

# Old Colony Planning Council

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April 30, 2018

Ms. Valerie Massard, AICP, CFM  
Planning Director – Town of Duxbury  
878 Tremont Street  
Duxbury, MA. 02332

Dear Ms. Massard,

Per the Town's request, please find enclosed the final report for the traffic study for Saint George Street, Alden Street, and Railroad Avenue. This planning level study was prepared in response to a request from the Town for technical services under the Old Colony Metropolitan Planning Organization's Local Highway Planning Technical Assistance program. The final report contains the findings of the traffic study, including a summary of existing traffic conditions and recommendations for improving safety on Saint George Street, Alden Street, Railroad Avenue, and around the Duxbury Public Schools campus. Traffic data collected on these roadways and associated analysis reports are available upon request.

Should you have any questions or comments about this traffic study or its findings, or should the town require additional assistance through the Local Highway Technical Assistance program, please contact Bill McNulty or (508) 583-1833 ext. 207, or by e-mail at [wmcnulty@ocpcrpa.org](mailto:wmcnulty@ocpcrpa.org).

Sincerely,



Charles Kilmer, AICP  
Assistant Director / Transportation Program Manager

Cc:

Chief Matthew Clancy, Duxbury Police Department  
Mr. Rene J. Reed, Town Manager, Town of Duxbury

Mr. Peter Buttkus, Director, Duxbury Department of Public Works  
Mr. Paul Brogna, Chairperson, Duxbury Highway Safety Committee  
Mr. Theodore J. Flynn, Chairperson, Duxbury Board of Selectmen  
Ms. Mary-Joe Perry, District Highway Director, MassDOT District Five  
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Enclosures:

Final Report – Traffic Study for Saint George Street, Alden Street, and Railroad Avenue

# Traffic Study for Saint George Street, Alden Street, and Railroad Avenue Duxbury, Massachusetts

April 2018

Prepared By:  
Old Colony Planning Council  
70 School Street  
Brockton, MA. 02301



Saint George Street



Railroad Avenue

Prepared under MassDOT Contract #88826

## **Acknowledgements**

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The views and opinions of the Old Colony Planning Council expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

This Planning Level Traffic Study was prepared by the following members of the Old Colony Planning Council staff under the direction of Pat Ciaramella, Executive Director, and the supervision of Charles Kilmer, Assistant Director / Transportation Program Manager.

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## **Introduction and Executive Summary**

This planning level study was prepared in response to a request from the Town of Duxbury for technical services under the Old Colony Metropolitan Planning Organization's Local Highway Planning Technical Assistance program. The Town had requested traffic and safety study of Railroad Avenue and its intersections with Saint George Street and Alden Street. Please see Figure 1 for a locus map highlighting the study area.

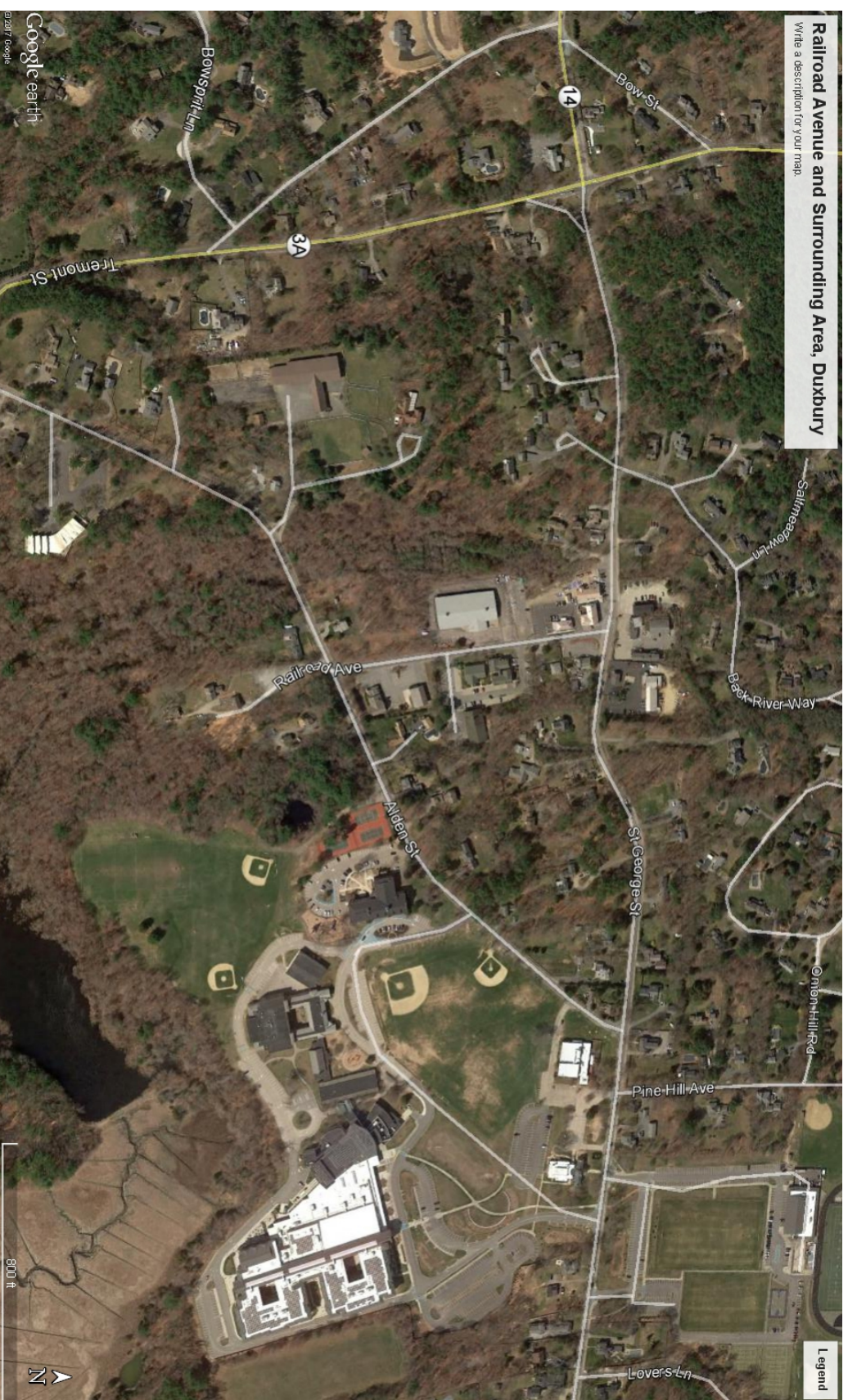
Development around the intersection of Saint George Street at Railroad Avenue features several small independently owned businesses located in a classic New England village commercial district, while the intersection of Alden Street at Railroad Avenue is located in primarily a low density residential area with a historic property directly opposite of Railroad Avenue. Saint George Street and Alden Street both serve as major connectors between Route 3A and the Duxbury Public Schools complex and Duxbury Beach area. While both intersections operate well and have low reported crash rates, opportunities have been identified for improving safety for motorists, pedestrians, and bicyclists in the area. This report summarizes existing conditions and those potential improvements that have been identified.

## **Study Purpose and Objective**

The purpose of this study was to conduct an assessment of existing conditions on Railroad Avenue and the surrounding area. The objective of conducting this study was to ultimately identify options for increasing mobility and improving safety for pedestrians and bicyclists in the area.



Figure 1: Study Area Locus Map



## Existing Conditions

Traffic counts on Saint George Street, Railroad Avenue, and Alden Street were conducted over two periods to determine both seasonal peak (combination of school traffic and summer recreational traffic) and off-season peak conditions. The time periods when data collection occurred were:

- June 5<sup>th</sup> to June 12<sup>th</sup>, 2017 (Weekdays and Weekend)
- September 11<sup>th</sup> to September 15<sup>th</sup>, 2017

In addition to traffic counts (using automated traffic recorders) on the mainline roadways, manual peak hour turning movement counts were also collected at the intersections of Saint George Street at Railroad Avenue and Alden Street at Railroad Avenue.

## Saint George Street

Saint George Street is a two lane roadway functionally classified as an Urban Minor Arterial and owned and maintained by the Town of Duxbury. The road provides a main connection between Routes 3A and 14 to Washington Street and the Duxbury Beach area. It serves a mix of residential, commercial, and municipal land uses. The Duxbury High School, Middle School, town library, and Percy Walker Pool are all located on Saint George Street. Within the study area, land use is primarily commercial, with the Millbrook Station development directly opposite of Railroad Avenue, and commercial properties on the other side of the street as well.

**Table 1: Saint George Street Existing Traffic**

Location	Average	Saturday	Sunday	Speed	85th %tile Speed		% heavy
	Weekday				Weekday	Weekend	
Volume	Volume	Volume	Limit	Weekday	Weekend		
Spring 2017							
St. George Street, east of Railroad Avenue	5,708	5,692	6,730	30 MPH	29 MPH	29 MPH	5.4%
St. George Street, west of Railroad Avenue	6,860	6,401	7,299	30 MPH	35 MPH	35 MPH	7.8%
Fall 2017							
St. George Street, east of Railroad Avenue	5,533			30 MPH	29 MPH		7.8%
St. George Street, west of Railroad Avenue	6,597			30 MPH	39 MPH		6.9%
Note: weather on Sunday, June 11th Sunny and 90's; Ideal beach weather							



## Railroad Avenue

Railroad Avenue is a relatively short (0.18 miles) two-lane roadway connecting Saint George Street to Alden Street. The roadway is a local roadway (not federally functionally classified) and is under the jurisdiction of the Town of Duxbury. Development along the roadway is commercial (mainly office space), and is also the location of the “Duxplex”, an athletic facility primarily serving children and teenagers. Railroad Avenue serves as a major pedestrian connection between the Duxbury school complex and businesses that attract high school and middle school students (a pizza shop, a bakery, and an ice cream shop) at the intersection of Railroad Avenue and Saint George Street. The data in Table 2 summarizes traffic conditions on Railroad Avenue in the Spring and Fall of 2017.

Table 2: Railroad Avenue Existing Traffic

Location	Average Weekday Volume	Saturday Volume	Sunday Volume	Speed Limit	85th %tile Speed		% heavy Vehicles
					Weekday	Weekend	
Spring 2017							
Railroad Avenue, south of St. George Street	1,625	1,044	808	30 MPH	30 MPH	30 MPH	7.4%
Railroad Avenue, north of Alden Street	1,509	975	746	30 MPH	29 MPH	30 MPH	8.1%
Fall 2017							
Railroad Avenue, south of St. George Street	1,439			30 MPH	29 MPH		6.4%
Railroad Avenue, north of Alden Street	1,330			30 MPH	29 MPH		9.9%
Note: weather on Sunday, June 11th Sunny and 90's; Ideal beach weather							

## Alden Street

Alden Street is a two-lane, local (not federally functionally classified) roadway that connects Tremont Street (Route 3A) to Saint George Street. It provides a significant connection between Route 3A and southern areas of Duxbury to the Duxbury Public Schools and Duxbury beach area. Development along the roadway is typically low density residential and historic (Alden House), and municipal with the Duxbury school complex at the western end of the Roadway at its intersection with Saint George Street. The western end of Alden Street between Railroad Avenue and Saint George Street serves a significant amount of pedestrian traffic, primarily with middle and high school students. Table 3 summarizes the traffic data collected along Alden Street in the Spring and Fall of 2017.

**Table 3: Alden Street Existing Traffic**

Location	Average Weekday Volume	Saturday Volume	Sunday Volume	Speed Limit	85th %tile Speed		% heavy Vehicles
					Weekday	Weekend	
Spring 2017							
Alden Street, east of Railroad Avenue	3,614	1,569	1,359	30 MPH	37 MPH	39 MPH	7.3%
Alden Street, west of Railroad Avenue	3,869	2,072	1,732	30 MPH	39 MPH	39 MPH	6.0%
Fall 2017							
Alden Street, east of Railroad Avenue	3,444			30 MPH	37 MPH		7.0%
Alden Street, west of Railroad Avenue	3,755			30 MPH	39 MPH		7.8%
Note: weather on Sunday, June 11th Sunny and 90's; Ideal beach weather							

### Intersection of Saint George Street at Railroad Avenue

The intersection of Saint George Street and Railroad Avenue is a three-legged intersection with STOP sign control on Railroad Avenue. A driveway to the Millbrook Station development opposite of Railroad Avenue functionally serves as a fourth leg to the intersection. While the driveway is un-signed, stop control is implied. The location of parking for the business in the 277-281 Saint George Street building and lack of curbing allows vehicles to make wide, high speed turns around rounding the corner from Saint George Street onto Railroad Avenue. Furthermore, the structure and parking on the southwest corner of the intersection restricts sight lines between Saint George Street and Railroad Avenue.



**Figure 2:** Village commercial district on Saint George Street at Railroad Avenue

The Duxbury Police Department did not have any records of crashes occurring at this intersection between June 1, 2014 and June 1, 2017, and as such the intersection has a very low crash rate of near zero.

Traffic volumes are vernaly light in the area, and the intersection operates well at most hours of the day. However, during the morning and afternoon peak demand hours, drivers exiting Railroad Avenue do experience some delay due to the volume and speed of traffic on Saint George Street limiting gaps in the traffic flow. The

intersection operates with a level of service grade of “E” (average delay of 36.4 seconds per vehicle on Railroad Avenue) during the morning peak hour and a level of service grade of “C” (average delay of 23.5 seconds per vehicle on Railroad Avenue) during the afternoon peak hour.

### **Intersection of Alden Street at Railroad Avenue**

The intersection of Alden Street and Railroad Avenue is a three-legged intersection with STOP sign control on Railroad Avenue. A driveway to the Alden House property is located opposite of Railroad Avenue however use of this property is only periodic and the driveway rarely factors into intersection operations.



Figure 3: Alden Street at Railroad Avenue

Duxbury Police Department records show one (1) crash occurring at this intersection between June 1, 2014 and June 1, 2017, resulting in a crash rate of 0.19 crashes per million entering vehicles, well below the MassDOT District Five regional average of 0.58 crashes per million entering vehicles.

Traffic volumes are vernaly light in the area, and the intersection operates well at most hours of the day. However, during the morning and afternoon peak demand hours, drivers exiting Railroad Avenue do

experience some delay. The intersection operates with a level of service grade of “C” (average delay of 16.7 seconds per vehicle on Railroad Avenue) during the morning peak hour and a level of service grade of “B” (average delay of 12.8 seconds per vehicle on Railroad Avenue) during the afternoon peak hour.

## **Potential Improvements**

### **Improvements to Intersection of Saint George Street at Railroad Avenue**

Reducing the total area of pavement coverage by using curbing to “square off” the intersection of Saint George Street at Railroad Avenue can improve safety for pedestrians, bicyclists, and motorists by forcing drivers to reduce speeds while making the turn from Saint George Street. The intersection is currently designed as such with open parking areas immediately located on the southwest corner in front of 277 Saint George Street. This large area of open asphalt

without curbing allows for vehicles to turn from Saint George Street onto Railroad Avenue at a high rate of speed. Additionally, the structure at 277 Saint George Street creates a blind turn where drivers making the right hand turn cannot see the receiving area on Railroad Avenue until they have completed the turn.

## Sidewalks

Sidewalks should be constructed along Alden Street, between Saint George Street and Railroad Avenue. This is one of the primary walking routes for students, parents, and faculty of the Duxbury school complex located at the intersection of Alden Street and Saint George Street. The businesses located on the intersection of Saint George Street and Railroad Avenue, particularly the pizza shop, bakery, and ice cream shop, are significant after-school trip generators, as is the Duxplex sports complex on Railroad Avenue.

Along with Alden Street, sidewalks should also be constructed on the entire length of Railroad Avenue, from Alden Street to Saint George Street. Doing so would create a complete safe pedestrian connection between the village commercial district at the intersection of Saint George Street at Railroad Avenue, the Duxplex, and the Duxbury school complex.

The sidewalk on Saint George Street in the area of Railroad Avenue could be improved with a wider, smoother surface to make more ADA accessible and with a higher curb reveal to enhance the separation between motorists and pedestrians. Furthermore, utility poles currently within the sidewalk network limit the capacity of the sidewalk and often creates a major obstacle for those using mobility assistance equipment or pushing strollers. There should be a long term vision and plan to relocate these utilities out of the sidewalk layout, or widen the sidewalks so the utility poles are less of an impediment.

## Crosswalks

The existing crosswalk at the intersection of Saint George Street at Railroad Avenue has pedestrians in a vulnerable position on the southern end of the crosswalk (Railroad Avenue side) as it's located in a spot not protected by sidewalks or curbing, where drivers are making right hand turns at a high rate of speed. Improving this intersection by squaring off the intersection by forming a 90 degree corner with curbing could improve this situation for pedestrians. Additionally, the crosswalk should be properly signed in compliance with the Manual of Uniform Traffic Control Devices (MUTCD). Finally, the crosswalk is currently non ADA accessible, with a curb on the northern end of crosswalk. Both sides of the crosswalk should have ADA accessible ramps with truncated domes.

Crosswalks should also be added to the intersection of Alden Street at Railroad Avenue. However, ideally, this would be done in conjunction with the addition of sidewalks as to provide a safe receiving area and passage way for pedestrians.

Using a traditional “Continental” style crosswalk (ladder type design) with white paint may be more visible to drivers than the current solid green painted crosswalks.

### **Safe Routes to School**

It is highly recommended that the Alden Elementary School and Duxbury Middle School remain active Safe Routes to School partners. Active participation with a robust education program increases awareness and safe habits within the students. Furthermore, active participation allows the Town to apply for engineering and infrastructure projects that could be used to improve pedestrian and bicycle infrastructure around the schools.

### **Traffic Calming and Complete Streets**

Traffic calming on Saint George Street, Railroad Avenue, and Alden Street could be accomplished by making the roadways “complete streets” with the addition of sidewalks and narrowing travel lanes to 10 or 11 feet with the use of white fog lines and / or curbing. While there may not be enough room within the existing layout for full bike lanes, sharrows and “Share the Road” signage could be installed to alert drivers to the presence of bicycles and in doing so further calm traffic.

### **Lighting**

Improving lighting along Saint George Street, Alden Street, and Railroad Avenue should be considered to improve visibility at night and improve safety.

### **Conclusion**

The recommended potential improvements for the study area outline in this Study reflect best planning and engineering practices that are applicable to Saint George Street, Railroad Avenue, and Alden Street and are context sensitive to the surrounding neighborhoods and land uses. All roadways featured in this traffic study are under the jurisdiction of the Town of Duxbury, and therefore it is the Town’s responsibility to use their discretion in selecting improvements to pursue for the area and initiate. While some improvements are relatively low cost and can be implemented in the short term (signage improvements, crosswalks, etc.), other improvements (sidewalks, lighting, utility poles) are larger scale improvements that will require planning, engineering, and significant capital investment.

Should the Town have questions about the contents of this traffic study, or require additional assistance through the Old Colony Metropolitan Planning Organization, please connect Bill McNulty at (508) 583-1833 x207 or [wmcnulty@ocpcrpa.org](mailto:wmcnulty@ocpcrpa.org).