conditions

To begin this study, Commission staff conducted an existing conditions analysis for the study area. During this analysis, staff performed a site visit (see [Figure 4](#)), collected data, reviewed the zoning, land use, bicycle and pedestrian accommodations, transit connections, traffic volumes, speed limits, and crash history for the study area.

SITE VISITS

During the course of the study, Commission staff conducted several site visits to the study area. These site visits helped Commission staff better understand the area, observe how the traffic functions, and view the area's character, opportunities, and constraints. During these site visits, staff noted congestion and confusion at several intersections in the corridor, missing links in sidewalks, and the lack of bike accommodations. However, there were many positive aspects to the area, including a vibrant community activity Center, providing attractive walkable neighborhoods and retail plaza destinations and services.





Figure 4: Mashpee Site Visit

ZONING AND LAND USE

Zoning and land use through the corridor are shown in *Figure 5* and *Figure 6*, respectively. Surrounding the rotary and the five major roadway approaches, the area is primarily zoned commercial. Abutting the commercial parcels, there is a mix of residential, open space and conservation land uses.

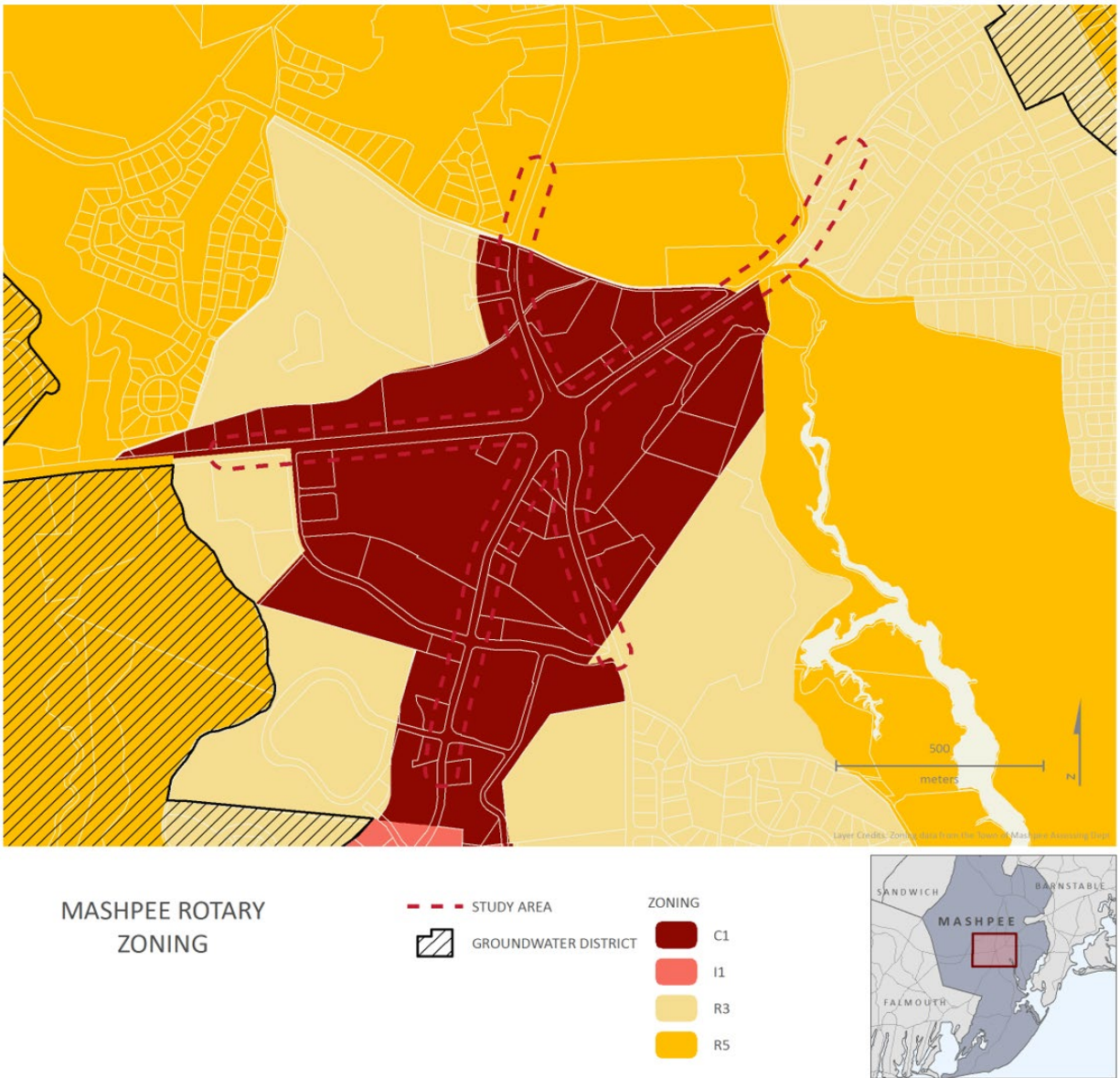
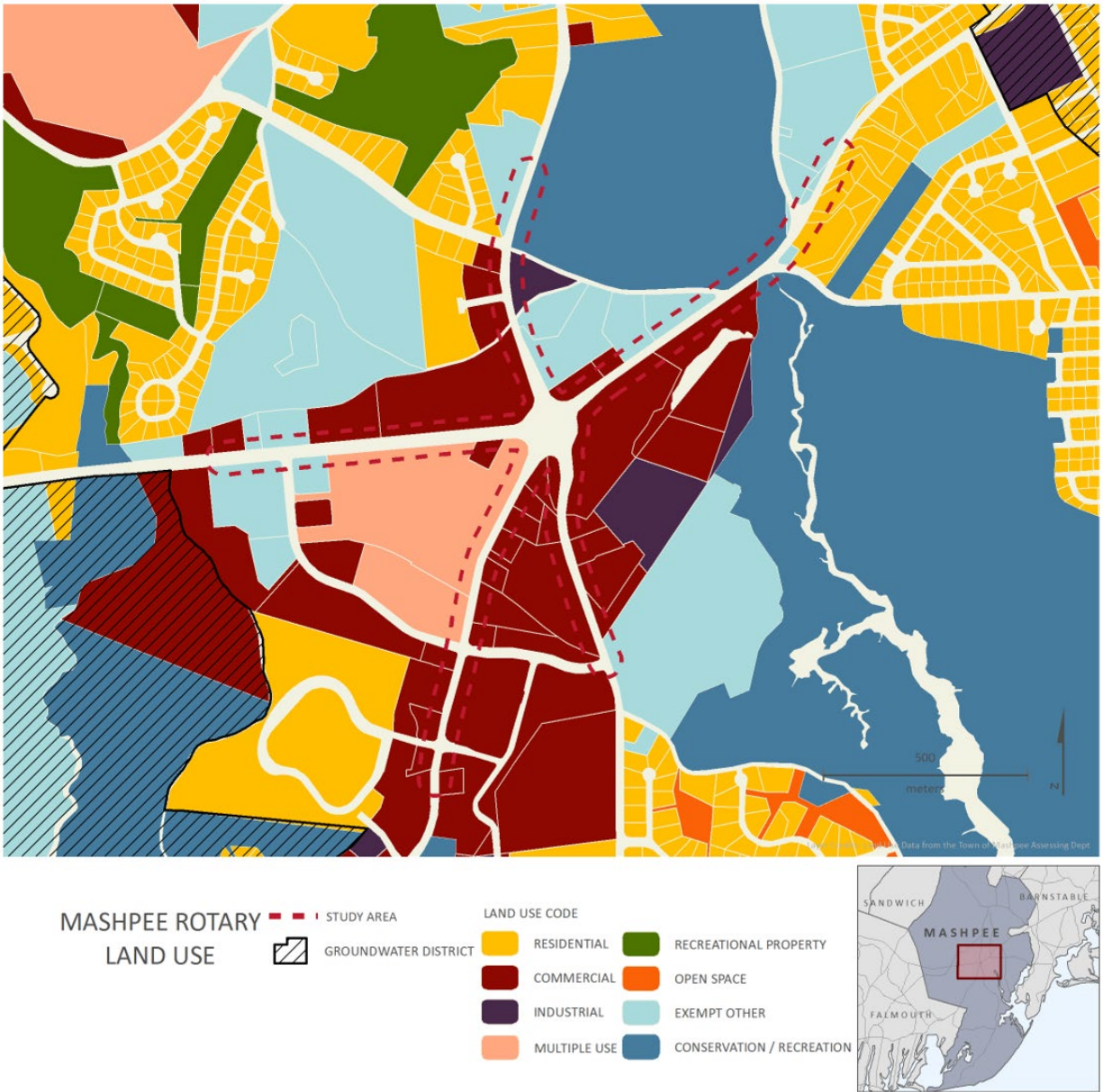


Figure 5: Existing Zoning



The information depicted on these maps is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. It should not be substitute for actual on-site survey, or supersede deed research.

Figure 6: Existing Land Use

Regional Community Activity Center

Community Activity Centers are one of eight placetypes articulated in the 2018 Cape Cod Regional Policy Plan (RPP), which will help to provide context and a lens for the Cape Cod Commission’s planning and regulatory work. In total, there are 17 community activity centers identified across the Cape, including one in Mashpee surrounding the immediate area around the Mashpee Rotary. The area largely encompasses undeveloped and developed land owned by Mashpee Commons.

Community Activity Centers are areas with a concentration of business activity, community activity, and a compact built environment. A Community Activity Center is envisioned to accommodate mixed-use and multifamily residential development in a walkable, vibrant area, preserve historic buildings, and to provide diverse services, such as shopping, recreation, civic spaces, housing, and job opportunities at a scale of growth and development desired by the community, with adequate infrastructure and pedestrian amenities to support development. The selection of the Community Activity Centers was based on based a multi-step GIS analysis using a set of criteria that encompasses community activity, business activity, and physical form.

Community Activity Center Designation in Mashpee



HISTORIC AREAS, WETLAND, AND OPEN SPACE

As shown in *Figure 7*, the area features two large areas of protected open space, the Mashpee River Reservation on Old Barnstable Road and Mashpee River Woodlands Conservation area on Quinaquisset Avenue.

There are a cluster of historic places to the east of Meetinghouse Road, which include the Old Indian Meeting House and burial ground and the South Mashpee School. Together these historic places are listed on the National Register of Historic Places. Also, there is one property on Great Neck Road South, where a historic inventory was conducted in 1969 on a contemporary-style office building. There is no special designation for this property.

There are no delineated wetlands within the study area, but the Mashpee River bisects Route 28 to the east with a culvert under Route 28.



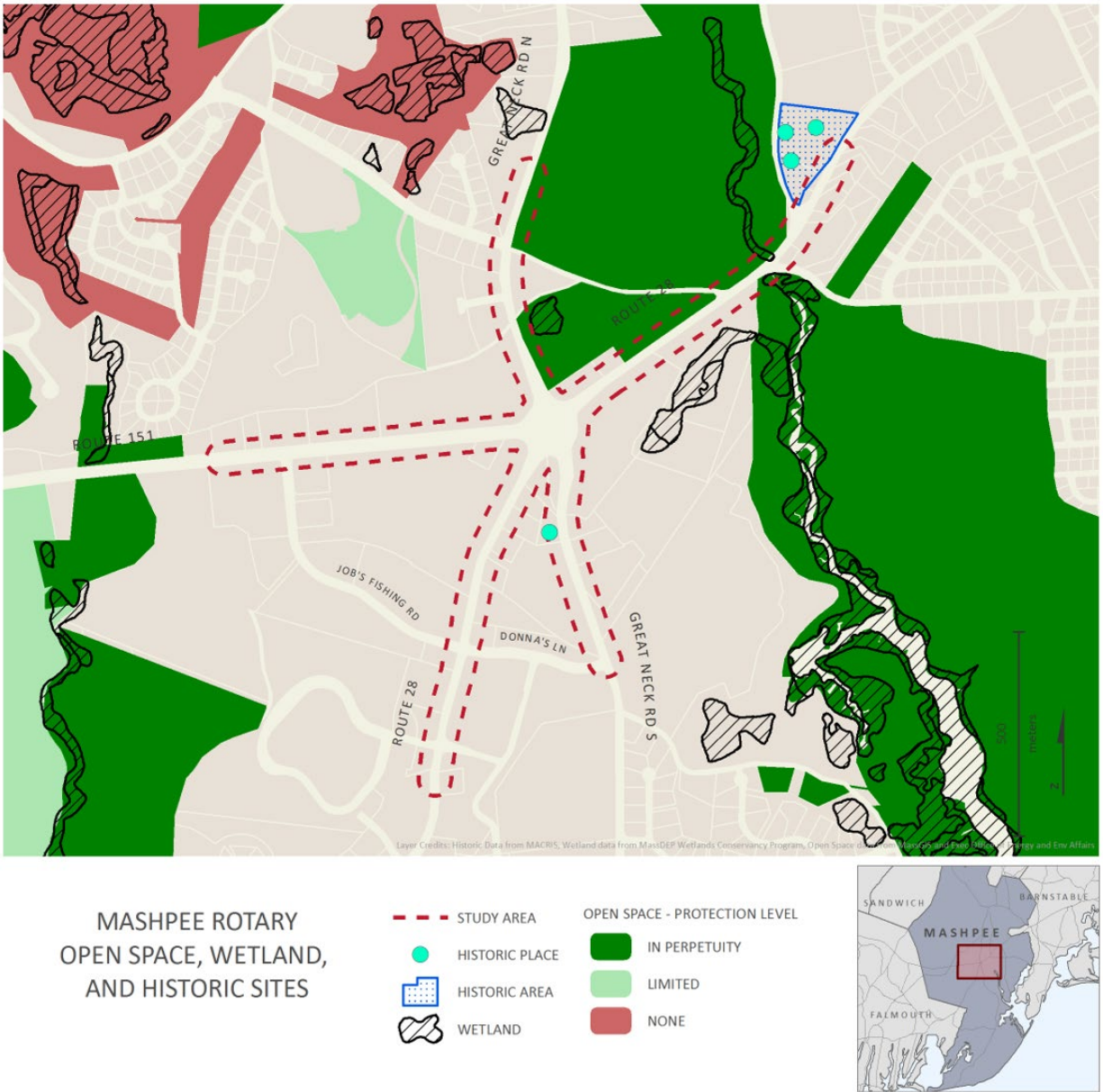
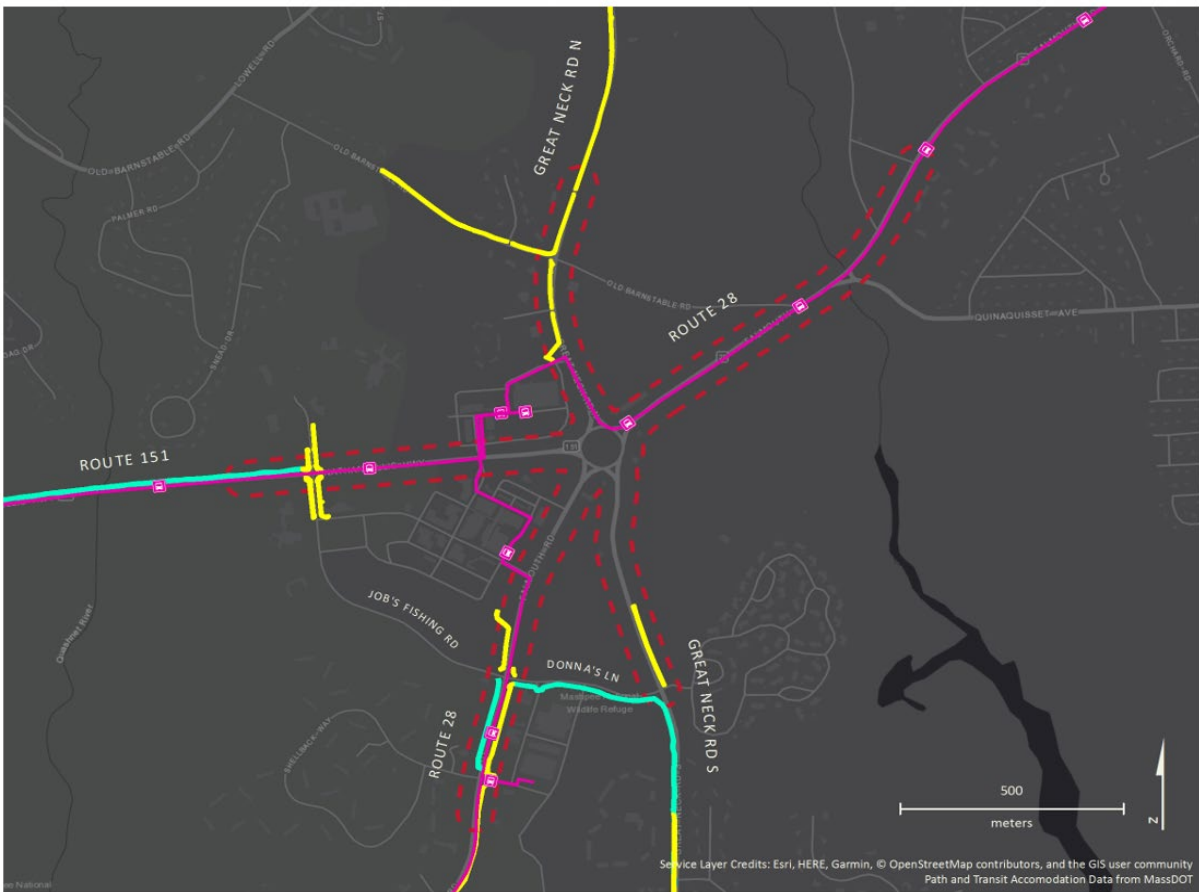


Figure 7: Open Space, Wetland, and Historic Sites

BICYCLE AND PEDESTRIAN ACCOMMODATIONS

Figure 8 shows existing bicycle and pedestrian accommodations within the study area. There are currently no pedestrian or bicycle accommodations surrounding the Mashpee Rotary or on Route 28 from the east. With no multi-modal accommodations from the east, a critical gap is created as there is no other viable connection for non-motorists connecting Barnstable and Mashpee in the vicinity of the Route 28 corridor due to the Mashpee River.



MASHPEE ROTARY BIKE, PEDESTRIAN, TRANSIT ACCOMODATIONS

- STUDY AREA
- SIDEWALK
- BUS ROUTE
- MULTI-USE PATH



The information depicted on these maps is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. It should not substitute for actual on-site survey, or supersede deed research.

Figure 8: Pedestrian, Bike, and Transit Accommodations

Shared use paths exist to the west on Route 151 terminating at Frank E Hicks Drive and to the south on Great Neck Road South terminating at Donna's Lane. As part of the MassDOT Route 151 improvement project currently under design, the shared use path on Route 151 will be extended further east to Market Street. Aside from the shared use paths, there are no dedicated bicycle accommodations in the vicinity of the project site. Furthermore, the shoulders on the study area roadways very narrow and not well-suited for bicycle use.

Sidewalks currently exist on the west side of Great Neck Road North, terminating at the Mashpee Commons driveway. Sidewalks also exist on the east side of Route 28 from Donna's Lane southerly to the Falmouth town line. Also, on Route 28 in the south, there is a small section of a shared use path beginning within Mashpee Commons and traveling southerly to the intersection of Route 28 at Shellback Way.

Within the study area, there are signalized pedestrian crossings at the following study area intersections:

- Route 28 at Job's Fishing Road/Donna's Lane
- Route 151 at Job's Fishing Road/Frank E Hicks Drive
- Route 151 at Market Street

Also, a rectangular rapid flashing beacon (RRFB) exists at a crosswalk on Great Neck Road South at its intersection with Donna's Lane.



TRANSIT

The Cape Cod Regional Transit Authority (CCRTA) currently serves the Town of Mashpee with two bus routes – Bourne Run and Sea Line.

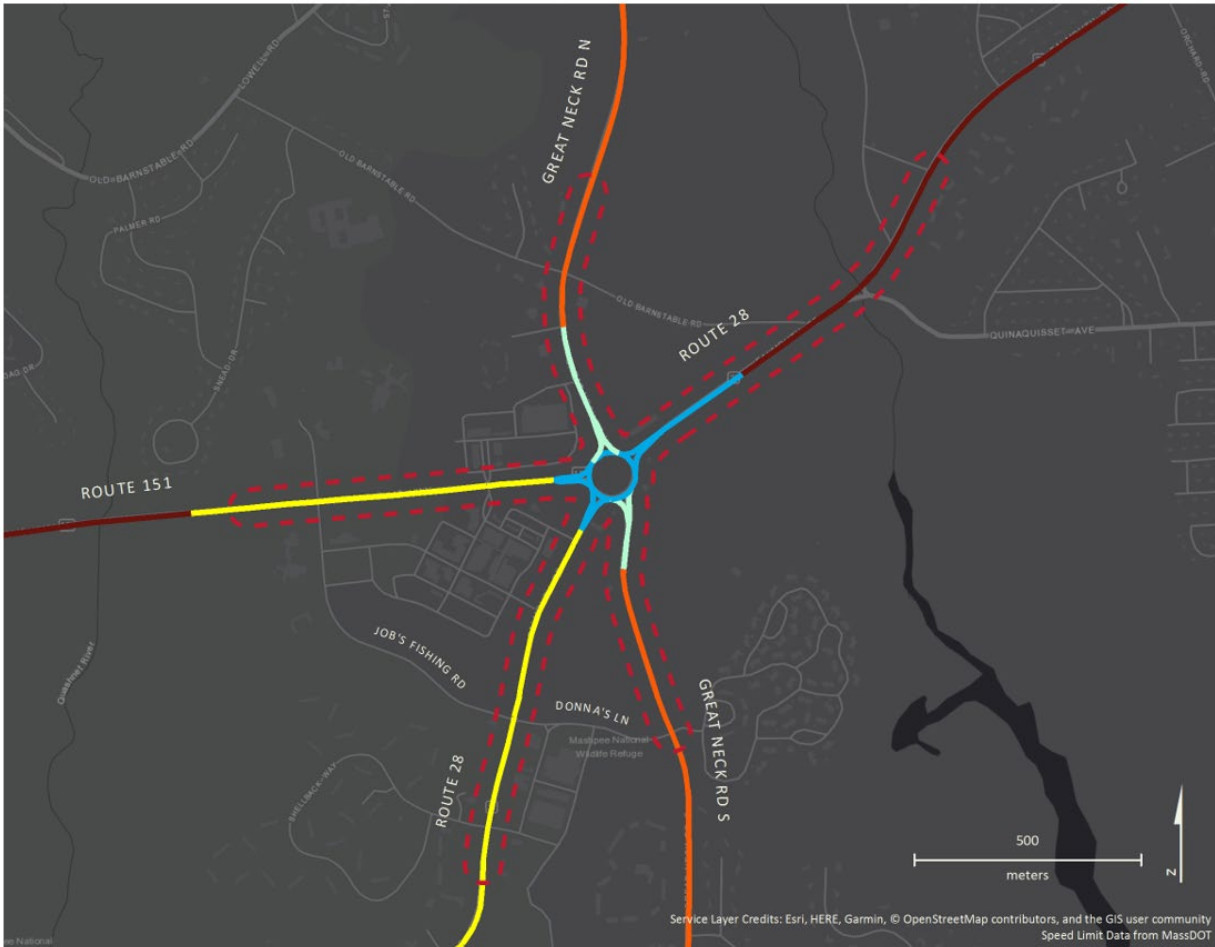
The Sealine is a fixed bus route providing daily service (Monday through Saturday) from approximately 8:00 AM and 6:00 PM along Route 28 between Hyannis and Falmouth. Within Mashpee, the Sealine has bus stops at the Community Health Center of Cape Cod, the South Cape Village and Mashpee Commons. Stops can also be requested to/from the Boys & Girls Club and Mashpee Medical Center. Passengers may also flag down the bus anywhere along the route. The Sealine connects to the Bourne Run at Mashpee Commons and connects with other local and regional bus service at the Hyannis Transportation Center.

The Bourne Run is a fixed bus route providing daily service (Monday through Friday) from approximately 7:00 AM and 6:30 PM along Route 151 and Route 28A connecting Mashpee to Bourne and Wareham. Within Mashpee, the Bourne Run has bus stops at Stop and Shop, Mashpee Village and Algonquin Avenue. Passengers may also flag down the bus anywhere along the route. The Bourne Run connects with GATRA bus service at the Wareham Cranberry Plaza.

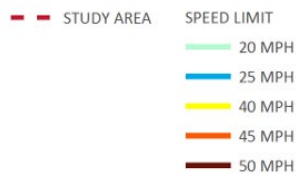
In addition to CCRTA service, there is also local bus service provided by the Council on Aging and the Mashpee Wampanoag Tribe.



SPEED LIMITS



MASHPEE ROTARY SPEED LIMITS



The information depicted on these maps is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. It should not be substitute for actual on-site survey, or supersede deed research.

Figure 9: Speed Limits

As seen in [Figure 9](#), the speed limit within the Mashpee Rotary is 25 miles per hour (mph). Approaching the rotary, each of the five roadways has varying speed limits, some more abrupt than others. Notably, Route 151 and Route 28 (from the south) both have a posted speed limit of 40 mph outside of the rotary. On both Great Neck Road approaches, the posted speed limit approaching the

rotary is 20 mph and then increases up to 25 mph within the rotary. This discrepancy may be due to varying roadway ownership. Outside of the rotary, both Great Neck Road approaches have a posted speed limit of 45 mph. On Route 28 (from the east), the posted speed limit immediately approaching and leaving the rotary is 25mph and then increases to 50 mph.



CRASH HISTORY

Crashes reported within the latest five years (2012-2016) are shown in *Figure 10* and *Figure 11*.

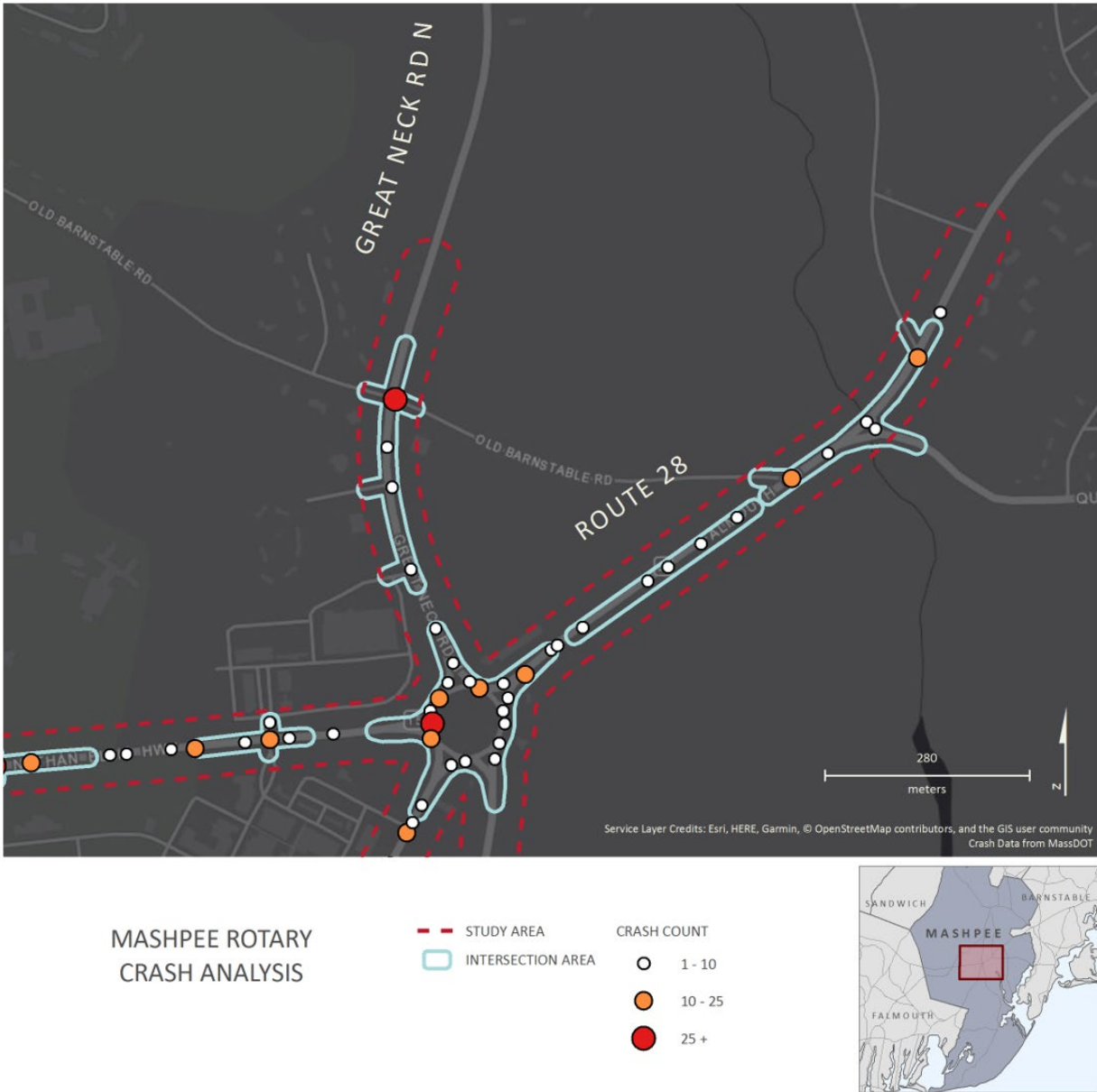


Figure 10: Crash Analysis I (2012-2016)



MASHPEE ROTARY
CRASH ANALYSIS



The information depicted on these maps is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. It should not be substitute for actual on-site survey, or supersede deed research.

Figure 11 Crash Analysis II (2012-2016)

As seen in these figures, the following intersections are shown to have the highest occurrence of crashes (over 25) during the five-year period.

- Mashpee Rotary
- Great Neck Road South at Old Barnstable
- Route 151 at Job's Fishing Road/Frank E Hicks Drive
- Route 28 at Job's Fishing Road/Donna's Lane

A detailed crash analysis was conducted for the Mashpee Rotary which included the preparation of a collision diagram and a Roadway Safety Audit (RSA). Based on the crash analysis, the Mashpee Rotary experienced approximately 128 crashes with 25 of the crashes resulting in an injury (see *Figure 12*). The majority of the crashes were classified as a rear-end collision (78%) and the common trend was a rear-end collision occurring at the rotary entrance points. The RSA performed analyzed crash trends and causes and then identified short-term, mid-term and long-term countermeasures ranging from low cost to high cost improvement recommendations. A final report was prepared, dated August 2019, and is uploaded to both the CCC and MassDOT Safety webpages. MassDOT will look to implement some of the short-term, low cost solutions, such as tree trimming and various signage upgrades. Additional details on the RSA are discussed later in this report under Alternative Development.

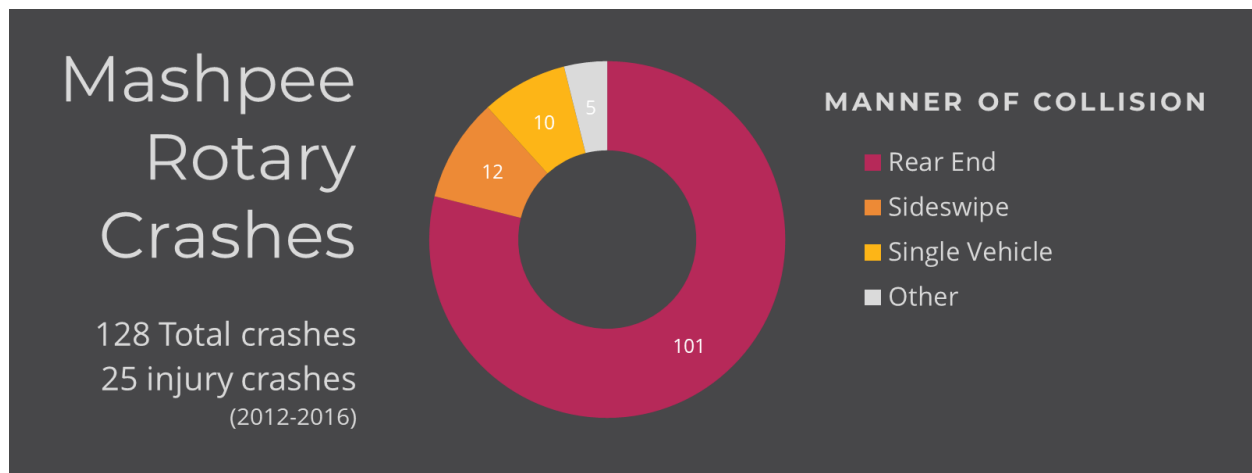
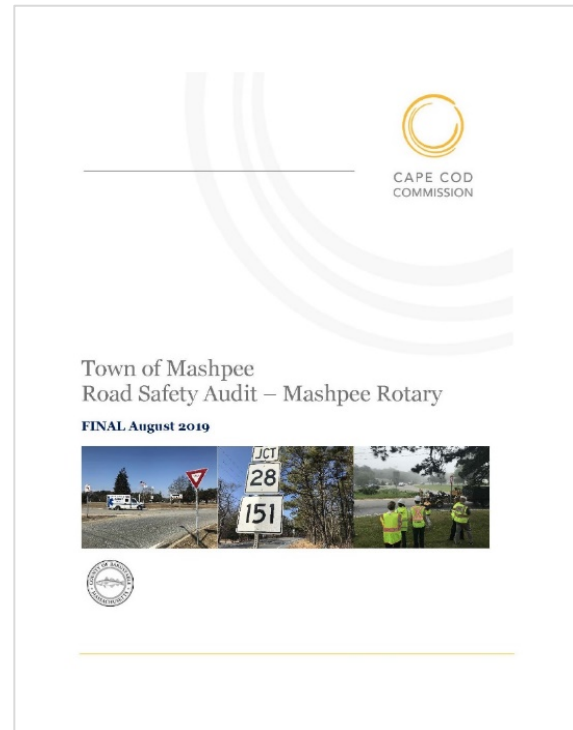


Figure 12 Mashpee Rotary crash analysis 2012-2016

The local intersection of Great Neck Road North at Old Barnstable Road has a long-standing crash history and is identified as a MassDOT Highway Safety Improvement Project (HSIP) crash cluster from 2014-2016 with an RSA performed in June 2009.

Less pronounced safety issues appear at the remaining study area intersections. However, the unsignalized intersections along Route 28 to the east (Meetinghouse Road and Quinaquisset Avenue) has known grades and horizontal curves issues, and experience reoccurring congestion due to Mashpee Rotary queues and the adjacent commercial land uses. In addition, the local intersection of Great Neck Road South at Donna’s Lane has seen an increase in both vehicular and pedestrian activity with recent new developments in the area. Local residents have voiced concerns about potential safety upgrades for this intersection.

TRAFFIC VOLUMES

As seen in *Figure 13*, Commission staff measured traffic volumes on major roads and at major intersections within the study area in the Summer of 2018 and 2019, including collecting volumes within the Mashpee Rotary. *Table 1* presents a summary of the volumes typically seen on the major roadways within the study area.

Table 1: Traffic Volumes

ROADWAY	AADT ¹	SUMMER ADT ²
Route 28 (from East) ³	22,000-23,000	29,000-30,000
Route 28 (from South)	14,000-15,000	17,000-19,000
Route 151	13,000-14,000	15,000-17,000
Great Neck Road North	10,000-12,000	13,000-14,000
Great Neck Road South	8,000-9,000	9,000-11,000

¹ Average Annual Daily Traffic (AADT)

² Summer Average Daily Traffic

³ Based on historical traffic count from MassDOT in August 2014



MASHPEE ROTARY
TRAFFIC COUNTS
SUMMER 2018

- STUDY AREA
- AVERAGE DAILY TRAFFIC COUNTS
- INTERSECTION COUNTS (4-6PM)
- ◆ SUMMER 2019 DATA

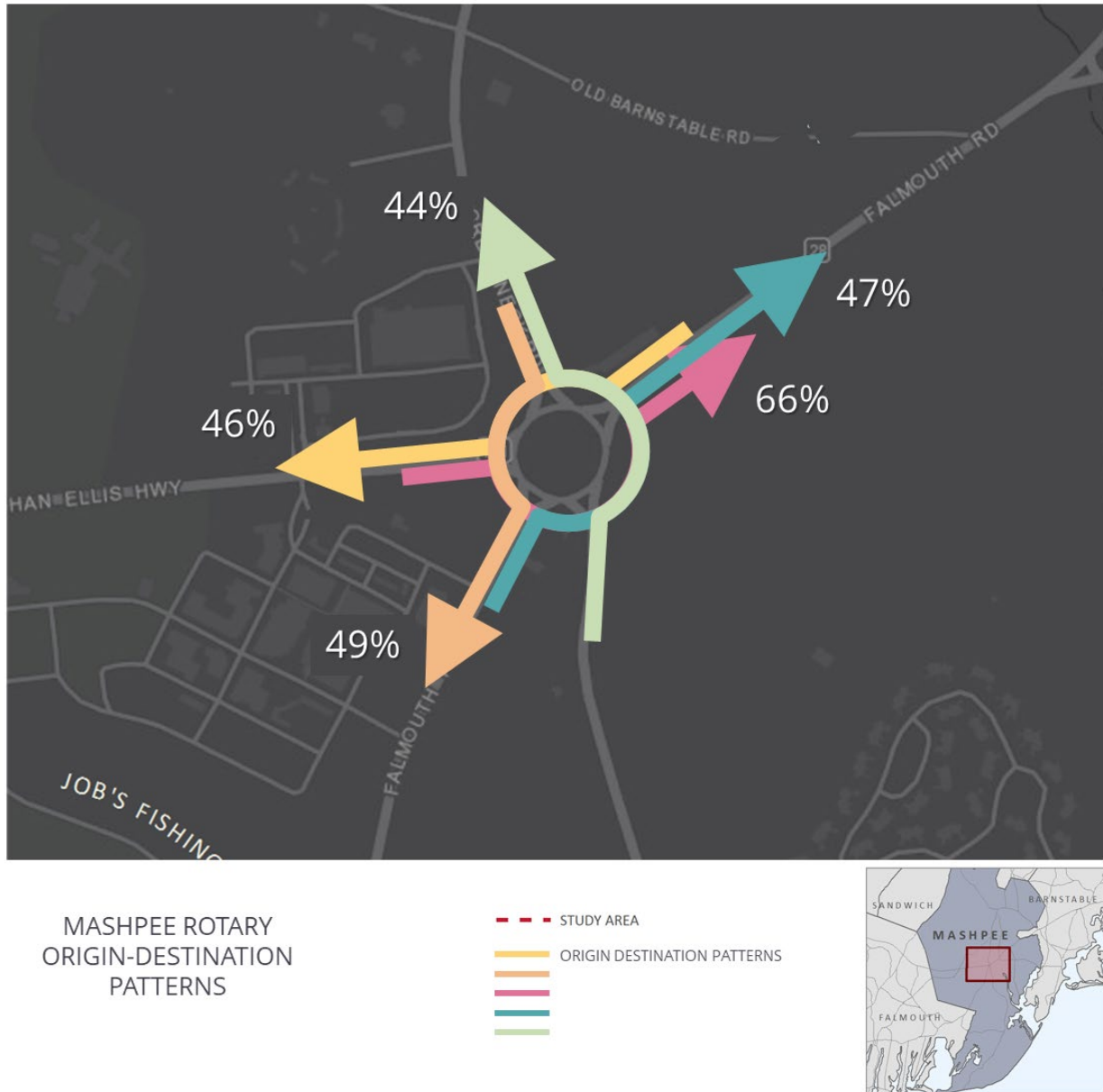


The information depicted on these maps is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. It should not be substitute for actual on-site survey, or supersede deed research.

Figure 13 2018 Traffic Count Locations

Annual Average Daily Traffic is the average number of vehicle trips per day on the roadway over the course of a full calendar year. Summer Average Daily Traffic represents the average number of vehicle trips per day on the roadway over the months of July and August. Traffic patterns vary day-to-day due to events, weather, and a host of other facts so the actual traffic on any given day can vary substantially. Detailed traffic volume data is included in **Appendix A**.

Figure 14 presents the results of the origin-destination conducted during the weekday afternoon peak period, which identifies the major movements through the rotary.



The information depicted on these maps is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel level analysis. It should not be substitute for actual on-site survey, or supersede deed research.

Figure 14 Origin - Destination Patterns Around Mashpee Rotary

Alternative Development

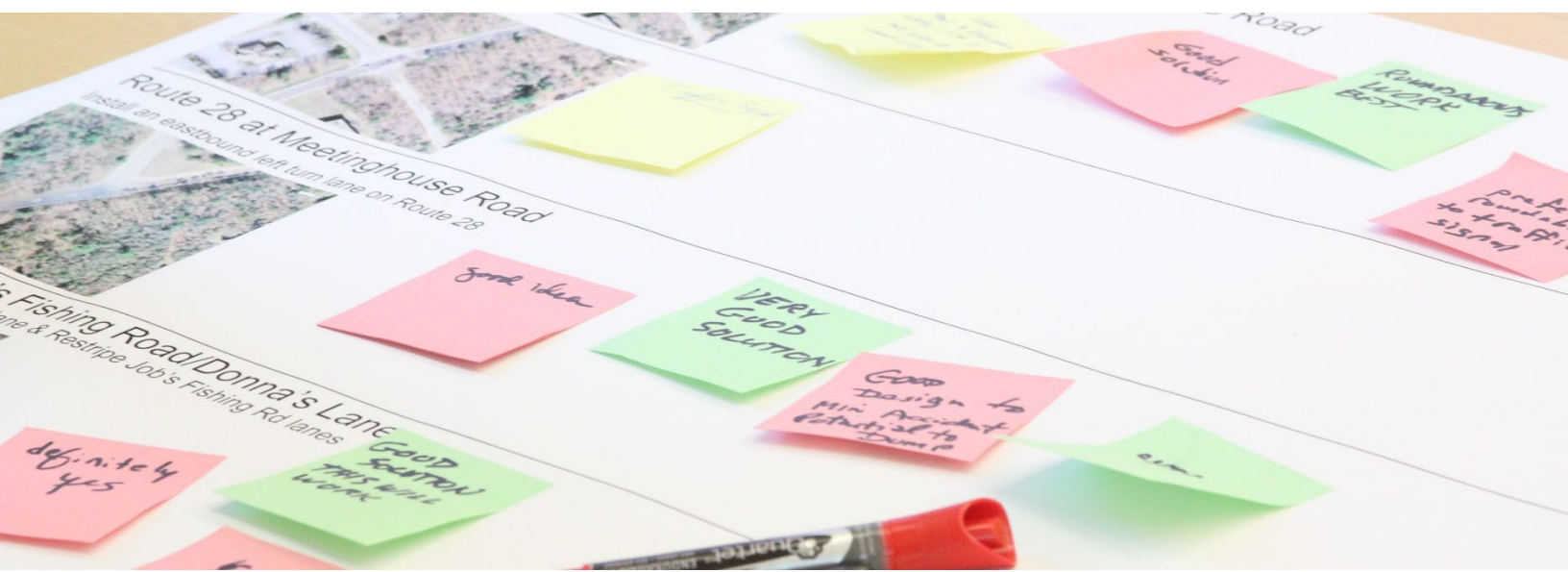
All of the work in analyzing existing conditions was used to support a community-driven alternative development process that began with a listening session. A full set of meeting notes, including a copy of the presentation, are included as **Appendix B**.

EXISTING TRAFFIC OPERATIONS

An existing traffic operations inventory for each study area intersection was conducted for the weekday afternoon peak hour. Capacity analyses were performed by CCC Staff for all stop controlled and signalized intersections using Synchro software. In cooperation with MassDOT, a capacity analysis model for the Mashpee Rotary intersection was prepared by Kittleson & Associates as part of a statewide contract for engineering support of roundabout projects. The capacity analysis model for the rotary was based on based on the Highway Capacity Manual 6th edition. Detailed capacity analysis worksheets for existing and future conditions are included in **Appendix C**.

FUTURE TRAFFIC VOLUMES

As part of the future analysis for the Mashpee Rotary project, a ten-year future design year (2028) was assumed. A ten-year design year is appropriate when conceptualizing a major roadway infrastructure project to ensure the potential alternatives will be designed adequately. In order to account for future growth, a background growth rate was assumed and applied to the existing traffic volume data. The background growth rate was determined based on a review of CCC historical count data based on a review of the entire region and a review of historical trends in the town of Mashpee. Based on our review, an annual background growth rate of 0.75% was selected and applied to develop the 2028 future traffic volumes. A second component of the 2028 future traffic volumes was to incorporate specific traffic volumes associated with developments that are currently permitted, but not yet built. According to the CCC Regulatory files, there is a future permitted phase



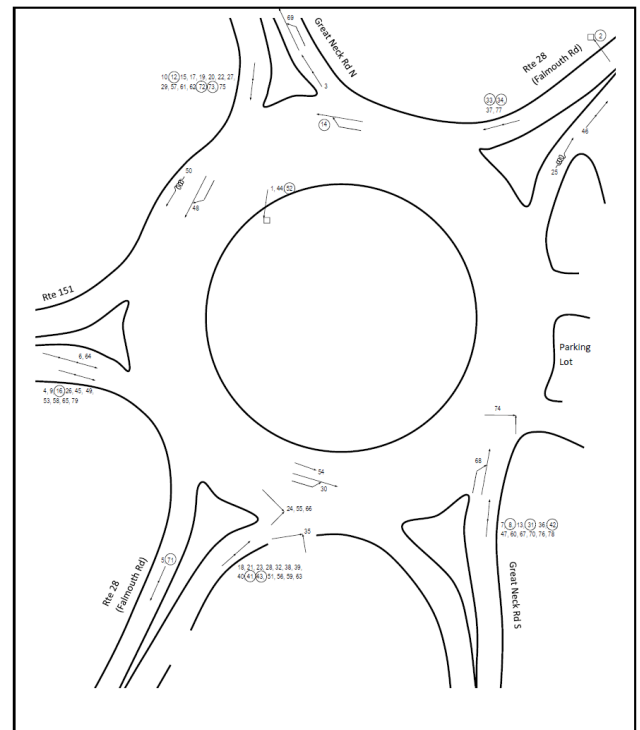
of the Mashpee Commons expansion that was originally approved by the CCC in 2006. The permitted expansion included a mixed-use development of the Jobs-Whiting Neighborhood and included approximately 40,900 square feet of new commercial space and approximately 382 residential units. The estimated future traffic volumes associated with this expansion were documented in the Traffic Impact Analysis Study dated December 12, 2005, prepared by Vanasse Associates. As of 2019, only three buildings along Market Street have been built and it is likely were not fully occupied during the 2018 data collection process. Therefore, to provide a conservative analysis we have incorporated all of the future estimated Mashpee Commons expansion volumes into the Mashpee Rotary study area in addition to future volumes associated with the background growth.

In 2019, Mashpee Commons began the process of entering into a Development Agreement with the Town of Mashpee and the Cape Cod Commission to allow for a future expansion "in a manner that will produce a model smart-growth community in conformance with the goals of the 2018 Regional Policy Plan." (Notice of Intent to File Development Agreement, December 2019). The future traffic volumes and analysis conducted as part of this corridor study do not account for this potential expansion, which is currently still in the early planning phase.

ROADWAY SAFETY AUDIT RECOMMENDATIONS

A Roadway Safety Audit (RSA) was conducted for the Mashpee Rotary on June 20, 2019 and was a key component of the alternatives development process. A RSA is a formal safety review of an existing road or intersection and includes an independent, multidisciplinary technical team of state, regional and local officials.

As part of the RSA a thorough crash analysis was conducted of the high-crash location to summarize the data and identify the trends. Crash data was provided by the Mashpee Police Department and was reviewed by the MassDOT Highway Safety Section. A collision diagram was prepared to locate and identify the types of crashes within the intersection. The majority of crashes were classified as rear-end crashes at the rotary entry points and did not result in any injuries.



CRASH DIAGRAM

Location: Mashpee Rotary
 Town: Mashpee
 Date of Crash Data: 1/1/16 - 12/31/18
 Total Crashes: 79 Injury Crashes: 15 Fatal Crashes: 0
 Note: 77 of 79 mapped. The exact location of crash #11 could not be determined.

SYMBOLS	MANNER OF COLLISION
→ Moving Vehicle	○ Single Vehicle Crash
← Backing Vehicle	⊖ Rear-end
↔ Lane Change	∠ Angle
↻ Turning Vehicle	⊘ Sideswipe
⊘ Out of Control	⊘ Head on
⊘ Indefinitely Involved Vehicle	⊘ Rear to Rear
⊘ Bicycle	⊘ Injury Crash
⊘ Pedestrian	⊘ Fatal Crash
⊘ Parked Vehicle	
⊘ Fixed Object	

During the audit, the multi-disciplinary team discussed the crash data in detail, identified safety issues, observed traffic operations in the field and brainstormed potential countermeasures to improve safety for all users. The team included representatives from the MassDOT Safety section, MassDOT District 5 office, the Town of Mashpee Department of Public Works and Planning Department, Mashpee Wampanoag Tribe, Mashpee Police Department, Mashpee Fire Department and the Cape Cod Commission. Below is a list of the key recommendations from the RSA, which were further analyzed as part of the alternative screening process for the corridor study.

RSA Recommendations:

- Construct shared-use path with ADA compliant crossings around the rotary and its approaches
- Evaluate the existing splitter islands and consider re-designing to improve deflection
- Retrofit the rotary to include modern roundabout lane markings to provide a clearer sense of the rotary layout and provide traffic calming
- Investigate to see if curb cuts within the rotary can be modified or consolidated to provide safer access
- Investigate long-term improvements to improve overall operations of the rotary, including rotary replacement or consider redesigning the rotary into a one- or two-lane modern roundabout

LISTENING SESSION

The listening sessions, the first public meetings for this project, were held at two different time periods at the Mashpee Library on April 11, 2019. Following a presentation to the audience about the study area, goals, and existing conditions, attendees participated in a visioning exercise for the corridor. The visioning exercise



began with a brief group brainstorm of what stakeholders liked about the area. Attendees then split into groups to record on maps the strengths of the corridor, the issues they saw with the area, any suggestions for the corridor, and any other comments they had. Additionally, public comments were received via email for those who could not attend the meeting. While a variety of opinions and suggestions were shared, the majority of participants and emails suggested that a major design of the rotary was not necessary. Comments from the meeting and received via email are summarized below.

Strengths

- Shared use paths
- Bypass roads
- Open space
- Walking paths in Commons
- Holiday Lights
- How Rotary is always Moving
- Rotary Works Well Most of Year
- Rotary over traffic light, easy & efficient

Issues

- Challenging for peds/bikes
- Rotary too large/unsure if two lanes
- Additional turn lanes needed
- High speeds
- People don't know how to drive rotary
- Lane merges
- Rotary curb cuts problematic
- Rotary over traffic light, easy & efficient
- Lack of signage and pavement markings

Suggestions

- Smarter signals
- Bike connections & walking paths
- More lighting
- Grade separation
- Traffic signals
- Roundabouts
- More speed signage
- Remove one road from rotary
- Add lane lines in rotary
- Add/lengthen turn lanes at traffic signals

Email Comments

- "Don't change the rotary"
- "Focus on other areas to improve"
- "I can easily avoid the rotary if needed"
- "Add lane lines like Otis Rotary to slow cars down"
- "Do not support major reconfiguration of rotary or a traffic signal"

A meeting summary and a copy of the presentation materials from the Listening Session can be found in **Appendix B**.

ALTERNATIVE IDENTIFICATION

Potential improvements were identified from suggestions from the listening sessions and a technical review of the issues present at each location. Commission staff, in consultation with Town staff, reviewed these possible improvements and developed the following set of potential improvements for further investigation:

Mashpee Rotary

- Rotary Retrofit
- Two-Lane Roundabout
- Route 28 Overpass
- Traffic Signal (3 options)

Great Neck Road North at Old Barnstable Road

- Implement RSA short-term recommendations (i.e. signage & striping improvements)
- Install a traffic sign or a roundabout

Great Neck Road South at Donna's Lane

- Short-Term Install signage on Donna's Lane to encourage exiting retail traffic from South Cape Plaza (Roche Brothers) to use Route 28 instead of Great Neck Road South
- Mid-Term - Construct a right turn lane on Donna's Lane
- Long Term - Install a traffic signal or a roundabout

Route 28 at Job's Fishing Road/Donna's Lane

- Restripe Job's Fishing Road eastbound travel lanes
- Add a westbound right turn lane on Donna's Lane

Route 28 at Meetinghouse Road

- Restrict Meetinghouse Road to right turn out only
- Install a Route 28 eastbound left turn lane

Route 28 at Quinaquisset Avenue

- Upgrade signage and striping to enforce turn restrictions on Quinaquisset Avenue

Multi-Modal Accommodations

- Add shared use path around the Mashpee Rotary
- Connect existing sidewalk and shared use path gaps within the study area

Transit Accommodations

- Review CCRTA routing for regional efficiency
- Identify areas for bus pull-offs on Route 28 and Route 151
- Consideration of a small local circulator route (i.e. trolley)
- Consideration of a small multi-modal transportation center

Other

- Stormwater management
- Improved vegetation management
- Speed management on Route 151

Photos from Route 28 at Meetinghouse Road(left) and Route 28 at Quinaquisset Avenue (right)



ALTERNATIVE SCREENING

While all alternatives identified through the above described process appeared to provide some benefit, a number were eliminated from consideration based on the feasibility analysis. It may be appropriate to reconsider some of these eliminated alternatives in the future if there are significant changes in traffic characteristics or other demands on roadway. Significant changes to adjacent land uses may also present an opportunity to reevaluate the best solutions to meet the needs of all roadway users including regional travelers and those accessing local destinations. More detail on alternatives that were not further developed can be found in **Appendix D**. Eliminated alternatives included the following:

Mashpee Rotary

- Signalized Intersection with 5 legs
- Signalize existing rotary
- Tunnel

Great Neck Road North at Old Barnstable Road

- Restrict turning movements on Old Barnstable Road approaches
- Closure of one-way section of Old Barnstable Road

Route 28 at Meetinghouse Road

- Install a traffic signal or roundabout

Route 28 at Quinaquisset Avenue

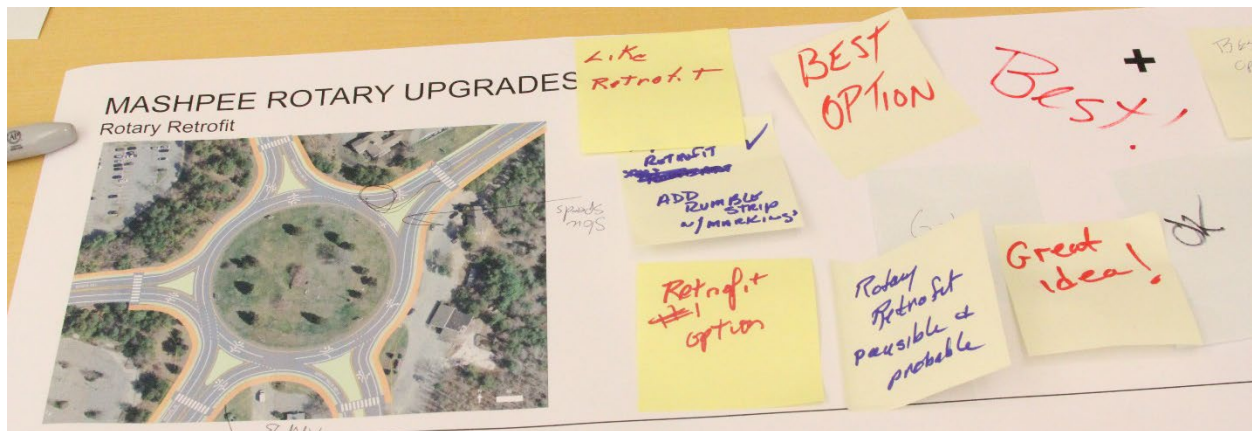
- Realign Quinaquisset Avenue to intersect Route 28 at its intersection with Meetinghouse Road to form a new 4-way intersection.

PUBLIC REVIEW OF ALTERNATIVES

The public review of alternatives took place at the second public meeting for this project, held during two different time periods at the Mashpee Library on December 5, 2019. The presentation provided a brief overview of the project, a summary of the issues and suggestions provided at the April public meetings, and then walked through the potential alternatives for each intersection as well as some corridor-wide improvement alternatives.

Following the overview of the alternatives, attendees provided comments and feedback on each alternative by visiting five tables throughout the room. Each table had a different intersection or issue area for the corridor broken out as follows: Mashpee Rotary Upgrades (i.e. maintain circular intersection), Mashpee Rotary Replacement, Local Intersections, Multi-Modal Accommodations, and Transit Accommodations. At each table, attendees wrote down feedback and comments for each alternative and put their feedback in a + or - column to show whether they generally supported the idea or not. Attendees circulated to each table they were interested in.

Based on the public feedback provided, there was strong support for the rotary retrofit alternative and minimal support for the rotary reconfiguration options, such as the traffic signals. There was also support for improved multi-modal accommodations, transit improvements and support for



local intersection upgrades. Additionally, public comments were received via email for those who could not attend the meeting. The majority of the comments received voiced opposition to a major change at the Mashpee Rotary or stated that only minor short-term changes, such as signage and striping should be implemented. Additionally, there were several email comments supporting improved facilities for pedestrians and bicyclists throughout the study area. A full set of meeting notes, including a copy of the presentation, are included in **Appendix D**.



Summary of Alternatives

ALTERNATIVE REFINEMENT

The opinions expressed and comments made on the alternatives presented at the December public meeting were used to refine the alternatives. The following section presents the alternatives developed as part of this study along with a discussion of relative time frame and cost, and expected impacts in terms of safety, congestion, bicycle and pedestrian accommodation, and property of each alternative. [Table 2](#) summarizes the alternatives.



Table 2: Summary of Alternatives

INTERSECTION ALTERNATIVES	TIME FRAME	COST	ANTICIPATED IMPACT				
			SAFETY	CONGESTION	BICYCLE/ PEDESTRIAN	PRIVATE PROPERTY	COMMUNITY CHARACTER
MASHPEE ROTARY							
Rotary Retrofit	Mid	\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
Two-Lane Roundabout	Long	\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
Route 28 Overpass	Long	\$\$\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
Traffic Signal	Long	\$\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
GREAT NECK ROAD NORTH AT OLD BARNSTABLE ROAD							
Installation of Traffic Signal	Long	\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
Installation of Roundabout	Long	\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
GREAT NECK ROAD SOUTH AT DONNA'S LANE							
Installation of Traffic Signal	Long	\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
Installation of Roundabout	Long	\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
ROUTE 28 AT JOB'S FISHING ROAD/DONNA'S LANE							
Turn Lane Enhancements	Mid	\$\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
ROUTE 28 AT MEETINGHOUSE ROAD							
Route 28 Left Turn Lane	Long	\$	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●	●●● ●●●
CORRIDOR CONCEPTS							
PEDESTRIAN CONCEPTS	BICYCLE CONCEPTS	TRANSIT CONCEPTS	OTHER CONCEPTS				
<ul style="list-style-type: none"> • Close sidewalk and shared use path gaps within study area • Install shared use path around Mashpee Rotary 	<ul style="list-style-type: none"> • Expanded shoulders where possible for bicycle accommodation • Prioritize Route 28 section towards Barnstable for bicycle accommodations 	<ul style="list-style-type: none"> • Bus pull-outs • Local circulator route • Review existing routes/ stops to increase efficiency • Small transportation center 	<ul style="list-style-type: none"> • Improved stormwater management and treatment • Improved vegetation management • Speed management on Route 151 				

MASHPEE ROTARY

The Mashpee Rotary is the convergence of five roadways into one large circular intersection. The rotary has one 35-foot wide general use circulating lane and handles both regional and local traffic. The five roadways include Route 28 (Falmouth Road), Route 151 (Nathan Ellis Highway), Great Neck Road North and Great Neck Road South. There are no pavement markings within the rotary except for edge lines and there are no sidewalks or crosswalks provided around the rotary. All approaches operate under yield control and provide one wide lane entering the rotary. Within the rotary, three curb cuts exist for private business driveways (Picnic Box, Mocean/Smitty's Ice Cream and Sotheby's Real Estate office). It should be noted that each of the businesses have a second curb cut on their adjacent street.

Key issues at this location include congestion, a known crash history with a high occurrence of rear-end collisions at the entry points, and lack of bicycle and pedestrian accommodations. Given the safety issues at this intersection consideration should be given to the short- and long-term potential improvement alternatives detailed on the following pages as well as in the RSA report.

Rotary Retrofit

Similar to a recent successful rotary retrofit project in Middleborough, MA, this alternative seeks to keep the original rotary design and upgrade the layout with roundabout features, such as signage and striping, to better arrange and inform circulating traffic. In addition, multi-modal accommodations via a shared-use path would be incorporated to provide connections to pedestrians and bicyclists. It is important to note that the Mashpee Rotary handles approximately 30% less traffic volumes during the summer months when compared to the similar Middleborough Rotary Retrofit project. Minor geometric improvements are recommended to improve the angle of deflection at the rotary entry points to reduce rear-end collisions. To improve safety with this alternative, there would be a recommendation to consolidate and/or remove some of the existing curb cuts within the rotary. Most of the businesses have a secondary means of access/egress on an approach roadway, such as Great Neck Road South, which would provide a safer means of access/egress than within the rotary.



Middleborough Rotary retrofit example

Based on a future capacity analysis to accommodate future traffic growth, it is recommended to widen and stripe the approach roadways to accommodate two entering lanes. There may be the

Roundabout – Two Lane

The two-lane roundabout alternative builds upon the rotary retrofit alternative and reduces the size of the inside circle to improve safety by slowing vehicular speeds. The roundabout will impact a smaller footprint inside the circle and would open up additional open space on the outside of the circle. This design shows only one lane approaches on each leg of Great Neck Road, which may have operational issues during peak summer months. The curb cuts within the rotary would be closed and access/egress likely relocated to the adjacent roadways. The two-lane roundabout alternative is shown in *Figure 16*.

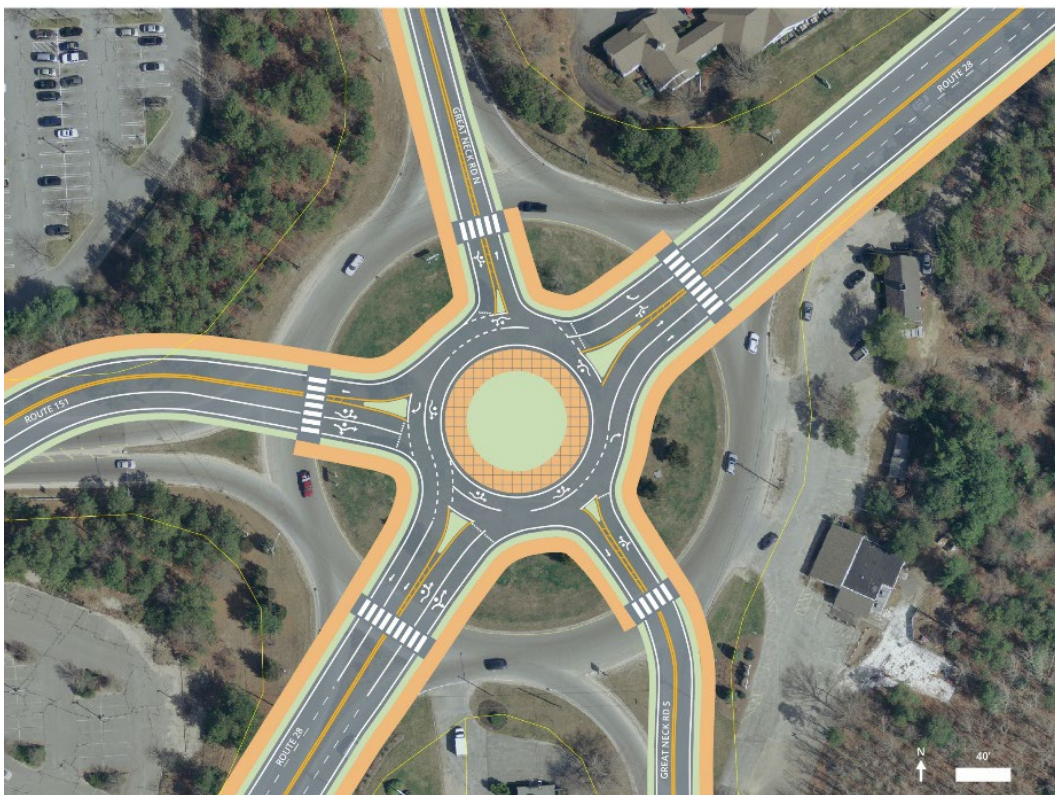
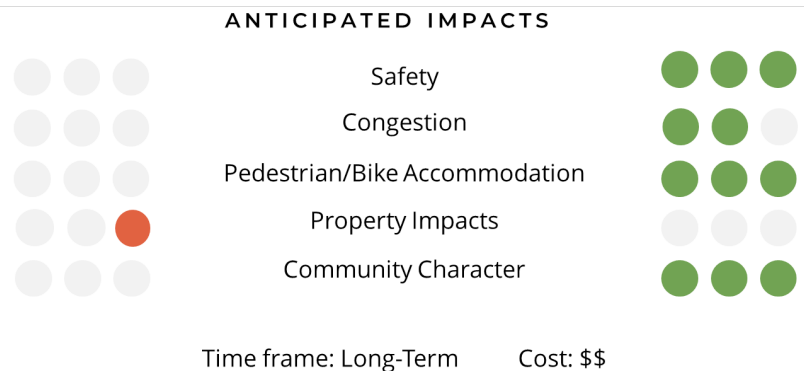


Figure 16 Two-Lane Roundabout Alternative and Anticipated Impacts



Route 28 Overpass

The overpass alternative would prioritize regional traffic by allowing Route 28 through traffic to bypass the rotary. Since Route 28 carries a significant amount of traffic, safety within the rotary for the remaining roadways would be improved by reducing congestion and conflict points within the rotary. The other three intersecting roadways (Great Neck Road North, Great Neck Road South & Route 151, as well as Route 28 turning movements, would all continue to use the rotary. On and off-ramps would have to be constructed on Route 28 and would likely impact abutting properties due to the construction of retaining walls and topography changes. However, an overpass may have a negative impact on the community by prioritizing Route 28 regional traffic and motorists may no longer view Mashpee as a destination or a stopping point. In addition, the construction of an overpass creates a physical barrier and is not as inviting for pedestrians and bicyclists. A schematic footprint layout of a potential Route 28 Overpass concept is shown in *Figure 17*.

Figure 17. Route 28 Overpass Alternative and Anticipated Impacts



ANTICIPATED IMPACTS



Time frame: Long Term Cost: \$\$\$

Traffic Signal

A long-term solution would be to create a conventional 4-legged signalized intersection. Three (3) traffic signal concepts were developed for the Mashpee Rotary. Under all three traffic signal options, pedestrians and bicyclists would be accommodated with new sidewalks, bicycle lanes and/or shared-use paths with protected phases at the traffic signals. In order to provide acceptable traffic operations all approach roadways would have to be widened as they approach the new traffic signal(s) to accommodate new turn lanes and the projected vehicle queues. Most notably, Route 28 from the east has the potential to be widened to a six-lane cross section (4 approach lanes; 2 receiving lanes).

Traffic Signal Option A

would involve relocating Route 151 through Mashpee Commons land. A new traffic signal would also be installed at the newly created intersection of Route 151 and Route 28. Option A allows local access on Great Neck Road to remain unchanged. Under this option, it is recommended to widen Route 28 to two through lanes in each direction in order to provide acceptable traffic operations. *Figure 18* presents the Traffic Signal Option A.



Figure 18 Traffic Signal Option A Alternative

Traffic Signal Option B

would relocate Great Neck Road South (which is a lower volume roadway compared to Route 151 under Option A) to create a conventional 4-legged traffic signal to replace the rotary. Route 28 from the south would need to be realigned through private property to create a traditional intersection layout. In addition, Great Neck Road South would terminate at the intersection of Donna’s Lane with the construction of a roundabout. All vehicles on



Figure 19 Traffic Signal Option B Alternative

Great Neck Road South would have to relocate to the Route 28 and Job’s Fishing Road/Donna’s Lane signalized intersection, which would require a major intersection upgrade to accommodate the additional traffic volumes. In addition, the intersection of Route 28 at Shellback Way would also likely need to be upgraded to relieve congestion on Route 28 due to its close proximity and shared connections to South Cape Village shopping center. Traffic Signal Option B is presented in *Figure 19*.

Traffic Signal Option C builds upon Option B, but does not terminate Great Neck Road South. Great Neck Road South would be relocated to intersect Route 28 as a new unsignalized intersection through private property south of the existing Mobil gas station. A southbound left turn lane would be provided on Route 28 South for the large volume of left turning vehicles. To enhance safety, left turns



Figure 20: Traffic Signal Option C Alternative

exiting Great Neck Road South would be prohibited as they would likely have made their connections via the Donna's Lane intersection to the south. Traffic Signal Option C is presented in *Figure 20*.

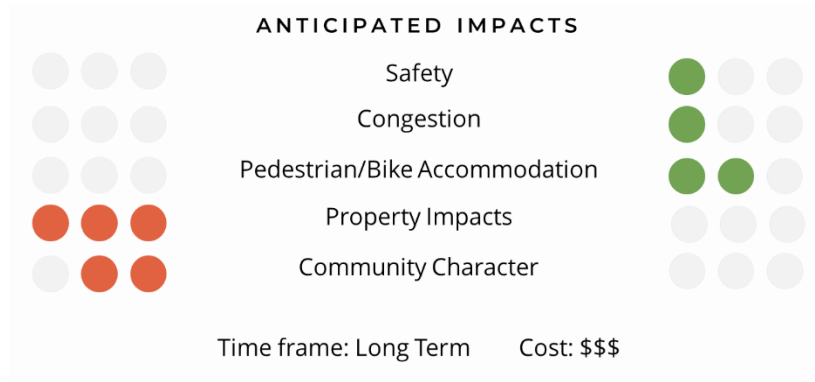


Figure 21: Traffic Signal Alternative Options A - C Anticipated Impacts

GREAT NECK ROAD NORTH AT OLD BARNSTABLE ROAD

Old Barnstable Road intersects Great Neck Road North to form a four-way unsignalized intersection. Each of the four approaches consists of a single travel lane shared to all movements. Old Barnstable Road from the east is a one-way roadway in the westbound direction, which limits the movements at the intersection. However, the one-way approach on Old Barnstable Road is wide enough to accommodate two travel lanes, but no lane designation or striping currently exists. Sidewalks currently exist on the western side of Great Neck Road North and the northern side of the western approach of Old Barnstable Road. Only one crosswalk is present at the intersection on the western approach. It should be noted that this intersection provides access to the Town's two elementary schools.

Key issues are the alignment of the two stop-controlled approaches on Old Barnstable Road are slightly offset from one another due to the large width of the westbound approach which complicates operations. Sight distance is also an issue for motorists on Old Barnstable Road due to a horizontal curve and vegetation.

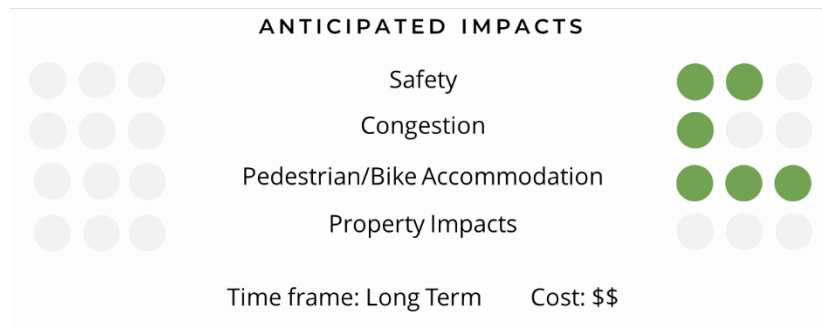
Installation of a roundabout or traffic signal

An RSA was conducted by the CCC at this intersection in June 2009. Short term improvements included signage and striping recommendations while long term recommendations included

realignment of the Old Barnstable Road approaches. Based on a preliminary traffic signal warrant analysis, a traffic signal would meet the eight-hour, four-hour and peak hour volume warrants. A traffic signal would likely operate adequately with a single lane approach for all four legs. Pedestrian and bicycle accommodations are recommended to be included as well with the installation of a pedestrian phase and improved multi-modal accommodations. *Figure 22* shows the potential for a traffic signal installation at this intersection.



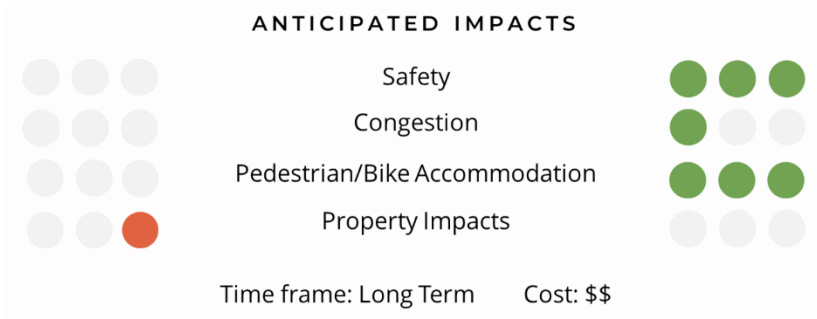
Figure 22: Great Neck Road North Traffic Signal and Anticipated Impacts



Conversely, a roundabout would also be an ideal candidate for this intersection and is the preferred intersection treatment recommended by the CCC as roundabouts have been found to be safer alternative to a traffic signal. Based on a preliminary analysis, a single-lane roundabout would provide adequate traffic operations during both the weekday morning and weekday afternoon peak hours during the peak summer season. As seen in *Figure 23*, a single lane roundabout could likely be constructed at this location, however, it may require small pieces of permanent land takings on the intersection corners.



Figure 23: Great Neck Road North Roundabout and Anticipated Impacts



GREAT NECK ROAD SOUTH AT DONNA'S LANE

The unsignalized intersection of Great Neck Road South and Donna's Lane consists of four approaches with the two minor roadway approaches of Donna's Lane and Blue Spruce Way operating under stop control. Each approach consists of a single travel lane. To the north of the intersection on Great Neck Road South, sidewalks currently exist on the east side of the roadway, while south of the intersection a shared use path exists on the west side of Great Neck Road South. Sidewalks also exist on the south side of Donna's Lane providing a connection to Route 28 and the South Cape shopping center. Crosswalks exist on the southern and eastern approaches of the intersection. A rectangular rapid flashing beacon (RRFB) was recently installed at the Great Neck Road South mid-block crosswalk.

This local intersection has some key issues for residents which were heard during the public process. The issues include difficulty crossing Great Neck Road South as a pedestrian even with the RRFB and difficulty for vehicles exiting from the minor side streets due to heavy traffic volumes, high speeds and sight line challenges.

Short Term – Install new Route 28 directional signage across from Commercial Street

Based on the traffic count data at the intersection of Great Neck Road South and Donna's Lane, approximately 65% of the eastbound volume consists of right-turns, while the remaining 35% are left-turning vehicles likely originating from the nearby shopping center on Commercial Street with a desire line back to the Mashpee Rotary. To improve the safety of these left-turning vehicles who have difficulty making this movement in the short-term, it is recommended that new directional signage be installed across from the Commercial Street exit on Donna's Lane to encourage those vehicles to return to the Mashpee Rotary via Route 28 instead. Additional short-term recommendations also



Figure 24: Recommended installation of new Route 28 directional guide signage on Donna's Lane for motorists exiting Commercial Street

included installation of intersection warning ahead signage and installation of a stop sign on Blue Spruce Way. A rendering of the recommended signage installation is shown in Figure 24.

Mid Term – Construct Right Turn Lane on Donna’s Lane

To accommodate the heavy demand for right turns on Donna’s Lane to Great Neck Road South, it is recommended that a new right turn lane be constructed to separate the turning movements on the eastbound approach. Only minor roadway widening would be required in the northwest quadrant to accommodate the new turn lane. Vehicle delays and queues would be reduced with a dedicated right-turn only lane. In addition, with the construction of the right-turn lane on Donna’s Lane, a traffic signal may no longer meet the warrant requirements due to the high right-turning volume. Figure 25 shows the potential addition of a right-turn only lane on Donna’s Lane.



Figure 25: Donna’s Lane Right Turn Lane Alternative

Long Term – Installation of a roundabout or traffic signal

After the potential short-term and mid-term alternatives have been considered, a long-term solution may still be needed to improve intersection safety and operations. Based on traffic volume data obtained in 2018, a traffic signal has the potential to satisfy warrant criteria. However, the effect of the heavy right-turn volumes on Donna’s Lane need careful consideration as part of the traffic signal warrant analysis. Therefore, the ideal long-term solution may be the construction of a roundabout at this intersection.

ROUNDAABOUT

Based on a preliminary analysis and as shown in *Figure 26*, a single-lane roundabout would be expected to provide adequate traffic operations and would likely fit within the available right-of-way. A roundabout solution would improve safety and operations for the turning movements and would assist in slowing vehicles down on Great Neck Road South. The multi-modal environment would also be improved with the introduction of a roundabout to slow traffic.

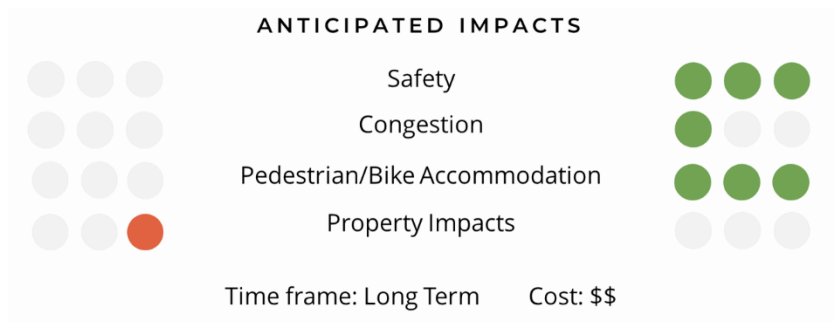


Figure 26: Donna's Lane Roundabout and Anticipated Impacts

TRAFFIC SIGNAL

Conversely, a traffic signal could also achieve the same long-term benefits as a roundabout, if the traffic volume data meets the applicable warrants. Based on a preliminary analysis and layout and as shown in *Figure 27*, a traffic signal could operate adequately with one lane approaches for each leg. The multi-modal environment would also be improved with the introduction of a pedestrian phase within the traffic signal.

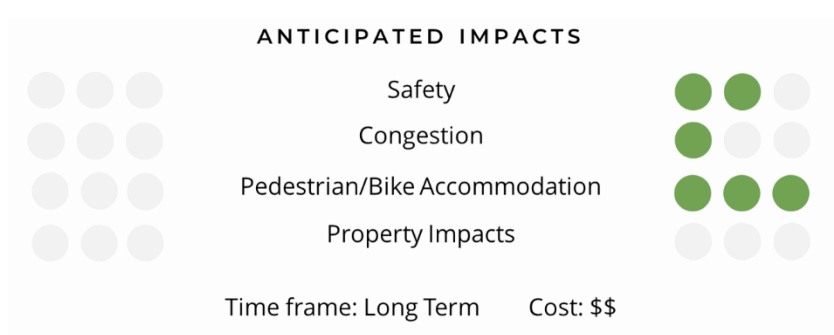


Figure 27: Donna's Lane Traffic Signal and Anticipated Impacts

ROUTE 28 AT JOB'S FISHING ROAD/DONNA'S LANE

Job's Fishing Road and Donna's Lane intersect Route 28 to form a four-way signalized intersection. In both directions, Route 28 consists of a left-turn lane, one through lane and one shared through/right-turn lane. Job's Fishing Road consists of two shared-use lanes, while a left turn lane and a shared through/right turn lane exist on Donna's Lane. At the intersection, sidewalks exist on the south side of Job's Fishing Road and Donna's Lane, the west side of Route 28 (from the north) and on both sides of Route 28 (from the south). Crosswalks with pedestrian push buttons exist on all four approaches. The traffic signal operates as a four-phase actuated coordinated signal including a lead protected phase for northbound and southbound Route 28 left turns, a phase for northbound and southbound Route 28 through traffic, a lead protected phase for westbound Donna's Lane through traffic and protected left turns and a phase for the eastbound and westbound through traffic with permissive left turns on both

Job's Fishing Road and Donna's Lane. There is an exclusive pedestrian phase as well that operates when actuated.

Currently, this traffic signal is under construction by MassDOT to install a flashing yellow arrow on Donna's Lane to improve safety, as well as, American with Disabilities Act (ADA) upgrades for all of the pedestrian crossings and handicapped access ramps. New pedestrian signal heads with countdown timers will also be installed.

Key issues that exist include the lack of lane assignments and striping on Job's Fishing Road and the potential need for a right turn lane on Donna's Lane to divert motorists who currently using the Donna's Lane and Great Neck Road South unsignalized intersection.

Short Term - Restripe Job's Fishing Road lanes

This alternative involves installing lane designation striping on the two general purpose travel lanes on Job's Fishing Road. There are two options; 1) designate a left turn lane and a shared through/right-turn lane; or 2) designate a shared left-turn/through lane and a dedicated right-turn lane. Both lane assignment options have benefits and detriments that need to be weighed as additional delay is added to the shared-use lane. Currently the eastbound Job's Fishing Road approach operates with acceptable traffic operations and minimal queuing during the weekday afternoon peak hour. This short-term recommendation seeks to enhance safety as it would likely result in less efficient traffic operations with reassignment of two general purpose lanes.

Option 1 – Under Option 1, the inside lane on Job's Fishing Road would be designated for left-turn movements only while the outside lane would be designated and shared for through and right-turn movements, similar to what exists on the opposite approach on Donna's Lane. It is recommended that a leading protected left-turn signal phase be installed to coincide with the new eastbound left turn lane, similar to what exists on the westbound approach. Operationally during the weekday afternoon peak hour, a dedicated left-turn lane would be expected to operate with average delays while the shared through/right-turn lane would be expected to experience additional vehicle delay, but operate at acceptable operations.

Option 2 – Under Option 2, the inside lane on Job's Fishing Road would be designated as a shared left-turn/through lane, while the outside lane would be designated for right turns only. It is recommended to install an overlap phase for this right-turn lane to coincide with the protected left-turn signal phases on Route 28. Operationally, the shared through/right-turn movements would be expected to operate with similar vehicle delays as under existing conditions, while the dedicated right-turn lane would be expected to improve and operate with minimal delay during the weekday evening peak hour. Public support for this option was heard at the Presentation of Alternatives public meetings as it is a desirable movement for people to avoid the Mashpee Rotary via Route 151 and will assist in making this movement more attractive.

To fully understand the impacts associated with the lane designating, additional data collection and analysis should be performed to assess the lane change impacts during other critical peak periods including, the weekday morning and Saturday midday peak periods.

Long Term - Add westbound right turn lane on Donna’s Lane and install a directional guide sign to direct retail traffic back to Route 28

As shown in *Figure 28*, this alternative involves the construction of a new right-turn lane on Donna’s Lane to alleviate congestion and concerns previously identified at the Donna’s Lane and Great Neck Road South unsignalized intersection to the east. Based on the short-term signage recommendation discussed under the Great Neck Road South and Donna’s Lane intersection, a new westbound right-turn lane is desired at the intersection of Donna’s Lane and Route 28 to promote a safer turning movement for vehicles headed

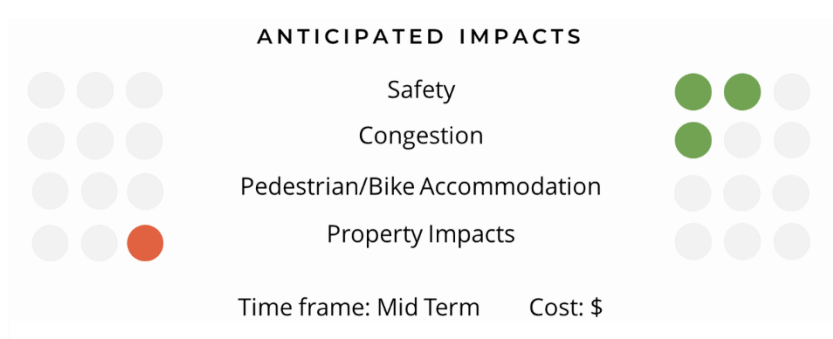


Figure 28: Turn Lane enhancements for Route 28 at Job’s Fishing Road/Donna’ Lane

to the Mashpee Rotary. Based on the count data, vehicles are currently turning right out of the shopping center onto Donna’s Lane then turning left onto Great Neck Road South to return to the Mashpee Rotary. With the recommendation to install new guide signage and this new westbound right turn lane at the Route 28 intersection with Donna’s Lane, safety and traffic operations should be improved at the both of the intersections with Donna’s Lane.

ROUTE 28 AT MEETINGHOUSE ROAD

Meetinghouse Road intersects Route 28 from the north to form an unsignalized T-intersection. All approaches consist of one shared travel lane with Meetinghouse Road under stop control. The intersection lies within a vertical curve and to the west there is a horizontal curve, both which present challenges for the side street movements. Meetinghouse Road provides a connection for residents and trucks to access the Mashpee Transfer Station and Recycling Center. In addition, the Mashpee Department of Public Works (DPW) is also located on Meetinghouse Road contributing to frequent truck traffic. Sidewalks do not currently exist and the shoulders on Route 28 are very narrow and are not bicycle tolerant.

Key issues at this location include difficulty for all turning movements in and out of Meetinghouse Road. Vehicle speeds on Route 28 and limited sight distance present hazards to vehicles approaching the intersection. Frequent queuing on Route 28 coupled with geometric horizontal and vertical curves is also a key issue for eastbound left turning vehicles onto Meetinghouse Road.

Restrict Turning Movements

A short-term alternative that could be further investigated would involve restricting left turn movements out of Meetinghouse Road as there is the alternative connection from Meetinghouse Road to Route 28 via Asher's Path. It should be noted that left turn volumes during the weekday evening peak hour were found to be low. Prior to proceeding with this alternative, additional data collection with consideration of the peak periods of activity at the Transfer Station and Recycling Center should be considered to ensure no adverse impacts.

Install Route 28 Left Turn Lane

To enhance safety on Route 28, an alternative would be to construct a left turn lane in the eastbound direction to accommodate the desire line connection for residents and truck traffic to the transfer station. The left turn lane would aim to reduce rear-end collision and keep traffic moving on Route 28. *Figure 29* depicts a conceptual eastbound left turn lane on Route 28.

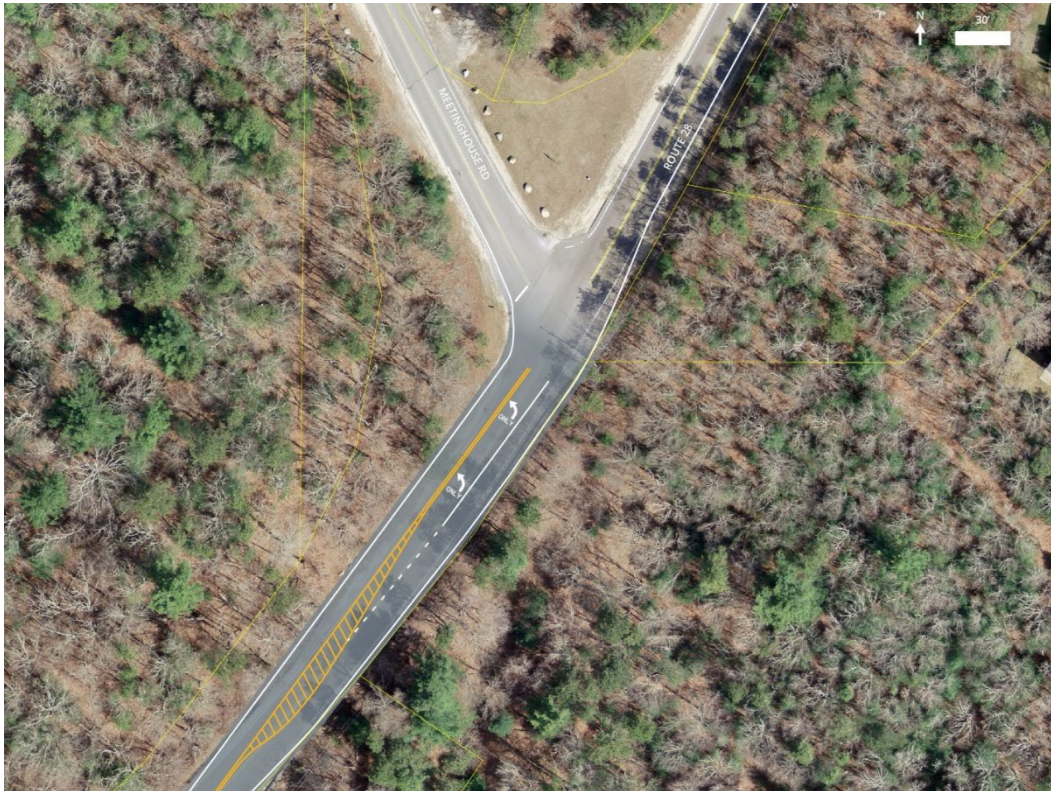
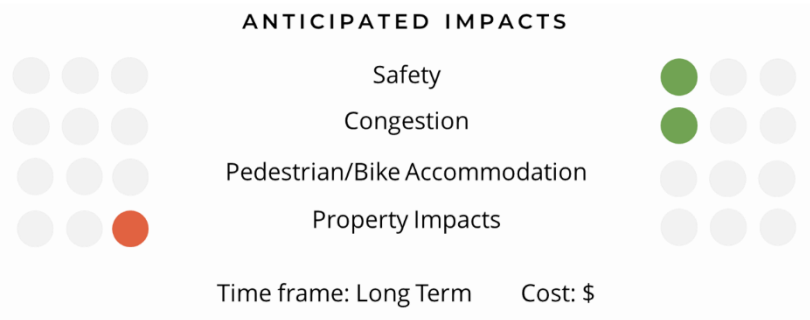


Figure 29: Route 28 at Meeting-house Road Left Turn Lane Alternative



ROUTE 28 AT QUINAQUISSET AVENUE

Quinaquisset Avenue intersects Route 28 from the south to form an unsignalized T-intersection. Due to significant horizontal and vertical curvature on Route 28, the configuration of a large channelized traffic island on Quinaquisset Avenue allows for right turns only to/from Route 28. Left turns to/from Route 28 must occur at the adjacent intersection of Route 28 and Orchard Road to the east. Both approaches on Route 28 consist of a single travel lane and there are no sidewalks or bicycle accommodations provided at the intersection, although several comments were received about the need for bicycle connections at this critical point. Public comments also noted that a few motorists from Quinaquisset Avenue have been observed turning right onto Route 28 and then making a u-turn movement at Route 28 at Meetinghouse Road to head west on Route 28. In addition, there was an observation of a motorist on Quinaquisset Avenue who drove into the receiving lane on the left side of the traffic island to connect to Route 28 via an illegal left turn movement.

Key issues at this location include the lack of multi-modal accommodations at this intersection and the occurrence of illegal and dangerous movements of vehicles who do not obey the turn restrictions.

As stated earlier, the potential for an intersection upgrade project of the Route 28 intersections of Meetinghouse Road and Quinaquisset Avenue was not further evaluated due to right-of-way restrictions and open space requirements. In addition, the traffic volumes from the minor approaches do not warrant major infrastructure upgrades, such as a traffic signal. It is recommended that this intersection be evaluated for a further review for short-term improvements, including signage and striping to further enforce the turn restrictions at this intersection. Long term multi-modal accommodations should be planned for at this location on Route 28.

PEDESTRIAN AND BICYCLE ACCOMMODATION ALTERNATIVES

Install shared use path around Mashpee Rotary

Mashpee is fortunate to have a good foundation of existing shared use path networks and sidewalks in the greater vicinity of the Mashpee Rotary, however, there is a large gap created with the presence of the Mashpee Rotary, which creates a barrier to multi-modal connectivity within the town. The Mashpee Rotary presents a challenging environment for pedestrians and bicyclists to navigate and cross with no accommodations. During our field visit, pedestrians and bicyclists were present on all roadways as well as within the Mashpee Rotary area. As part of the rotary retrofit alternative, it is recommended that a shared use path be constructed around the rotary with crossing treatments at every approach.

Close the sidewalk gaps

The second step is to entirely close the gaps in the sidewalk and shared use path network by extending multi-modal accommodations on all five legs of the Mashpee Rotary approach roadways to connect to the existing network.

On Route 28 towards Barnstable, there is currently no multi-modal network to connect to. The existing shoulder on Route 28 is narrow and ill-suited for most bicyclists. During the public meetings, bicyclists informed staff that they currently use local roads such as Old Barnstable Road to avoid Route 28 and the Mashpee Rotary, however, there is the small section of Route 28 between Old Barnstable Road and Quinaquisset Avenue that they cannot avoid. A priority area for multi-modal improvements on Route 28 would be for this section between the Mashpee Rotary and Quinaquisset Avenue as there is no alternative road for bicyclists to connect to. Multi-modal accommodations could include bicycle lanes or bicycle-tolerant shoulders, a sidewalk or a shared use path on the south side of Route 28. The shared use path could exist next to the roadway with appropriate buffers or could be constructed along the old alignment of Route 28 where an old roadbed still exists today. Once on Quinaquisset Avenue, bicyclists can continue on the local roadways to bypass Route 28 until a long-term regional solution is developed.

Additionally, pedestrian accommodations, including push buttons, curb ramps and crosswalks, should be prioritized and installed at the Route 28 and Orchard Road signal to provide a safe alternative for bicyclists to make a left turn onto Route 28 to head west towards the Mashpee Rotary. *Figure 30* shows the areas for future connections for pedestrians and bicycles to complete the network.





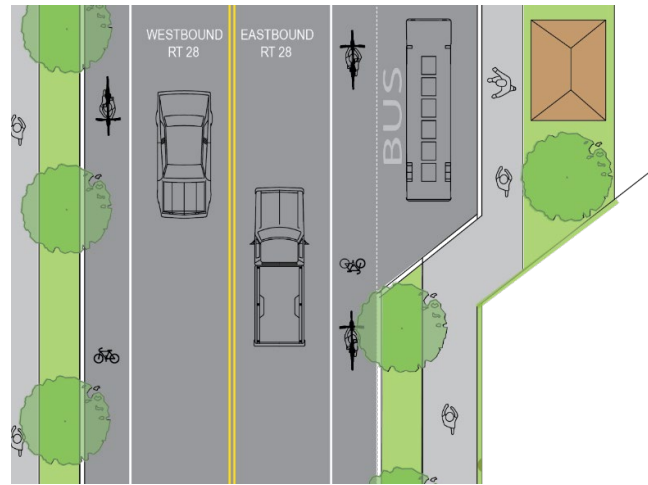
Figure 30: Future sidewalk and bicycle connections

TRANSIT ALTERNATIVES

The Cape Cod Regional Transit Authority (CCRTA) provides transit service to Mashpee via the Sealine (Falmouth-Mashpee-Hyannis) along Route 28 and via the Bourne Route (Wareham-Bourne-Falmouth-Mashpee) along Route 151. Within the study area, there are formal bus stops within the Mashpee Commons (both routes) and South Cape shopping center (Sealine). In addition, transit riders can also flag down the bus along all of the routes as well. A short-term recommendation would be to review these two transit routes to see if there is an opportunity to increase regional efficiency. As the buses currently have formal bus stops within the retail shopping plazas, there may be an opportunity to provide an Express service during peak times where the buses would stop along Route 151 or Route 28 instead. Adequate multi-modal infrastructure must first be in place to provide the pedestrian and bicycle connections before implementation. The following additional recommendations could assist in achieving this effort.

Identify areas for bus pull-offs

If CCRTA buses could stop on the major roadways instead of within the shopping plazas, an additional recommendation would be to install formal bus pull-offs with bus shelters. By constructing a bus pull-off, disruption to the traffic flow would be minimized while safety would be increased for the bus and the transit rider. A properly signed bus stop would add to the visibility of the service. Furthermore, a properly sited stop will ensure the transit user waits in a safe location that is easily visible to the bus driver.



Consideration of small local circulator route

With the recommendation to improve regional efficiency for CCRTA service with bus pull-outs and express service, there may be the need and/or the desire to create a small local circulator transit route to enhance the local connections from the regional service. The service could be in cooperation with the major commercial developments and municipal buildings in the nearby area for Mashpee residents and visitors. An example of a local circulator route is the Woods Hole (WHOOSH) trolley service in Falmouth.



Consideration of small transportation center

Additionally, the consideration for a small transportation center to compliment a potential local Mashpee circulator transit route may be desirable by the community in cooperation with the CCRTA. A small transportation center could provide a visible transfer point where the regional and local service intersects.



OTHER ALTERNATIVES

Improved stormwater management and treatment

Effective stormwater management has both road safety and environmental benefits. Removing water from the roadway surface is critical in reducing hazards such as hydroplaning, while the elimination of untreated stormwater discharge into groundwater and surface water sources is critical to the health of the area's natural environment. Stormwater BMPs should be implemented as standalone projects or whenever major upgrades to the roadway are planned. Given the location within a nitrogen-sensitive watershed in Popponesset Bay, stormwater improvements should utilize BMPs with the ability to remove nitrogen.

Improved vegetation management

While only relatively minor issues were noted in the field, it is important that vegetation near the roadway continue to be well maintained to avoid obstructing the sightlines of motorists. Tree limbs that extend towards the roadways, and hedges and shrubs near intersections, need to be periodically trimmed. This is particularly important in locations where obstructions may compromise drivers' ability to see pedestrians and bicyclists.



Speed management on Route 151

Vehicle speeds on Route 151 were consistently noted as an issue by members of the public. It has been consistently shown that simply changing the speed limit on a roadway does little to change vehicle speeds. The best way to reduce vehicle speeds is to change the character of the roadway. Features such as sidewalks and streets trees that visually narrow the roadways encourage lower speeds. Within the study area, it needs to be apparent to drivers they are entering a stretch of Route 151 distinctly different than the relatively high-speed sections to the west. The proposed improvements to the Route 151 corridor will assist in redefining the corridor with enhanced intersection treatments and additional multi-modal accommodations.



Recommendations and Next Steps

With the benefit of active participation by members of the community, a host of potential improvement options were developed for the corridor. Based on a technical review and feedback from a public review of the alternatives, these improvements options were refined and organized into the following sets of key short- and long-term recommendations. Four recommendations were prioritized as high-priority and are denoted in bold below. These recommendations relatively provide the greatest benefit for the Mashpee Rotary in relation to potential cost. In addition, these recommendations received strong community support during the public process.

SHORT TO MID-TERM RECOMMENDATIONS

- **Install shared use path around Mashpee Rotary (High Priority)**
- **Implement rotary retrofit improvements at Mashpee Rotary (High Priority)**
- **Install Route 28 directional signage on Donna's Lane for retail traffic (High Priority)**
- Construct right-turn lane on Donna's Lane at the Great Neck Road South intersection
- Implement lane designation striping on Job's Fishing Road at the Route 28 intersection
- Implement signage and striping improvements at the intersection Route 28 and Quinaquisset Avenue
- Implement signage and striping improvements at the intersection of Great Neck Road North and Old Barnstable Road

LONG-TERM RECOMMENDATIONS

- **Plan for multi-modal accommodations on Route 28 between Mashpee Rotary and Quinaquisset Avenue (High Priority)**
- Plan for a roundabout at Great Neck Road North and Old Barnstable Road
- Install eastbound left turn lane at Route 28 and Meetinghouse Road intersection
- Construct additional sidewalk and shared use paths to close network gaps
- Install pedestrian accommodations at Route 28 and Orchard Road traffic signal
- Plan for transit service enhancements with the CCRTA



Understanding that transportation and land use planning are inextricably linked, it may appropriate to refine or revise long-term recommendations as additional information about redevelopment activities in the area becomes available. The Cape Commission is available to discuss long-term recommendations with MassDOT, the Town, and other stakeholders in the area including the business community. Ultimately, major transportation investments should both benefit the travelling public and serve to support and enhance the vitality of the community.

NEXT STEPS

The next steps would focus on collaboration between the Town of Mashpee and MassDOT to prioritize implementation of the short-term improvements to improve safety of the Mashpee Rotary and the other study area intersections. Plans for long-term improvements can also be initiated to begin the planning process. Staff of the Cape Cod Commission are available to assist in these efforts. A future meeting between MassDOT, the Town and Commission staff will be set up in the near future to discuss next steps for implementation and funding strategies for the recommendations from this study.



CAPE COD COMMISSION

3225 MAIN STREET • P.O. BOX 226 • BARNSTABLE, MASSACHUSETTS 02630
(508) 362-3828 • Fax (508) 362-3136 • www.capecodcommission.org

