

Nantucket, Massachusetts  
Surfside Crossing 40B  
*3-9 South Shore Road*  
*September 2018*

## TRAFFIC IMPACT AND ACCESS STUDY

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*3-9 South Shore Road*  
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Prepared by: BETA GROUP, INC.  
Prepared for: Town of Nantucket

September 2018

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## EXECUTIVE SUMMARY

A Traffic Impact Study has been prepared by BETA Group, Inc. to evaluate the potential transportation impacts of the proposed 40B housing project at 3-9 South Shore Road in Nantucket, Massachusetts. The project site consists of approximately 13.6 +/- acres of undeveloped land on the west side of South Shore Road, south of Surfside Road. The project includes three site driveways on South Shore Road. Figure 1 shows the project site location. The proposed project includes 60 single-family homes and 96 condominium units.

The following summarizes the findings of the study:

- The Town of Nantucket collected traffic data on select study roadways and intersections in June and August, 2018, respectively. BETA Group conducted new traffic, pedestrian, bicycle and scooter AM and PM peak period volume counts on Thursday August 2, 2018 at the following study area intersections:
  1. South Shore Road/Fairgrounds Road/Surfside Road;
  2. Fairgrounds Road/Ticcoma Way;
  3. Fairgrounds Road/Newtown Road/Public Safety Building Driveway
  4. Fairgrounds Road/Old South Road;
  5. Old South Road/Planning Building Driveway;
  6. Old South Road/Amelia Drive;
  7. Ticcoma Way/Amelia Drive;
  8. Old South Road/Orange Street/Sparks Avenue/Milestone Road;
  9. Sparks Avenue/Hooper Farm Road/Lower Pleasant Street;
  10. Surfside Road/Atlantic Avenue/Sparks Avenue/South Prospect Street;
  11. Surfside Road/Bartlett Road;
  12. Surfside Road/Surfside Drive/Miacomet Road
- Old South Road, south of Fairgrounds Road has an average daily traffic (ADT) volume of approximately 16,600 vehicles. South Shore Road, south of Surfside Road has an average daily traffic volume of approximately 3,100 vehicles. Old South Road carries the highest peak hour volumes in the study area with 1,295 vehicles in the AM peak hour and 1,430 vehicles in the PM peak hour. South Shore Road has 229 vehicles in the AM peak hour and 252 vehicles in the PM peak hour.
- The intersection of Surfside Road/Bartlett Road had the highest number of pedestrian crossings with 108 during the AM peak hour. The highest peak hour bicycle volumes occurred on the Surfside Road Bike Path between South Shore Road and Bartlett Road (40 to 71 AM; 95 to 109 PM).
- The intersections of Fairgrounds Road/Old South Road and Surfside Road/Surfside Drive/Miacomet Road fall within MassDOT Highway Safety Improvement Program Crash Clusters for 2013-2015. The Sparks Avenue/Hooper Farm Road/Lower Pleasant Street roundabout falls within a bicycle cluster for 2006-2015.
- The highest number of crashes between 2012 and 2016 occurred at Old South Road/Orange Street/Sparks Avenue/Milestone Road (16), Fairgrounds Road/Old South Road (15), and Surfside

Road/Surfside Drive/Miacomet Road (12). The intersection of Old South Road/Orange Street/Sparks Avenue/Milestone Road had three pedestrian/bicycle crashes and one moped crash between 2012 and 2016. Surfside Road/Bartlett Road had two pedestrian/bicycle crashes in the study period.

- The Nantucket Regional Transit Authority (NRTA) provides three bus routes within walking distance of the project site: Surfside Beach Route, Miacomet Loop and Mid-Island Loop. Prior to 2018, all three routes provided only seasonal service. In 2018, the Miacomet and Mid-Island Loop routes were expanded to year round service.
- The following five study intersections operate with at least one movement at Level of Service (LOS) F for Existing Conditions in both the AM and PM peak hour:
  - Fairgrounds Road/Old South Road
  - Old South Road/Amelia Drive
  - Orange Street/Milestone Road/Old South Road/Sparks Avenue
  - Surfside Road/Bartlett Road
  - Surfside Road/Miacomet Road/Surfside Drive
- The existing 2018 peak hour traffic volumes were increased by a factor of 1.072 (1.0% compounded over 7 years) to represent background traffic growth in 2025. Peak hour trips generated from the Richmond Great Point Development and Ticcoma Green projects were added to the background growth to create the 2025 No-Build traffic volumes.
- At least one intersection movement will deteriorate to LOS F under No-Build conditions (assuming existing intersection geometrics) at the following intersections:
  - South Shore Road/Fairgrounds Road/Surfside Road: PM
  - Fairgrounds Road/Ticcoma Way : AM/PM
  - Fairgrounds Road/Newtown Road/Public Safety Driveway: AM
  - Fairgrounds Road/Old South Road: PM
  - Old South Road/Planning Dept. Driveway: AM/PM
  - Orange Street/Milestone Road/Old South Road/Sparks Avenue: AM
  - Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue: PM
  - Surfside Road/Miacomet Road/Surfside Drive: AM
- The project is estimated to generate 1,352 vehicle trips on a weekday with 93 (23 In/70 Out) vehicle trips in the morning peak hour and 120 (76 In/44 Out) vehicle trips in the PM peak hour. The proposed project would increase traffic volume (over 2025 No-Build conditions) on South Shore Road west of Surfside Road by 37% (93 vehicles) in the AM peak hour and 43% (120 vehicles) in the PM peak hour.
- The addition of project-generated vehicles to the roadway network will cause at least one intersection movement to deteriorate to LOS F under Build conditions at the following locations:
  - South Shore Road/Fairgrounds Road/Surfside Road: AM/PM
  - Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue: AM

- Future single lane roundabouts are proposed by the Town at three locations: Fairgrounds Road/Old South Road; Surfside Road/Sparks Avenue/Atlantic Avenue/South Prospect Street; and Surfside Road/Bartlett Road. An upgraded two-lane hybrid roundabout design is proposed at the Old South Road/Milestone Road/Orange Street/Sparks Avenue roundabout. Analysis results show that three locations will operate at LOS D or better in the No-Build and Build conditions in AM and PM peak hours. The intersection movements at Fairgrounds Road/Old South Road will operate at LOS D or better in the AM peak hour and at LOS E and F in the PM peak hour for the No-Build and Build conditions.
- A sensitivity analysis was performed for the intersection of South Shore Road/Fairgrounds Road/Surfside Road assuming a 25% reduction and a 50% reduction in dwelling units and project generated trips. The 25% reduction in project trips was found to represent approximately 10% reduction in vehicle delay for approaches operating at LOS F in both peak hours. The 50% reduction in project trips reduced the delay of these approaches by approximately 20% in both peak hours. While these LOS F approaches decreased in delay, they do not improve to LOS E operating conditions experienced in the 2025 No-Build.

- The following measures are recommended to improve transportation conditions in the study area:
  1. Consider a roundabout at the intersection of South Shore Road/Fairgrounds Road/Surfside Road

The following movements at this intersection will deteriorate to LOS F conditions in the Build condition as a result of project generated traffic:

- Surfside Rd SB AM: LOS E 45 seconds No-Build; LOS F 78 seconds Build
- Surfside Rd SB PM: LOS F 88 seconds No-Build; LOS F 157 seconds Build
- Surfside Rd NB PM: LOS E 45 seconds No-Build; LOS F 66 seconds Build
- Fairgrounds Rd SB PM: LOS E 48 seconds No-Build; LOS F 87 seconds Build

This intersection was evaluated for the Build conditions assuming a single-lane roundabout geometry. As a roundabout, the intersection would operate at LOS A in the AM peak hour and LOS A in the PM peak hour for the Build condition.

It is also recommended that consideration be given to relocate the NRTA bus stop on the Fairgrounds Road westbound approach of the intersection to the Surfside Road southbound departure lane.

2. Consider safety and capacity improvements at the intersection of Surfside Road/Miacomet Road/Surfside Drive

This intersection has experienced 12 crashes including one pedestrian/bicycle crash between 2012 and 2016, falls within a MassDOT HSIP Crash Cluster (2013-2015), and experiences high pedestrian and bicycle volumes. Motorists on Miacomet Road must edge into the Surfside Bike Path to see oncoming traffic on Surfside Road. The eastbound and westbound approaches at the intersection operate at LOS F for both peak hours for the No-Build and Build conditions. Consider providing better separation between the Miacomet Road Stop bar and the Bike Path and intersection capacity improvements such as a roundabout in the long-term.

3. Consider eliminating one project site access driveways on South Shore Road

Two driveways are not needed to serve the traffic generated by the single-family homes portion of the site. Consideration should be given to eliminating one of the access driveways.

#### 4. Address Pedestrian Accessibility Concerns

Sidewalks are proposed on the north side of South Shore Road between the three proposed site driveways. Consideration should be given to extending the sidewalk east to the intersection of with Surfside Road and Fairgrounds Road.

Each of the two new proposed crosswalks on South Shore Road should include handicap ramps, detectable warning panels, MUTCD pedestrian crosswalk signs and advance crosswalk signs and Stop signs for the South Shore Bike path northbound approach to South Shore Road.

There are sidewalks provided within the site to all residential units. However, there are no pedestrian connections provided between the condominium units and the single-family homes on-site or to adjacent developments. Consideration should be given to utilizing the sewer easement to provide pedestrian facilities to connect:

- The condominium units with the single-family homes on-site;
- The north end of the site with the Nanina Drive development to the north; and
- The south end of the site with the Wherowhero Lane development to the south

#### 5. Address Site Circulation and Parking Concerns

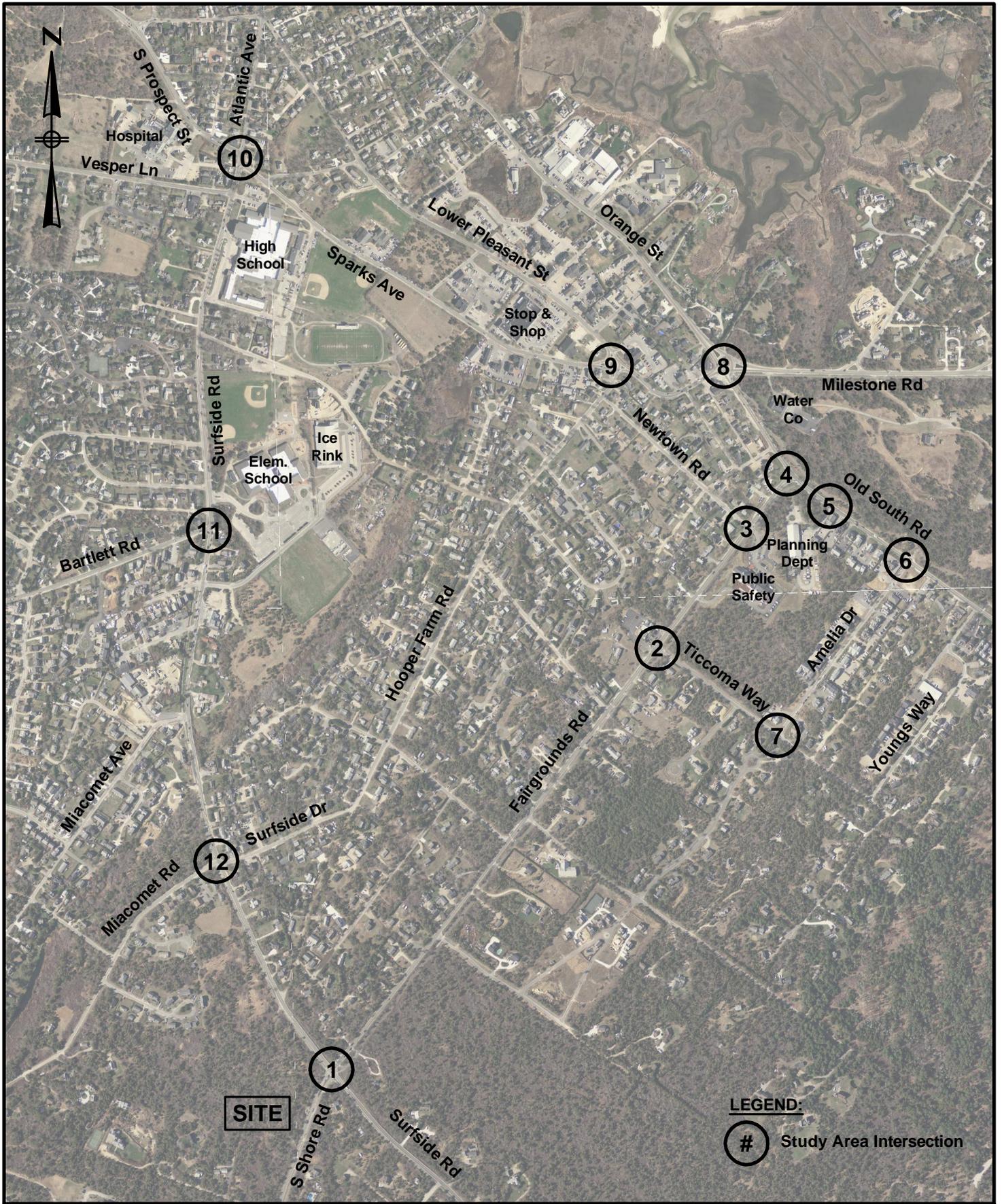
- There is no Stop control indicated on the three project site driveways on South Shore Road. Stop signs should be installed at the project site driveway approaches to South Shore Road.
- The Town should determine if the proposed tandem parking spaces and separation between spaces at adjacent single-family homes is acceptable.
- The project proponent should indicate if the Town's Standards are met for parking aisle width (12 feet) and parking space dimensions (not less than nine feet wide by 20 feet in length) for the condominium parking area. The project proponent should indicate if the proposed screening of parking for the condominiums meets the Town's Zoning Regulations.
- The project internal roadways serving the single-family homes are 20 or 24 feet wide. No on-street parking is indicated on the roadways serving the single-family homes. The proposed width of the internal roadways would not be adequate to allow on-street parking on both sides. Backing out of driveways with vehicles parked on-street may be difficult. The project proponent should identify the intended use for on-street parking on-site and obtain approval by the Nantucket Fire Department.
- There is a hammer-head type parking area that serves three single-family houses in the northwest corner of the project site. The Nantucket Fire Department should indicate if this area provides adequate emergency access, even when the spaces are occupied.

## 1.0 INTRODUCTION

BETA Group, Inc. (BETA) on behalf of the Town of Nantucket has prepared a traffic impact and access study for the proposed 40B residential development at 3-9 South Shore Road in Nantucket, Massachusetts. This study includes a review of the existing traffic and roadway conditions, forecasts background traffic growth within the study area, estimates the additional traffic generated by the proposed project, and estimates the potential impact of the project on the transportation network. This study was conducted in accordance with local, state and industry standards. The scope of work for this project was developed with input from Town of Nantucket staff.

The project site at 3-9 South Shore Road consists of approximately 13.6 +/- acres of undeveloped land on the south side of South Shore Road. The proposed project includes 60 single-family homes and 96 condominium units. The project includes three site driveways on South Shore Road.

Figure 1 shows the project site location in relation to the study area roadways and intersections.



**LEGEND:**

# Study Area Intersection



Figure No. 1  
**Locus Map**

## 2.0 EXISTING CONDITIONS

This section summarizes the existing transportation infrastructure and operating conditions in the project study area and includes the following:

- Study roadways and intersections;
- Traffic, pedestrian, bicycle and scooter volumes;
- Crash history; and
- Public transportation.

### 2.1 STUDY AREA

BETA staff conducted inventories in the study area to record existing roadway geometry, traffic control devices, pedestrian and bicycle facilities and general observations of roadway operating characteristics.

The main study roadways include the following:

- South Shore Road;
- Fairgrounds Road;
- Surfside Road;
- Old South Road;
- Sparks Avenue; and
- Hooper Farm Road.

The study focused on 12 study area intersections, shown in Figure 1 and listed below:

1. South Shore Road/Fairgrounds Road/Surfside Road;
2. Fairgrounds Road/Ticcoma Way;
3. Fairgrounds Road/Newtown Road/Public Safety Building Driveway
4. Fairgrounds Road/Old South Road;
5. Old South Road/Planning Building Driveway;
6. Old South Road/Amelia Drive;
7. Ticcoma Way/Amelia Drive;
8. Old South Road/Orange Street/Sparks Avenue/Milestone Road;
9. Sparks Avenue/Hooper Farm Road/Lower Pleasant Street;
10. Surfside Road/Atlantic Avenue/Sparks Avenue/South Prospect Street;
11. Surfside Road/Bartlett Road;
12. Surfside Road/Surfside Drive/Miacomet Road

#### 2.1.1 STUDY AREA ROADWAYS

##### South Shore Road

South Shore Road is a north-south two-lane local roadway connecting South Shore Wastewater Treatment Plant on the south with Surfside Road on the north. North of Surfside Road, South Shore Road becomes Fairgrounds Road. The South Shore Bike Path is separated from the roadway on the east side. The posted speed limit is 30 miles per hour (MPH). Adjacent land use is primarily residential with

equestrian uses towards the southern end of the roadway. The roadway is posted with “Equestrian XING” signage.

*For the purposes of this study, South Shore Road will be analyzed as a west-east roadway.*



Photo 1 : South Shore Road (Looking South)

#### Fairgrounds Road

Fairgrounds Road connects Surfside Road on the south with Old South Road on the north. It is a two lane local road that runs primarily north-south. South of Surfside Road, it becomes South Shore Road. The Fairgrounds Road Bike Path is separated from the roadway on the east side. The posted speed limit is 30 MPH. Adjacent land use is primarily residential with commercial use on the west side and civic use on the east side. Bus stops are generally provided along Fairgrounds Road for the Miacomet Loop and Surfside Beach routes.

*For the purposes of this study, Fairgrounds Road will be analyzed as a west-east roadway.*

#### Surfside Road

Surfside Road is a two lane local road that generally runs north-south and connects Western Avenue on the south with South Prospect Street on the north. North of South Prospect Street it becomes Atlantic Avenue. The separated Surfside Bike Path is located along the west side of Surfside Road within the study area. The bike path begins at Vesper Lane and travels southward. Sidewalks are provided on the east side of the roadway in the vicinity of the Nantucket High School and the Nantucket Elementary School. Sidewalk is also provided on the west side of the roadway north of Vesper Lane to South Prospect Street. A 20 MPH school speed limit is posted along the northern end of Surfside Road. Outside of the school area, Surfside Road is posted with a 35 MPH speed limit. Bus stops for the Mid Island Loop are generally located along the west side of the roadway, while stops for the Miacomet Loop are located along the east side of the roadway.



### Old South Road

Old South Road runs generally east-west and connects the Nantucket Airport on the east with the Sparks Avenue, Orange Street and Milestone Road rotary on the west. It is a two-lane local roadway with the separated Old South Road Bike Path located on the north side. The posted speed limit is 35 MPH and the adjacent land use is residential and commercial. Sidewalks are generally not provided within the study area, though rutted grass paths are located on the southern side of the roadway. Bus stops are generally provided on both sides for the Airport and Sconset via Old South routes.



*For the purposes of this study, Old South Road will be analyzed as a north-south roadway.*

### Sparks Avenue

Sparks Avenue is a two-lane local roadway that generally runs west-east and bends approximately 90 degrees between the two study area roundabouts. It connects Old South Road, Orange Street and Milestone Road on the east with Surfside Road on the west. It has a sidewalk on the south side for its entire length and also for a short section on the north side west of Hooper Farm Road. Between the two roundabouts Sparks Avenue is posted for 25 MPH. Commercial uses are located along the northern side of Sparks Avenue with educational uses along the southern side, west of Hooper Farm Road. In the area of the schools, Sparks Avenue is posted for 20 MPH school zone speed limits.

### Hooper Farm Road

Hooper Farm Road is north-south, two-lane local roadway that runs between Sparks Avenue on the north and Surfside Road on the south. The roadway is posted with a 30 MPH speed limit. Sidewalk and bus stops are generally provided on the east side of the roadway for the Mid Island Loop route.

## 2.1.2 STUDY AREA INTERSECTIONS

Each of the study area intersections are described below. A brief summary is provided in Table 1.

### South Shore Road/Fairgrounds Road/Surfside Road

South Shore Road/Fairgrounds Road/Surfside Road is a four-way All-Way Stop controlled intersection. All approaches have one general purpose lane. There are crosswalks on all legs except the northern Surfside Road leg. The South Shore Road-Fairgrounds Road Bike Path crosses the south Surfside Road leg. The Surfside Road Bike Path crosses the South Shore Road west leg. A large parking area with a bike rack is provided on the southwest corner of the intersection. Nantucket Regional Transit Authority (NRTA) bus stops are located on each side of Fairgrounds Road east of Surfside Road. Intersection Ahead and Stop Ahead warning signage are provided approaching the intersection.

### Fairgrounds Road/Ticcoma Way

Ticcoma Way is a Stop controlled local roadway that intersects Fairgrounds Road from the south. A restaurant driveway is provided opposite Ticcoma Way. There is one crosswalk on the Fairgrounds Road

east leg. The Fairgrounds Road Bike Path crosses Ticcoma Way to the south of Fairgrounds Road. Small stop signs are provided for bicycles at the bike path crossing. All approaches have one general purpose lane, although Ticcoma Way flares out at the intersection. There is a NRTA bus stop on each side of Fairgrounds Road east of Ticcoma Way.

#### Fairgrounds Road/Newtown Road/Public Safety Building Driveway

This is a four-way unsignalized intersection with Stop control on Newtown Road and the Public Safety Building driveway. There are also two Stop signs for the Fairground Road Bike Path to cross Fairgrounds Road. There is one crosswalk on the Fairgrounds Road north leg. All approaches have one general purpose lane. There is a NRTA bus stop on the Fairground Road southbound approach.

#### Fairgrounds Road/Old South Road

This is an unsignalized T-intersection with Stop control on the minor Fairgrounds Road approach. There is one crosswalk on the southern leg of Old South Road at the Fairgrounds Road Bike Path. The Fairgrounds Road Bike Path is also Stop controlled. The Old South Road approaches are one lane in each direction. The Fairgrounds Road approach flares out at the intersection to provide separate left- and right-turn lanes for two vehicle lengths. The Old South Road Bike Path runs parallel to the east of Old South Road separated by vegetation and trees.

#### Old South Road/Planning Department Driveway

This is an unsignalized T-intersection with the Planning Department Driveway forming the stem of the T as the minor approach. There is no Stop sign or Stop bar on the Planning Department Driveway approach. Sidewalks and crosswalks are not provided at the intersection. All approaches have one general purpose lane. The Old South Road Bike Path runs parallel to the east of Old South Road separated by vegetation and trees.

#### Old South Road/Amelia Drive

Old South Road/Amelia Drive is an unsignalized T-intersection with Amelia Drive being the minor approach. On the east side, there is a horseshoe-shaped pullout that Nantucket Regional Transit Authority buses use to serve the bus stop. The pullout also provides a connection between Old South Road and the Old South Road Bike Path located to the east. An additional bus pull out is located to the south on the west side of the roadway. There are no Stop signs or bars at the T-intersection, although it is evident from the geometry that motorists on Old South Road have the right-of-way and motorists on Amelia Drive must stop before entering the intersection. There is a crosswalk on the northern leg of Old South Road. All approaches have one general purpose lane.

#### Ticcoma Way/Amelia Drive

Amelia Drive intersects Ticcoma Way from the east to form an unsignalized T-Intersection. Amelia Drive is Stop sign controlled and provides "BIKE XING" warning signage. A bike path outlet is provided opposite Amelia Drive. Sidewalks are provided along both sides of Amelia Drive and the east side of Ticcoma Way, though no crosswalks are provided at the intersection. The bike path outlet provides a direct connection to Seikinnow Place, a cul-de-sac to the south.

#### Old South Road/Orange Street/Sparks Avenue/Milestone Road

This is a four-way unsignalized roundabout intersection, known as the James Coffin Memorial Rotary. Orange Street is Yield controlled and provides a shared through/right turn lane and a dedicated left turn

lane (approximately 120 feet long). Sparks Avenue is *Stop controlled*<sup>1</sup> and provides one general purpose lane. Old South Road is Yield controlled and provides one general purpose lane. Milestone Road is Yield controlled and provides one shared through/left lane and one dedicated right turn lane. Each leg provides one general purpose receiving lane separated from approach lanes by splitter islands. Crosswalks are provided for each leg of the roundabout, except across Orange Street. The Old South Road and Sconset Bike Paths begin/terminate at the southeast corner of the roundabout. The bike paths have Stop control to cross Old South Road. Sidewalk is provided on the west side of Orange Street and south side of Sparks Avenue. There is a NRTA bus stop on the Old South Road southbound departure lane, Sparks Avenue eastbound approach, and Milestone Road departure lanes.

#### Sparks Avenue/Hooper Farm Road/Lower Pleasant Street

This is a four-way unsignalized roundabout intersection. Each of the four legs provides one Yield controlled general purpose travel lane and one departure lane separated by splitter islands. Vehicles turning from closely spaced driveways on Lower Pleasant Street and Hooper Farm Road have damaged the noses of splitter islands on these approaches. Crosswalks are provided for each leg of the roundabout. There are sidewalks on all four legs of the intersection. There is a NRTA bus stop on the Sparks Avenue departure lane.

#### Surfside Road/Atlantic Avenue/Sparks Avenue/South Prospect Street

This is an off-set four-legged All-Way Stop controlled unsignalized intersection referred to as Four Corners. There is one crosswalk on the Sparks Avenue leg. Sidewalks are provided on both sides of Surfside Road and Sparks Avenue, the east side of Atlantic Avenue, and the south side of South Prospect Street. There are worn paths on the west side of Atlantic Avenue and north side of South Prospect Street. An additional worn desire path cuts the southeast corner of the intersection between Williams Lane and Vesper Lane. All approaches have one general purpose travel lane. There is a 20 MPH School Zone sign on the Surfside Road southbound departure lane and approaching the intersection from Sparks Avenue. There is a NRTA bus stop on the Atlantic Avenue southbound approach.

#### Surfside Road/Bartlett Road

Surfside Road/Bartlett Road is an unsignalized T-intersection with Stop control on the minor Bartlett Road approach. The east leg of the intersection has an unpaved driveway for the house at 32 Surfside Road which is uncontrolled. There is a crosswalk on Bartlett Road that connects to both sides of the Surfside Bike Path which runs parallel to Surfside Road. The Miacomet Bike Path begins/ends at the southwest corner of the intersection and travels along the southern side of Bartlett Road. There are Stop signs on both Surfside Bike Path approaches to Bartlett Road. The southwest corner of the intersection is guarded by several short wooden utility poles resembling bollards.

#### Surfside Road/Surfside Drive/Miacomet Road

This is an off-set four-way unsignalized intersection with Stop control on the Surfside Drive and Miacomet Road approaches. There is a crosswalk on the southern Surfside Road leg. The Surfside Road Bike Path runs along the west side of the intersection and has Stop signs on both approaches to Miacomet Road. There is a NRTA bus stop on the northbound Surfside Road approach and departure lanes.

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<sup>1</sup> Due to computer program limitations, this approach was analyzed as Yield Controlled.

Table 1: Intersection Summary

Study Intersection		Municipality / Jurisdiction	Intersection Control	Pedestrian/Bicycle Accommodations
1	Surfside Road/Fairgrounds Road/ South Shore Road	Nantucket	Unsignalized	Crosswalks: West, South, East Bike Path: West and South
2	Fairgrounds Road/Ticcoma Way	Nantucket	Unsignalized	Crosswalks: South, East Bike Path: South Side
3	Fairgrounds Road/Newtown Road/ Public Safety Building Driveway	Nantucket	Unsignalized	Crosswalks: East Bike Path: South Side
4	Fairgrounds Road/Old South Road	Nantucket	Unsignalized	Crosswalks: South Bike Path: South and East Side
5	Old South Road/Planning Department Driveway	Nantucket	Unsignalized	Crosswalks: None Bike Path: East Side
6	Old South Road/Amelia Drive	Nantucket	Unsignalized	Crosswalks: North Bike Path: East Side
7	Ticcoma Way/Amelia Drive	Nantucket	Unsignalized	Crosswalks: None Bike Path: Entry on South Side
8	Old South Road/Orange Street/ Sparks Avenue/Milestone Road	Nantucket	Roundabout	Crosswalks: West, South, East Bike Path: Southeast Corner
9	Sparks Avenue/Hooper Farm Road/ Lower Pleasant Street	Nantucket	Roundabout	Crosswalks: All Legs Bike Path: None
10	Surfside Road/Atlantic Avenue/ Sparks Avenue/S. Prospect Street	Nantucket	Unsignalized	Crosswalks: East Bike Path: None
11	Surfside Road/Bartlett Road	Nantucket	Unsignalized	Crosswalks: West Bike Path: West Side
12	Surfside Road/Surfside Drive/ Miacomet Road	Nantucket	Unsignalized	Crosswalks: South Bike Path: West Side

## 2.2 TRAFFIC, PEDESTRIAN, BICYCLE AND SCOOTER VOLUMES

Traffic volume data were collected to assess the operational characteristics within the study area. Traffic, pedestrian, bicycle and scooter volumes are discussed below.

### 2.2.1 TRAFFIC VOLUME

Automatic Traffic Recorders (ATRs) were deployed by the Town of Nantucket for seven consecutive days beginning on Monday, August 6, 2018 on three study area roadways: South Shore Road, Fairgrounds Road, and Old South Road. The ATR collected hourly traffic volumes in both directions. Table 2 summarizes the Weekday Average Daily Traffic (ADT), in vehicles per day, for each of the three roadways. Also listed in the table is the “K” Factor, which represents the percentage of the ADT that occurs during the peak hour. Consistent with the turning movement count data, Old South Road has the highest ADT among the data collected at 16,600 vehicles per day. The PM peak hour volumes are higher than the AM peak hour volumes on each study roadway. The K Factor for each roadway ranges between seven and nine percent, which is typical for roadways of this type. Raw traffic counts are provided in the Appendix.

The Town of Nantucket conducted intersection turning movement and classification counts on Wednesday, June 13 and Thursday, June 14, 2018 between 7:00 and 9:00 AM and 2:00 and 6:00 PM at the following three study intersections:

- 4. Fairgrounds Road/Old South Road
- 10. Surfside Road/Atlantic Avenue/Sparks Avenue/South Prospect Street
- 11. Surfside Road/Bartlett Road

BETA collected intersection turning movement and classification counts at the remaining nine study intersections on Thursday, August 2, 2018 between 7:30 and 9:30 AM and 4:00 and 6:00 PM. Scooter volumes were recorded in addition to autos, trucks/buses, pedestrians and bicycles. The peak hour volumes (highest individual intersection volumes) for each intersection were used and balanced upward to represent existing condition volumes at the study intersections. The balancing smoothed out volume differences between study intersections that may be due to different count dates and peak hours. The overall composite peak hours were generally 7:15 to 8:15 AM and 4:45 to 5:45PM.

Table 2 summarizes AM and PM peak hour roadway traffic volumes on the main study area roadways. The table shows that Old South Road carries the highest peak hour volumes in the study area with 1,295 vehicles in the AM peak hour and 1,430 vehicles in the PM peak hour. South Shore Road carries the fewest vehicles with 229 vehicles in the AM peak hour and 252 vehicles in the PM peak hour. Peak hour volumes on the other study roadways range between 692 and 1,133 vehicles. The data show that the peak direction flow is northbound in the AM peak hour (towards downtown) and reverses to southbound in the PM peak hour.

Table 2: Existing (2018) Roadway Traffic Volumes

Location	Weekday ADT <sup>3</sup>	AM Peak Hour				PM Peak Hour			
		EB/NB	WB/SB	Total	K	EB/NB	WB/SB	Total	K
South Shore Road w/o Surfside Road <sup>1</sup>	3,100	138 60%	91 40%	229	7%	106 42%	146 58%	252	8%
Fairgrounds Road w/o Old South Road <sup>2</sup>	9,600	403 58%	293 42%	696	7%	330 46%	392 54%	722	8%
Surfside Road s/o Sparks Avenue <sup>1</sup>	-	440 58%	325 42%	765	-	403 42%	557 58%	960	-
Old South Road s/o Fairgrounds Road <sup>2</sup>	16,600	653 50%	642 50%	1,295	8%	815 57%	615 43%	1,430	9%
Sparks Avenue w/o Old South Road <sup>1</sup>	-	493 50%	490 50%	983	-	625 55%	508 45%	1,133	-
Hooper Farm Road s/o Sparks Avenue <sup>1</sup>	-	452 65%	240 35%	692	-	368 45%	448 55%	816	-

<sup>1</sup> TMC conducted by BETA Group, Inc. on Thursday, August 2, 2018 from 7:30 to 9:30 AM and 4:00 to 6:00 PM

<sup>2</sup> TMC conducted by Town of Nantucket on Wednesday, June 13 and Thursday, June 14, 2018 from 7:00 to 9:00 AM and 2:00 to 6:00 PM

<sup>3</sup> ATR Conducted by the Town of Nantucket on the week of August 6, 2018.

### 2.2.1.1 SEASONAL VARIATION

Intersection traffic turning movement counts were conducted at the study intersections during June (three locations) and August (nine locations) in 2018. Town staff indicated that the summer period between June and September typically experiences the highest traffic volumes on the island. For this reason, no seasonal adjustments were made to the 2018 traffic volume data. However, peak hour approach and departure traffic volumes between study intersections were balanced upward to reduce volume differences due to different count dates and peak hours.

The Existing 2018 AM and PM peak hour vehicle turning movements at study intersections are shown in Figure 2 and Figure 3, respectively. Raw traffic counts are provided in the Appendix.

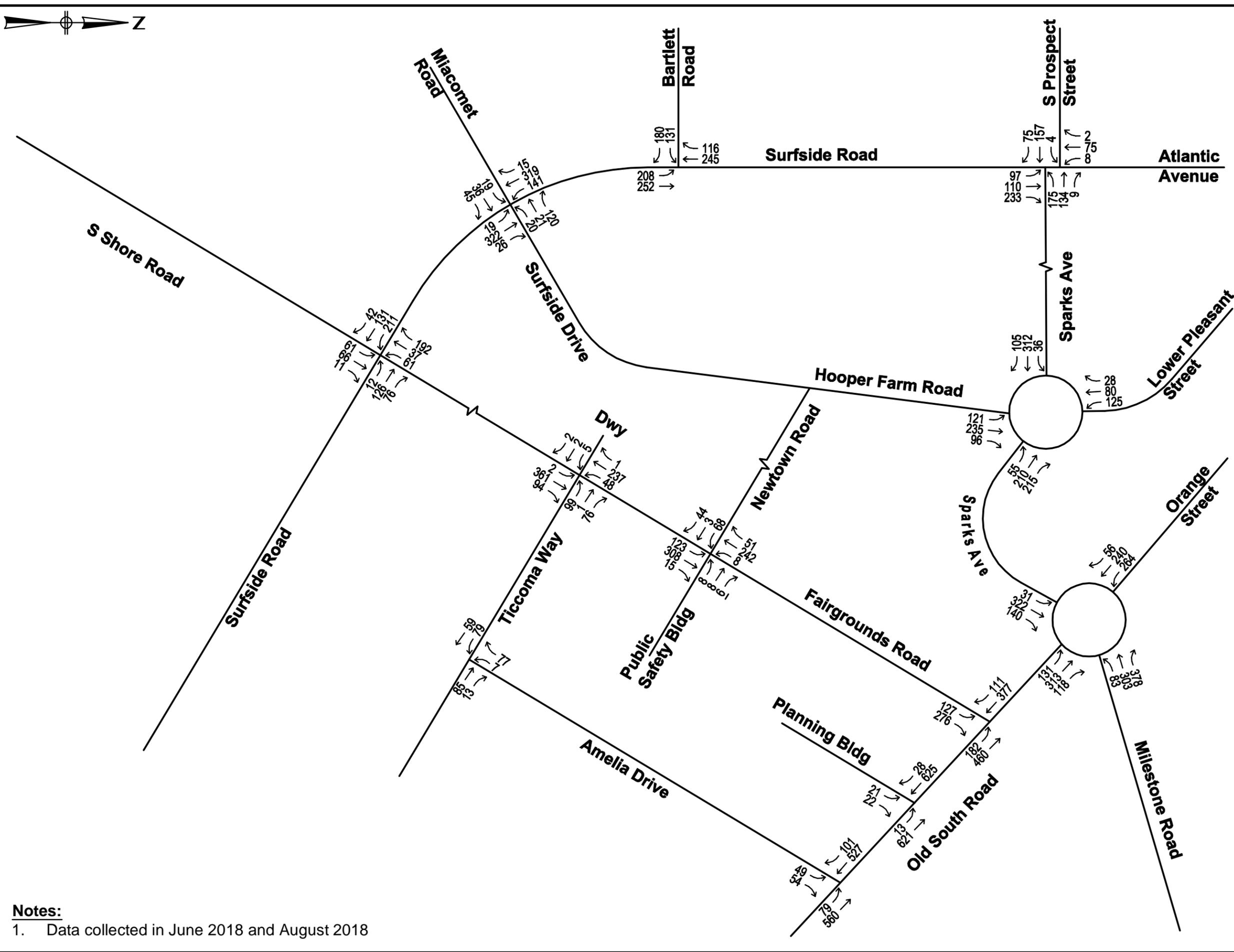


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## Surfside Crossing

Nantucket, MA

Scale: NTS

Figure No. 2

# 2018 AM Traffic Volumes

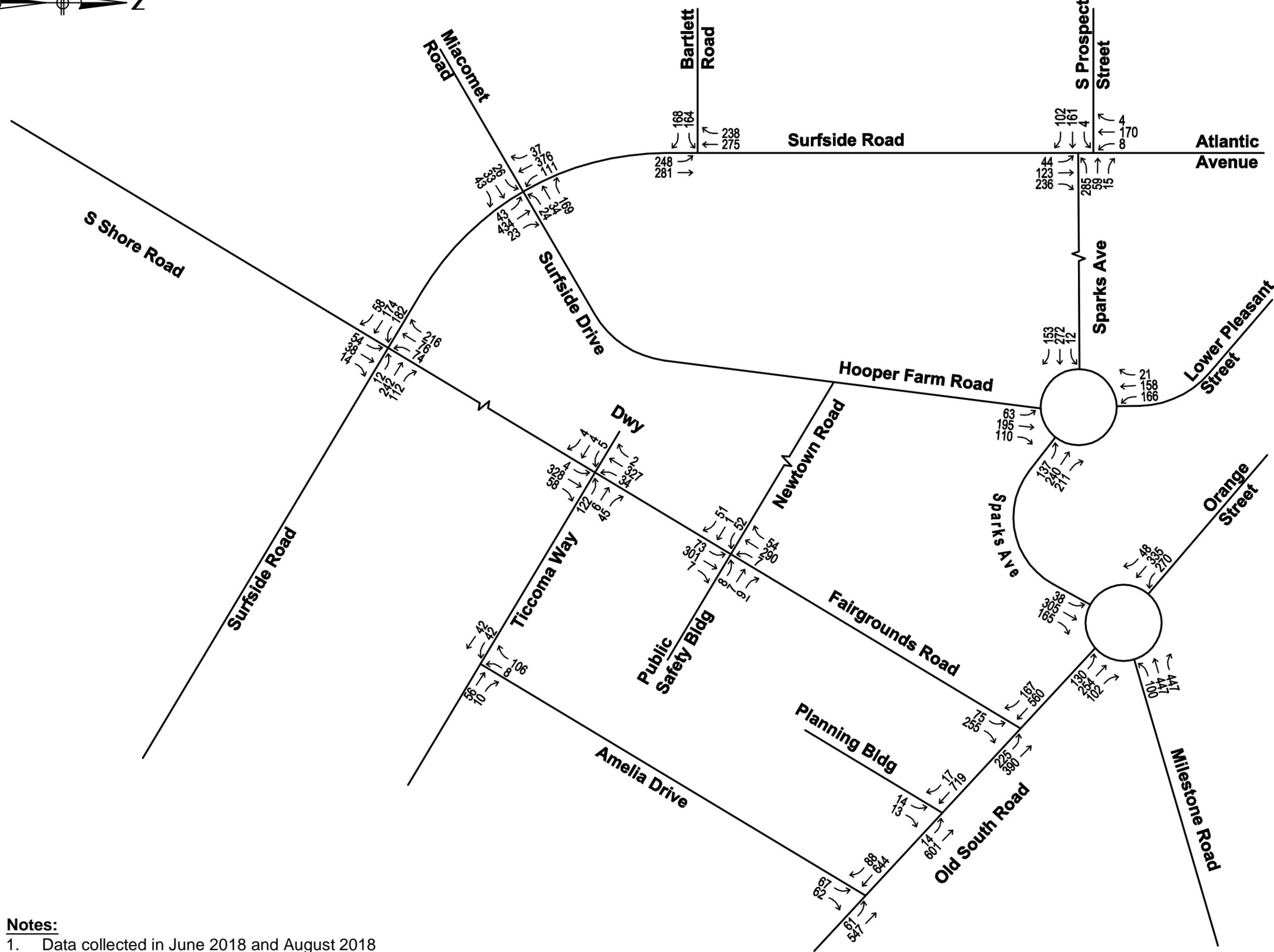


Prepared by:



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Print Date: 9/11/2018 3:52 PM



### Surfside Crossing Nantucket, MA

Scale: NTS

Figure No. 3

## 2018 PM Traffic Volumes

#### Notes:

1. Data collected in June 2018 and August 2018

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### 2.2.2 PEDESTRIAN, BICYCLE AND SCOOTER VOLUME

Pedestrian and bicycle volumes were counted as part of the intersection vehicle turning movement counts on Wednesday, June 13 and Thursday, June 14, 2018 between 7:00 and 9:00 PM and 2:00 and 6:00 PM at the following three study intersections:

4. Fairgrounds Road/Old South Road
10. Surfside Road/Atlantic Avenue/Sparks Avenue/South Prospect Street
11. Surfside Road/Bartlett Road

Scooter volumes were counted in addition to traffic, pedestrian and bicycle volumes at the remaining nine study intersections on Thursday, August 2, 2018 between 7:30 and 9:30 AM and 4:00 and 6:00 PM.

Figure 4 and Figure 5 show pedestrian and bicycle volumes at the 12 study intersections for the AM and PM peak hours, respectively. Pedestrian volumes are shown crossing the study intersections and bicycle volumes are shown as turning movements either on a bikeway or roadway.

The intersection of Surfside Road/Bartlett Road had the highest number of pedestrian crossings with 108 during the AM peak hour. The count at this intersection was conducted in June 2018 and reflects school activity. Other locations experiencing more than 20 pedestrian crossings in a peak hour include:

- South Shore Road/Fairgrounds Road/Surfside Road: 25 AM; 33 PM. Many crossings are associated with pedestrians walking to and from the bus stop.
- Old South Road/Orange Street/Sparks Avenue/Milestone Road: 33 AM

The highest peak hour bicycle volumes (two-way) occurred on the Surfside Road Bike Path between South Shore Road and Bartlett Road. Between 40 and 71 bicyclists traveled on the Surfside Bike Path in this section during the AM peak hour and between 95 and 109 bicyclists during the PM peak hour. Other locations experiencing more than 30 bicyclists in a peak hour include:

- Old South Road Bike Path south of Milestone Road: 75 AM; 59 PM
- Milestone Road Sconset Bike Path east of Old South Road: 67 AM; 64 PM
- Sparks Avenue west of Old South Road: 50 AM; 35 PM
- Hooper Farm Road south of Sparks Avenue: 50 AM
- Fairgrounds Road Bike Path between Surfside Road and Old South Road: 31-41 AM; 47-53 PM
- Orange Street west of Sparks Avenue: 36 AM

Scooters were counted during the intersection turning movement counts at the nine study intersections on August 2, 2018. The data show that more scooters were counted in the PM peak period than the AM peak period at all nine study intersections. The highest scooter volumes during the PM peak hour occurred at the following intersections:

- Old South Road/ Amelia Drive: 18
- Sparks Avenue/Hooper Farm Road/Lower Pleasant Street: 16
- Old South Road/Sparks Avenue/Milestone Road/Orange Street: 12

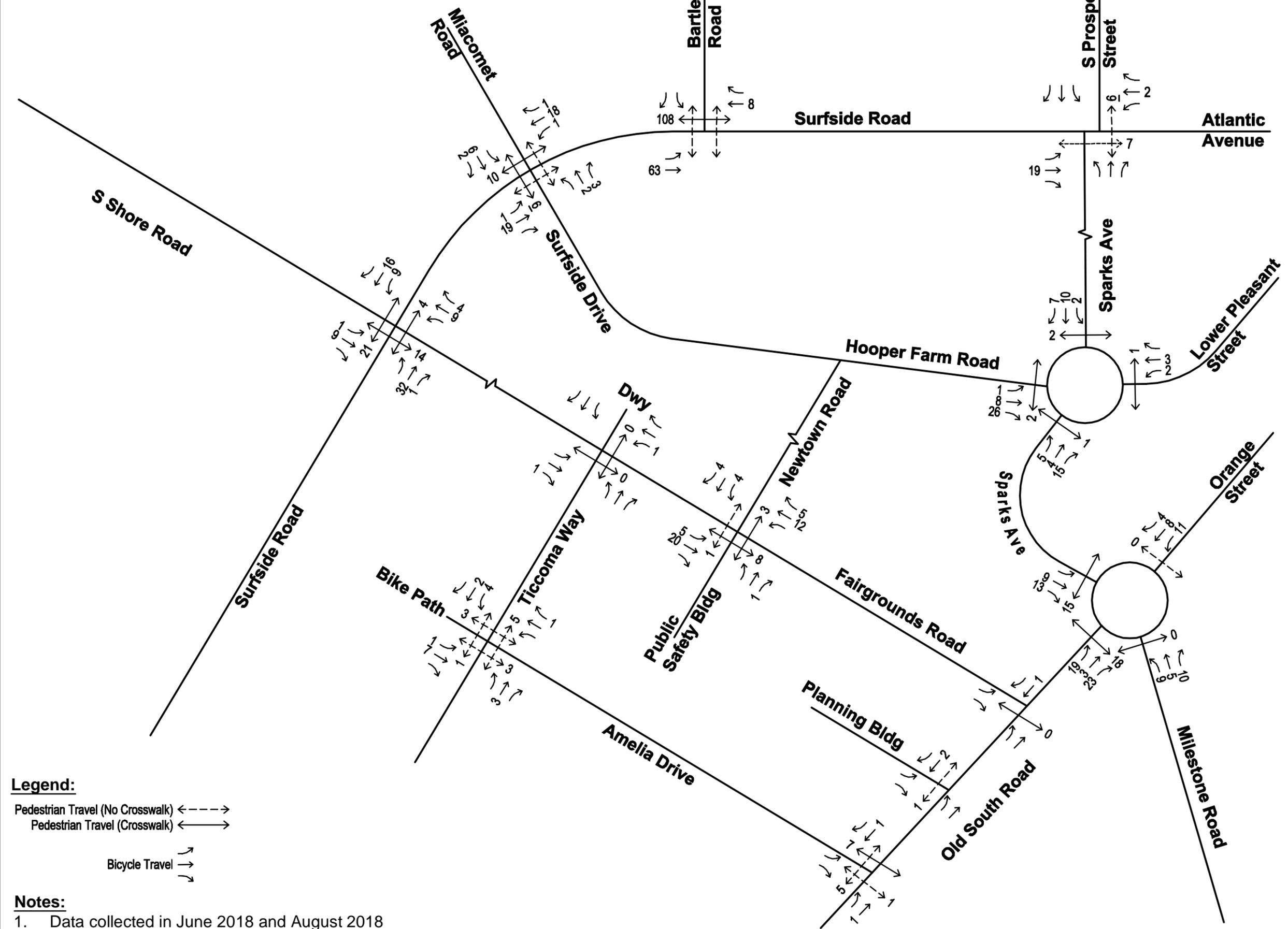
Data count sheets showing pedestrian, bicycle and scooter volumes at the study intersections are shown in the Appendix.



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### Surfside Crossing

Nantucket, MA

Scale: NTS

Figure No. 4

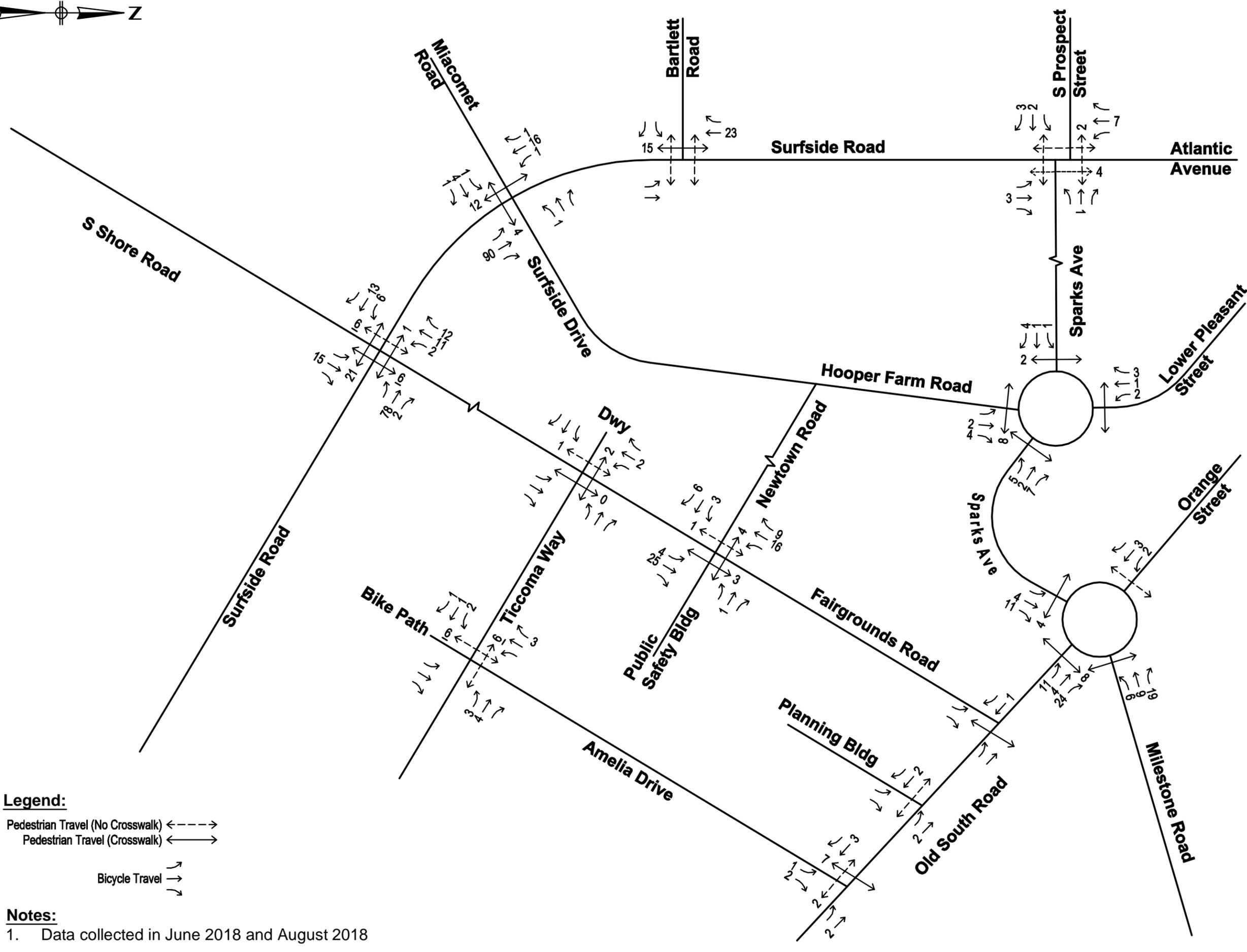
## 2018 AM Bike & Ped Volumes

- Legend:**
- Pedestrian Travel (No Crosswalk) ←---→
  - Pedestrian Travel (Crosswalk) ←==→
  - Bicycle Travel ↗ ↘ ↙ ↚

- Notes:**
- Data collected in June 2018 and August 2018

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- Legend:**
- Pedestrian Travel (No Crosswalk) ←---→
  - Pedestrian Travel (Crosswalk) ←==→
  - Bicycle Travel ↗ ↘

- Notes:**
1. Data collected in June 2018 and August 2018

**Surfside Crossing**  
 Nantucket, MA

Scale: NTS

Figure No. 5

**2018 PM Bike & Ped Volumes**

### 2.3 CRASH HISTORY

BETA examined historical crash data and trends to evaluate safety conditions at each of the 12 intersections within the study area. This exercise involved examining Crash Clusters and five years of MassDOT Crash Data.

#### 2.3.1 CRASH CLUSTERS

BETA examined Highway Safety Improvement Program (HSIP) clusters generated by MassDOT. The Highway Safety Improvement Program is a federal program developed with the goal of significantly reducing fatalities and injuries along all public roadways. For ease of comparison, crash clusters are developed for defined sections of roadways or specific intersections. Clusters are developed, and compared, by calculating the number of “equivalent property damage only” (EPDO) crashes within the defined area. Each crash within the area is awarded a number of points depending on the severity of the crash. For example, a property damage crash represents one EPDO, an injury crash represents 5 EPDO, and a fatality crash represents 10 EPDO. If the total EPDO within a cluster is within the top 5% of all clusters in the region, the cluster is considered eligible for the HSIP. Three areas within the study area were found to fall within HSIP clusters between 2006 and 2015. These clusters are summarized in Table 3 and can be seen in Figure 6.

Table 3 : MassDOT HSIP Cluster Summary

Location	HSIP Cluster	Color (Figure 6)
Fairgrounds Road/Old South Road	2013 – 2015	Purple
Sparks Avenue/Hooper Farm Road/Lower Pleasant Street	2006 – 2015 Bicycle	Green
Surfside Road/Surfside Drive/Miacomet Road	2013-2015	Purple

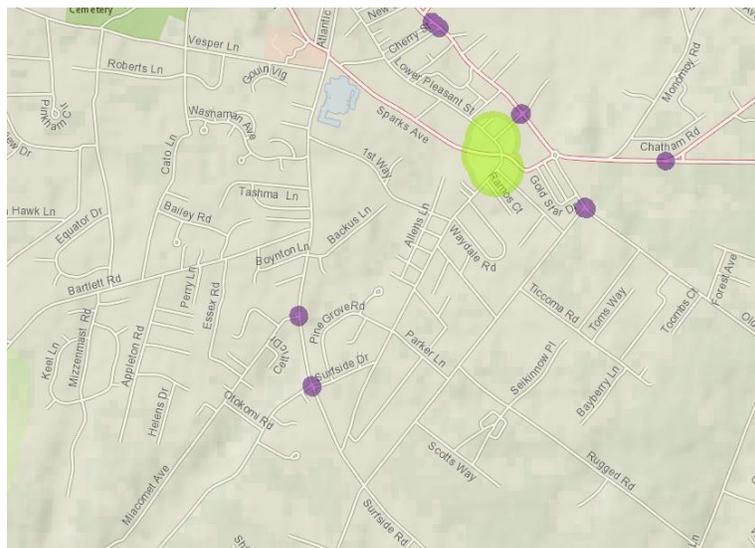


Figure 6 : MassDOT HSIP Cluster Map

As seen above, the Fairgrounds Road/Old South Road intersection and the Surfside Road/Surfside Drive/Miacomet Road intersection fall within crash clusters for 2013-2015. The Sparks Avenue/Hooper Farm Road/Lower Pleasant Street roundabout falls within a bicycle cluster. *It should be noted that while*

*the Surfside Road/Miacomet Avenue intersection was not included as a study area intersection, it too falls within a 2013-2015 crash cluster.*

### 2.3.2 MASSDOT CRASH DATA

The most recent five years of available crash data (2012-2016) were gathered for each study area intersection from the MassDOT Crash Database. The database provides crash data information for all crashes reported to the Registry of Motor Vehicles within the Commonwealth of Massachusetts. A summary of the crash data is provided in Table 4. The table categorizes the total number of crashes per year by collision type, crash severity, and operating conditions (ambient light and weather).

As seen in the table, zero crashes were reported at the Ticcoma Way/Amelia Drive intersection within the five year analysis period. The highest number of reported crashes (16) within the five years occurred at the Old South Road/Orange Street/Sparks Avenue/Milestone Road rotary. Other notable intersections included Fairgrounds Road/Old South Road with 15 crashes, and Surfside Road/Surfside Drive/Miacomet Road with 12 crashes.

A total of 74 crashes were reported at all 12 study area intersections. Of the 74 crashes, zero fatalities and 16 injuries were reported. The most common collision type among all of the intersections was found to be rear-ends (38). Twelve angle crashes were reported among all study intersections. Eight crashes were reported involving a pedestrian or a bicyclist and three crashes were reported involving a moped or a scooter. The intersection of Old South Road/Orange Street/Sparks Avenue/Milestone Road had three pedestrian/bicycle crashes and one moped crash in the study period. Surfside Road/Bartlett Road had two pedestrian/bicycle crashes in the study period. Nine crashes were reported as "single vehicle." These crashes typically involved vehicles striking an animal, utility pole, fence, or other parked vehicles. The narrow roadway and lack of defined curbing may play a role in these crashes.

### 2.3.3 CRASH RATES

In addition to summarizing the crash data, crash rates were calculated for each study area intersection. Crash rates were calculated based on the number of reported crashes and the intersection traffic volume during the peak hour. The crash rate represents the estimated number of crashes that would occur per one million entering vehicles (MEV) for the intersection. The statewide and MassDOT District 5 average crash rates for unsignalized intersections are 0.58 crashes per MEV. As seen in the table, all 12 study area intersections have a crash rate less than the statewide and District 5 average crash rates. Crash data and crash rate calculation worksheets are provided in the Appendix.

Table 4: Crash Data Summary

Year	Collision Type								Crash Severity				Ambient Light					Weather Condition					Total Crashes
	Angle	Rear-End	Sideswipe, Same Dir	Sideswipe, Opp. Dir	Moped	Pedestrian/Bike	Single Vehicle Crash	Unknown	Property Damage	Non-Fatal Injury	Fatal Injury	Not Reported	Daylight	Dawn/Dusk	Dark Lighted Roadway	Dark Non-Lighted Roadway	Unknown	Clear	Cloudy	Rain	Snow	Unknown	
1. South Shore Road/Fairgrounds Road/Surfside Road (Unsignalized)																						Crash Rate: 0.07 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	1	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	1
2015	-	1	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	-	1
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	1	0	1	0	0	0	0	1	0	0	1	1	1	0	0	0	1	0	0	1	0	2
2. Fairgrounds Road/Ticcoma Way (Unsignalized)																						Crash Rate: 0.05 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2016	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	1
Total	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1
3. Fairgrounds Road/Newtown Road/Public Safety Building Driveway (Unsignalized)																						Crash Rate: 0.13 MEV	
2012	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	1	-	-	-	-	1
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	1	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-	-	1
2015	-	-	1	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	1
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	1	1	1	0	0	0	0	0	1	1	0	1	3	0	0	0	0	2	1	0	0	0	3

Table 4: Crash Data Summary (Continued)

Year	Collision Type								Crash Severity				Ambient Light					Weather Condition					Total Crashes
	Angle	Rear-End	Sideswipe, Same Dir	Sideswipe, Opp. Dir	Moped	Pedestrian/Bike	Single Vehicle Crash	Unknown	Property Damage	Non-Fatal Injury	Fatal Injury	Not Reported	Daylight	Dawn/Dusk	Dark Lighted Roadway	Dark Non-Lightet Roadway	Unknown	Clear	Cloudy	Rain	Snow	Unknown	
4. Fairgrounds Road/Old South Road (Unsignalized)																						Crash Rate: 0.44 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	2	1	-	-	1	-	-	1	-	-	3	4	-	-	-	-	2	1	-	1	-	4
2014	-	6	-	-	-	-	1	-	3	3	-	1	7	-	-	-	-	3	2	1	1	-	7
2015	-	-	-	-	1	-	-	-	-	1	-	-	1	-	-	-	-	1	-	-	-	-	1
2016	-	2	-	-	-	-	1	-	3	-	-	-	2	-	1	-	-	3	-	-	-	-	3
Total	0	10	1	0	1	1	2	0	7	4	0	4	14	0	1	0	0	9	3	1	2	0	15
5. Old South Road/Planning Department Driveway (Unsignalized)																						Crash Rate: 0.04 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2015	-	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	1
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1
6. Old South Road/Amelia Drive (Unsignalized)																						Crash Rate: 0.20 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	2	-	-	-	-	1	-	1	1	-	1	2	-	1	-	-	3	-	-	-	-	3
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2015	-	1	-	-	-	1	-	-	1	1	-	-	2	-	-	-	-	1	1	-	-	-	2
2016	-	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	1	-	-	-	-	1
Total	0	3	0	0	0	1	2	0	3	2	0	1	4	0	2	0	0	5	1	0	0	0	6

Table 4: Crash Data Summary (Continued)

Year	Collision Type								Crash Severity				Ambient Light					Weather Condition					Total Crashes
	Angle	Rear-End	Sideswipe, Same Dir	Sideswipe, Opp. Dir	Moped	Pedestrian/Bike	Single Vehicle Crash	Unknown	Property Damage	Non-Fatal Injury	Fatal Injury	Not Reported	Daylight	Dawn/Dusk	Dark Lighted Roadway	Dark Non-Light Roadway	Unknown	Clear	Cloudy	Rain	Snow	Unknown	
7. Ticcoma Way/Amelia Drive (Unsignalized)																						Crash Rate: 0.00 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8. Old South Road/Orange Street/Sparks Avenue/Milestone Road (Roundabout)																						Crash Rate: 0.30 MEV	
2012	-	2	-	-	-	1	-	-	-	-	-	3	3	-	-	-	-	3	-	-	-	-	3
2013	1	1	-	-	1	-	-	-	2	1	-	-	3	-	-	-	-	3	-	-	-	-	3
2014	-	2	-	-	-	1	-	-	1	2	-	-	2	1	-	-	-	3	-	-	-	-	3
2015	-	4	-	-	-	-	1	-	3	-	-	2	5	-	-	-	-	3	2	-	-	-	5
2016	-	1	-	-	-	1	-	-	-	1	-	1	2	-	-	-	-	2	-	-	-	-	2
Total	1	10	0	0	1	3	1	0	6	4	0	6	15	1	0	0	0	14	2	0	0	0	16
9. Sparks Avenue/Hooper Farm Road/Lower Pleasant Street (Roundabout)																						Crash Rate: 0.11 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2015	1	2	-	-	-	-	-	-	3	-	-	-	3	-	-	-	-	3	-	-	-	-	3
2016	-	1	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	1
Total	1	3	0	0	0	0	0	0	3	0	0	1	4	0	0	0	0	4	0	0	0	0	4

Table 4: Crash Data Summary (Continued)

Year	Collision Type								Crash Severity				Ambient Light					Weather Condition					Total Crashes
	Angle	Rear-End	Sideswipe, Same Dir	Sideswipe, Opp. Dir	Moped	Pedestrian/Bike	Single Vehicle Crash	Unknown	Property Damage	Non-Fatal Injury	Fatal Injury	Not Reported	Daylight	Dawn/Dusk	Dark Lighted Roadway	Dark Non-Lightet Roadway	Unknown	Clear	Cloudy	Rain	Snow	Unknown	
10. Surfside Road/Atlantic Avenue/Sparks Avenue/South Prospect Street (Unsignalized)																						Crash Rate: 0.33 MEV	
2012	1	-	-	-	1	-	-	-	1	-	-	1	1	-	1	-	-	1	1	-	-	-	2
2013	-	2	-	-	-	-	-	-	1	-	-	1	2	-	-	-	-	2	-	-	-	-	2
2014	-	-	-	1	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	1
2015	-	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	1
2016	1	1	-	-	-	-	-	-	-	1	-	1	1	-	1	-	-	2	-	-	-	-	2
Total	2	4	0	1	1	0	0	0	4	1	0	3	6	0	2	0	0	7	1	0	0	0	8
11. Surfside Road/Bartlett Road (Unsignalized)																						Crash Rate: 0.22 MEV	
2012	1	-	-	-	-	1	-	-	-	1	-	1	2	-	-	-	-	2	-	-	-	-	2
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2015	-	1	-	-	-	-	1	-	2	-	-	-	2	-	-	-	-	2	-	-	-	-	2
2016	-	-	-	-	-	1	1	-	2	-	-	-	1	-	1	-	-	2	-	-	-	-	2
Total	1	1	0	0	0	2	2	0	4	1	0	1	5	0	1	0	0	6	0	0	0	0	6
12. Surfside Road/Surfside Drive/Miacomet Road (Unsignalized)																						Crash Rate: 0.44 MEV	
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
2013	2	-	-	1	-	-	1	-	-	1	-	3	3	-	1	-	-	2	1	1	-	-	4
2014	-	1	-	-	-	-	1	-	1	-	-	1	1	-	-	-	1	1	-	-	-	1	2
2015	1	-	-	-	-	1	-	-	-	2	-	-	2	-	-	-	-	1	1	-	-	-	2
2016	1	3	-	-	-	-	-	-	3	-	-	1	4	-	-	-	-	3	1	-	-	-	4
Total	4	4	0	1	0	1	2	0	4	3	0	5	10	0	1	0	1	7	3	1	0	1	12

## 2.4 PUBLIC TRANSPORTATION

The Nantucket Regional Transit Authority (NRTA) provides island-wide fixed route bus service called "The Wave." All buses are lift-equipped and wheel chair accessible and can carry two bicycles mounted to racks on the front of the bus.

The NRTA provides three bus routes within walking distance of the project site: Surfside Beach Route, Miacomet Loop and Mid-Island Loop. Prior to 2018, all three routes provided only seasonal service. In 2018, the Miacomet and Mid-Island Loop routes were expanded to year round service.

The three bus routes serving the project study area are described below.

### Surfside Beach Route

This route runs between Washington Street in Downtown and Surfside Beach (see Figure 7). In the study area it travels via Old South Road, Fairgrounds Road, and Surfside Road. There is a bus stop on the northwest corner of South Shore Road/Surfside Road/Fairgrounds Road. Service is provided seasonally everyday between June 18 and September 3, 2018. Buses run every 40 minutes in both directions. Buses leaving Downtown depart between 10:00 AM and 5:20 PM daily and buses leaving Surfside depart between 10:20 AM and 5:40 PM.

The fare is \$3.00 per one-way ride. Short-term 1-, 3-, and 7-day passes are available, as well as summer season and annual passes. Student and senior discounts are available. The bus is 29 feet long.

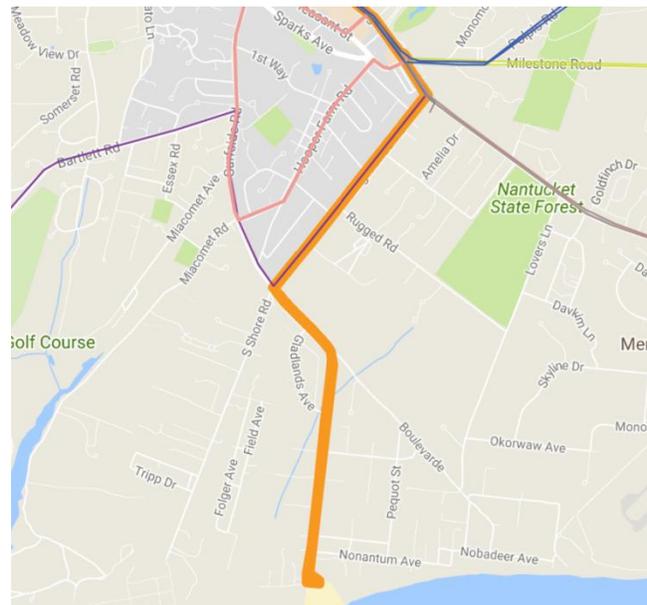


Figure 7: NRTA Surfside Beach Route

Source: NRTA Website Bus Routes

### Miacomet Loop

This route runs a loop leaving from the Greenhound Stop and Washington Street (see Figure 8). In the study area it travels on Surfside Road, Fairgrounds Road and Old South Road. Near the project site there are bus stops at the intersection of South Shore Road/Surfside Road/Fairgrounds Road. Service is provided year round with the following schedule:

- January 1-May 18, 2018: Every 30 minutes on weekdays between 7:00 and 9:00 PM and between 7:00 AM and 7:00 PM on weekends.
- May 19-June 10 and September 15-October 8, 2018: Every 30 minutes between 7:00 AM and 11:30 PM.
- June 11-September 3, 2018: Every 20 minutes between 7:00 AM and 12:00 AM.
- September 4-September 14, 2018: Every 15 minutes between 7:00 AM and 11:30 PM.

- October 9-December 31, 2018  
Every 30 minutes on weekdays  
between 7:00 and 9:00 PM and  
between 7:00 AM and 7:00 PM  
on weekends.

The fare is \$2.00 per one-way ride. Short-term 1-, 3- and 7-day passes are available, as well as summer season and annual passes. Student and senior discounts are available. The bus is 25 feet long.

#### Mid-Island Loop

This route runs a loop leaving from the Greenhound Stop and Washington Street (see Figure 9). In the study area it travels on Surfside Road, Surfside Drive, Hooper Farm Road and Sparks Avenue. Near the project site there is bus stops at Surfside Road/Surfside Drive/Miacomet Road. Service is provided year round with the following schedule:

- January 1-May 18, 2018: Every 30 minutes on weekdays between 7:00 and 9:00 PM and between 7:00 AM and 7:00 PM on weekends.
- May 19-June 10 and September 15-October 8, 2018: Every 30 minutes between 7:00 AM and 11:30 PM.
- June 11-September 3, 2018: Every 15 minutes between 7:00 AM and 12:00 AM.
- September 4-September 14, 2018: Every 15 minutes between 7:00 AM and 11:30 PM.
- October 9-December 31, 2018 Every 30 minutes on weekdays between 7:00 and 9:00 PM and between 7:00 AM and 7:00 PM on weekends.

The fare is \$2.00 per one-way ride. Short-term 1-, 3- and 7-day passes are available, as well as summer season and annual passes. Student and senior discounts are available. The bus is 25 feet long.

Information on bus ridership and schedules for 2015-2018 was provided by NRTA. Table 5 shows ridership information for the Miacomet Loop, Mid-Island Loop and Surfside Beach Loop bus routes. The Miacomet Loop and Mid-Island Loop bus routes are two of the highest NRTA ridership routes. Yearly ridership on the Miacomet Loop route has been fairly constant between 2015 and 2017 (between 62,315 and 64,556 riders). Yearly ridership on the Mid-Island Loop increased by 7% in 2016 and dropped by 5% in 2017 with a three-year average around 58,000 riders. In 2018, ridership levels on both the

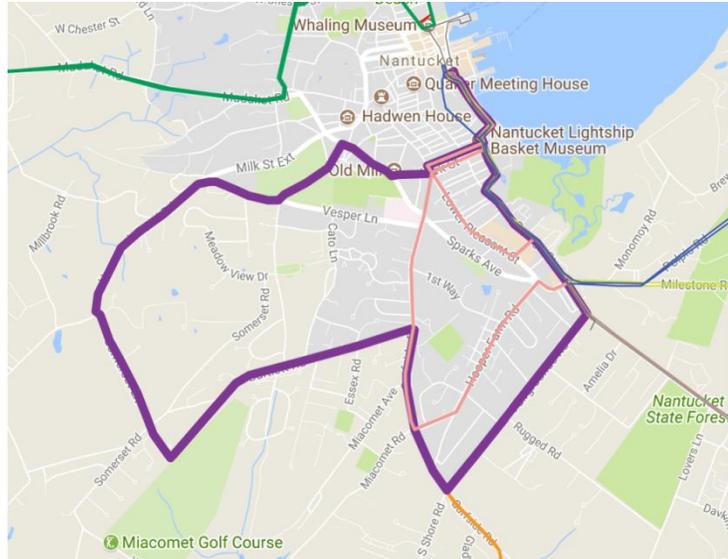


Figure 8: NRTA Miacomet Loop

Source: NRTA Website Bus Routes

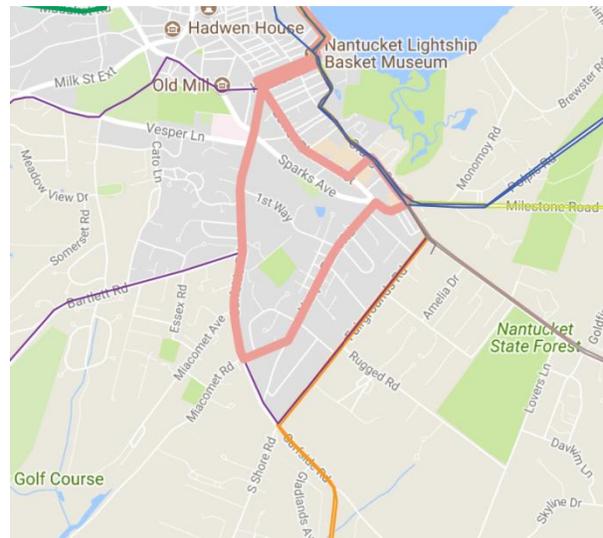


Figure 9: NRTA Mid-Island Loop

Source: NRTA Website Bus Routes

Miacomet and Mid-Island Loop routes will increase as a result of increasing to year round service. Annual Ridership on the Surfside Beach Loop route has decreased each year since 2015 (-23% since 2015).

NRTA staff indicated that the Surfside Beach Route tends to operate like an express route between Downtown and Surfside Beach during good weather summer days. On those days the bus tends to be at capacity when leaving Downtown in morning and at capacity when returning from the beach in the late afternoon. As a result, few people can board the bus at intermittent stops.

Table 5: Nantucket Regional Transit Authority Ridership 2015-2017 for Selected Bus Routes

	2015	2016	2017	% Change 2015-2016	% Change 2016-2017
Miacomet Loop <sup>1</sup>					
Ridership	63,771	62,315	64,566	-2%	+4%
Days in service	148	140	148	-5%	+6%
Riders/day	431	445	436	+3%	-2%
Mid-Island Loop <sup>1</sup>					
Ridership	56,466	60,614	57,299	+7%	-5%
Days in service	148	140	148	-5%	+6%
Riders/day	382	433	387	+13%	-11%
Surfside Beach Loop <sup>2</sup>					
Ridership	16,133	13,357	12,494	-17%	-6%
Days in service	77	72	78	-6%	+8%
Riders/day	210	186	160	-11%	-14%

1. Daily service for June-September and only select days in May and October
  2. Daily Service for July and August and only select days in June and September
- Source: Nantucket Regional Transit Authority

## 3.0 FUTURE CONDITIONS

This section evaluates future transportation operations in the study area both with and without the proposed project. Traffic volumes in the study area were projected to year 2025, which reflects a seven-year traffic planning horizon. Two 2025 future year scenarios were analyzed: a No-Build condition and a Build condition. The No-Build scenario provides a baseline condition for which to compare the potential impacts of the project.

### 3.1 2025 NO BUILD CONDITIONS

#### 3.1.1 BACKGROUND TRAFFIC GROWTH

Future No-Build traffic volume projections typically consist of a general background growth factor and traffic generated from other known specific development projects within the study area. Background growth is typically a function of unspecified development projects, increased economic activity, and population growth. Recent traffic studies performed on the island in the area have used a 1.0 percent annual traffic growth.<sup>2</sup> This rate appears reasonable for the study area to represent traffic growth for potential future projects. The existing 2018 peak hour traffic volumes were increased by a factor of 1.072 (1.0% compounded over 7 years) to represent background traffic growth in 2025.

The second component of traffic growth is identifying traffic from planned developments in or near the study area. Town of Nantucket staff indicated that the following two proposed projects would impact traffic in The Surfside Crossing study area:

- Richmond Great Point Development, Old South Road Mixed-use Development, 100 single-family homes, 225 apartment units, and approximately 15,500 square feet of retail and restaurant space
- Ticcoma Green, Affordable Housing, 64 apartment units at 6 Fairgrounds Road

The project-generated vehicle trips for the Richmond Great Point Development were taken from the Traffic Impact and Access Study conducted by Ron Muller & Associates, August 26, 2016. The study estimates that the project would generate 210 and 293 vehicle trips in the AM and PM peak hours, respectively. The Richmond Great Point project study area did not include all 12 study intersections being analyzed for the Surfside Crossing project. Therefore, BETA assigned the Richmond project trips through the remaining Surfside Crossing study intersections. The assignment of these trips was based on the overall distribution of traffic in the area (see Section 3.2.2 below), traffic volume flow and roadway circulation patterns.

A traffic study was not yet available for the Ticcoma Green project, so peak hour vehicle trips were estimated and assigned to the study roadway network. Vehicle trip generation was estimated using trip rates published in the Institute of Transportation Engineer's *Trip Generation, 10th Edition*. The Ticcoma Green project is estimated to generate 470 daily vehicle trips with 32 (8 in/24 out) in the AM peak hour and 40 (25 in /15 out) in the PM peak hour. The Ticcoma Green peak hour project trips were assigned to the study network based on the overall distribution of traffic in the area, traffic volume flow and roadway circulation patterns. Vehicle trip generation and distribution and assignment trips for both the Ticcoma Green and Richmond Great Point projects are provided in the Appendix.

The No-Build 2025 peak hour traffic volumes were developed by adding the year 2018 traffic volumes that were increased by a factor 1.072 with the project-generated trips from both the Richmond Great

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<sup>2</sup>Surfside Crossing Residential Development Traffic Impact Assessment, MDM Transportation Consultants, Inc., July 12, 2018; Richmond Great Point Development, Old South Road Mixed-use Development Traffic Impact and Access Study, Ron Muller & Associates, August 26, 2016.

Point and Ticcoma Green projects. Figure 10 and Figure 11 show the AM and PM peak hour 2025 No-Build traffic volumes.

### 3.2 BUILD CONDITIONS

In order to assess the potential impact of the project on traffic conditions in the study area, vehicle trips associated with the proposed project were estimated and distributed onto the roadway network. These vehicle trips were then added to the No-Build traffic volumes to create the 2025 Build traffic volumes for the weekday AM and PM peak hours.

The proposed project consists of 60 single-family homes and 96 condominium units. The project is proposing three full-access driveways on South Shore Road to serve the site. A concept of the proposed parking layout is provided below in Section 4.5.

#### 3.2.1 PROJECT GENERATED TRAFFIC

Vehicle trip generation was developed for the proposed project for weekday AM peak hour, PM peak hour and daily periods. Vehicle trip generation estimates for the project were based on rates provided in Institute of Transportation Engineers, *Trip Generation*, 10<sup>th</sup> Edition, 2017. Trip generation rates for Land Use Code (LUC) 210 – Single Family Detached Housing and LUC 220 – Multi-Family Housing (Low Rise) were used and applied to the proposed number of project units.

Table 6 summarizes estimated vehicle trip generation for the proposed project.

Table 6: Surfside Crossing Trip Generation Summary

Project Component	Daily			AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
60 Single-Family Homes <sup>1</sup>	325	325	650	12	35	47	40	23	63
96 Condominiums <sup>2</sup>	351	351	702	11	35	46	36	21	57
<b>Total</b>	<b>676</b>	<b>676</b>	<b>1,352</b>	<b>23</b>	<b>70</b>	<b>93</b>	<b>76</b>	<b>44</b>	<b>120</b>

<sup>1</sup> Based on ITE LUC 210 Single-Family Detached Housing trip rates.

<sup>2</sup> Based on ITE LUC 220 Multi-Family Housing (Low Rise) trip rates.

The table shows that the project is estimated to generate 1,352 vehicle trips on a weekday with 93 (23 In/70 Out) vehicle trips in the morning peak hour and 120 (76 In/44 Out) vehicle trips in the PM peak hour.

*To present a conservative estimate of potential project impacts on the study roadway network, the number of estimated project-generated vehicle trips shown in Table 6 was not adjusted downward to reflect non-auto trips.*



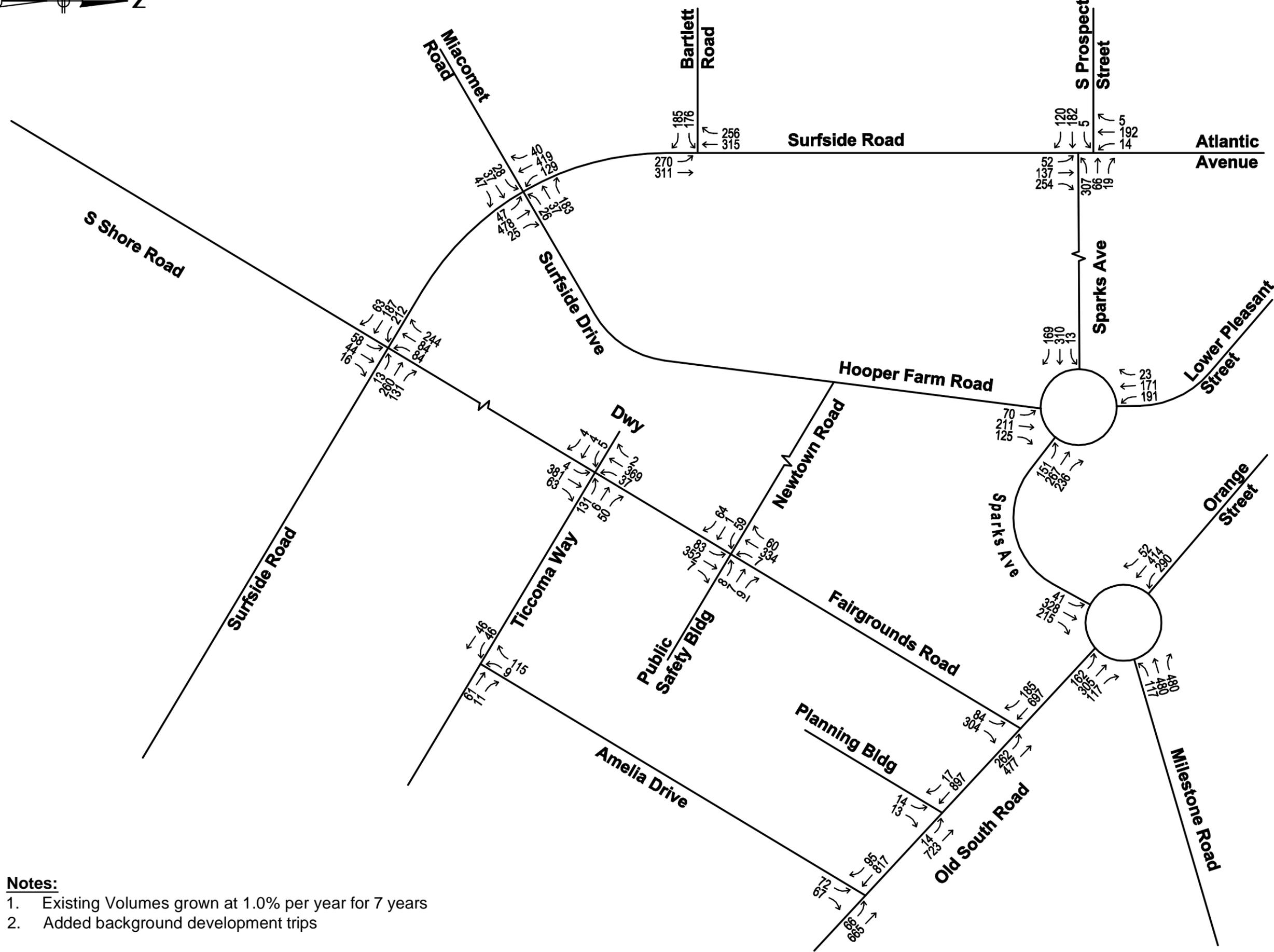


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### Surfside Crossing

Nantucket, MA

Scale: NTS

Figure No. 11

## 2025 No-Build PM Traffic Volumes

#### Notes:

1. Existing Volumes grown at 1.0% per year for 7 years
2. Added background development trips

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### 3.2.2 TRIP DISTRIBUTION AND ASSIGNMENT

In order to evaluate the potential impacts related to the incremental traffic volumes associated with the proposed project, the new vehicle trips were distributed and assigned onto the local roadway network. The estimated project trips were distributed and assigned based on existing peak hour traffic volumes at study intersections and roadway circulation patterns. Vehicle trips were assigned to the three proposed project driveways based on the layout of residential units on the site. The vehicle trip distribution used for analysis is summarized in Figure 12.

As shown in the figure, trips were distributed to/from the site with 55% destined north via Surfside Road, 40% to/from the east via Fairgrounds Road, and 5% to/from the south via Surfside Road. No trips were distributed east on South Shore Road as the roadway terminates at the beach with no major exterior connections. Due to commercial uses such as the Stop and Shop, approximately 9% of trips were projected to be attracted to Sparks Avenue between Hooper Farm Road and Atlantic Avenue. Otherwise, all traffic was distributed out of the network towards the Downtown, Airport, or other areas of the island.

Project trips assigned for the AM and PM peak hours are shown in Figure 13 and Figure 14.

The project vehicle trips were added to the Future No-Build peak hour traffic volume networks to create the 2025 Build traffic volumes, which are shown in Figure 15 and Figure 16.

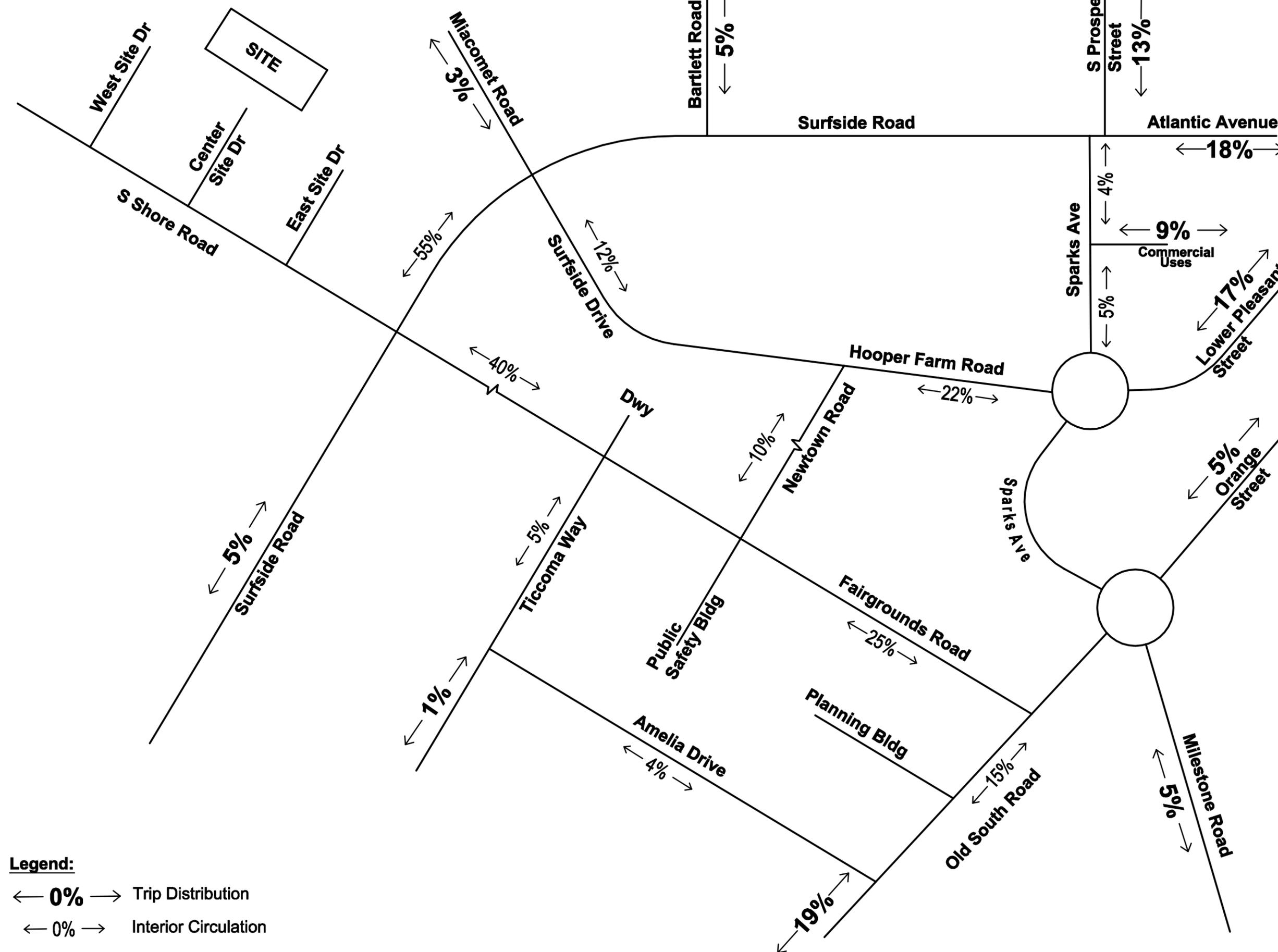


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### Surfside Crossing

Nantucket, MA

Scale: NTS

Figure No. 12

## Project Trip Distribution

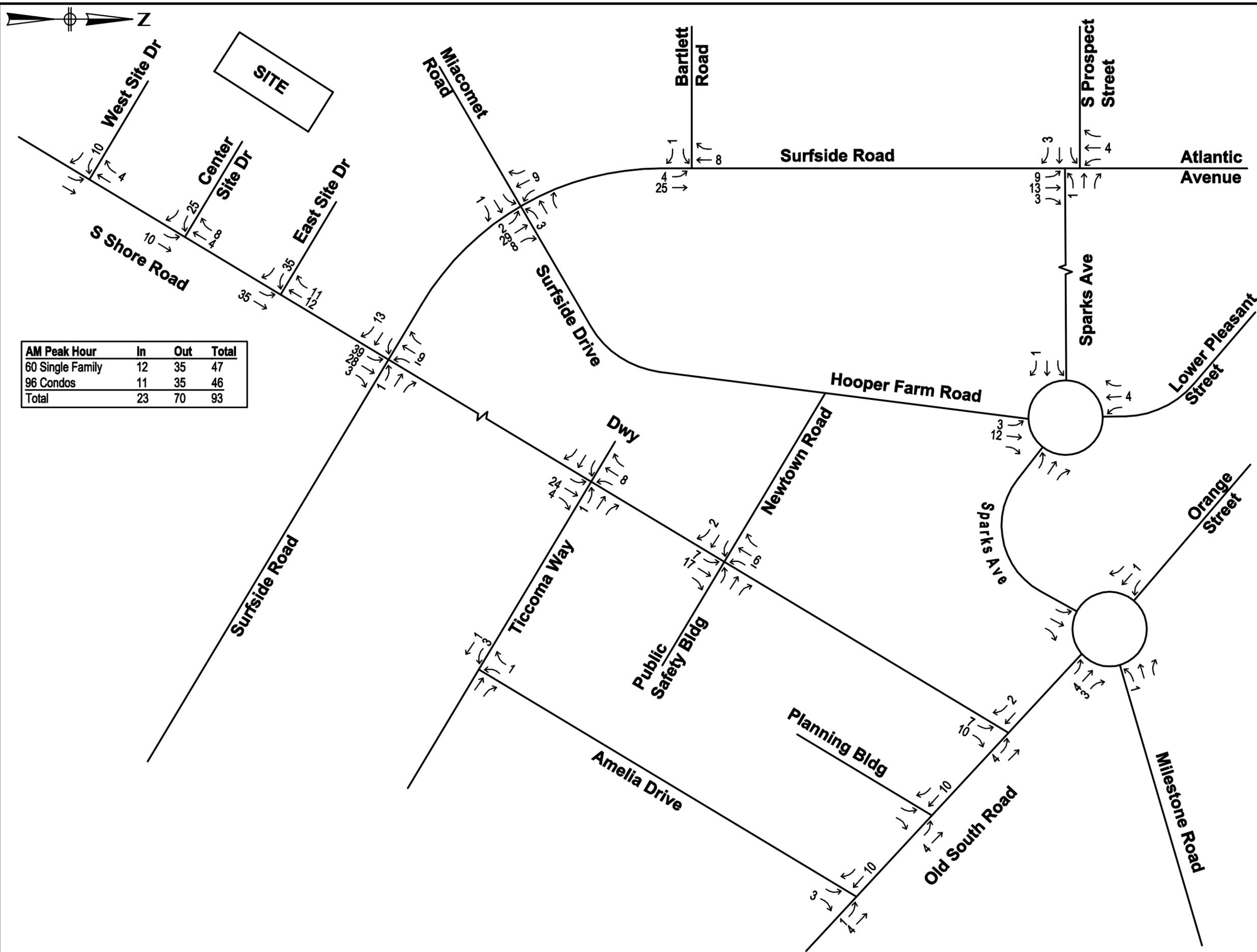
**Legend:**

← 0% → Trip Distribution

← 0% → Interior Circulation

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AM Peak Hour	In	Out	Total
60 Single Family	12	35	47
96 Condos	11	35	46
<b>Total</b>	<b>23</b>	<b>70</b>	<b>93</b>

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## Surfside Crossing

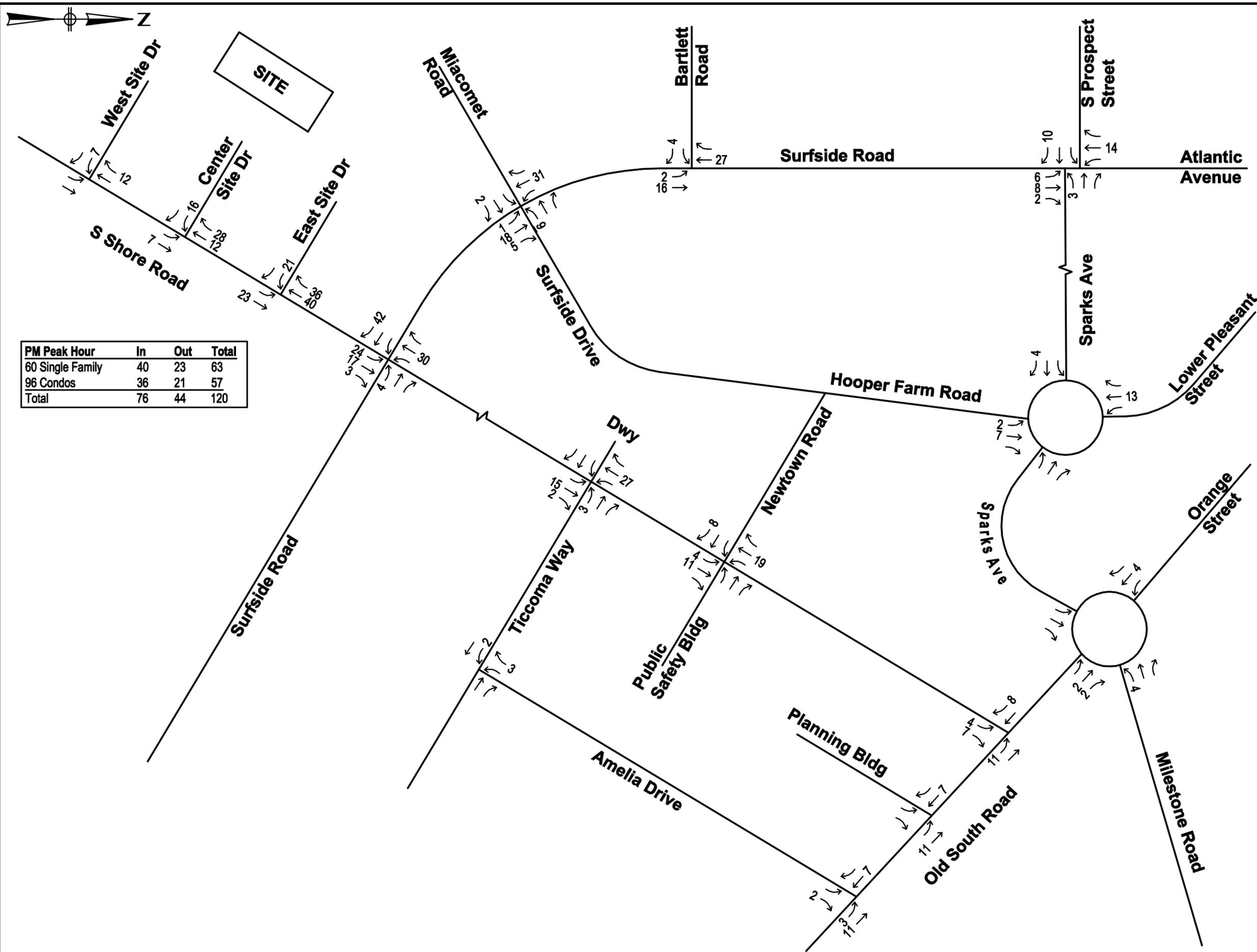
Nantucket, MA

Scale: NTS

Figure No. 13

## AM Project Trips

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PM Peak Hour	In	Out	Total
60 Single Family	40	23	63
96 Condos	36	21	57
<b>Total</b>	<b>76</b>	<b>44</b>	<b>120</b>

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## Surfside Crossing

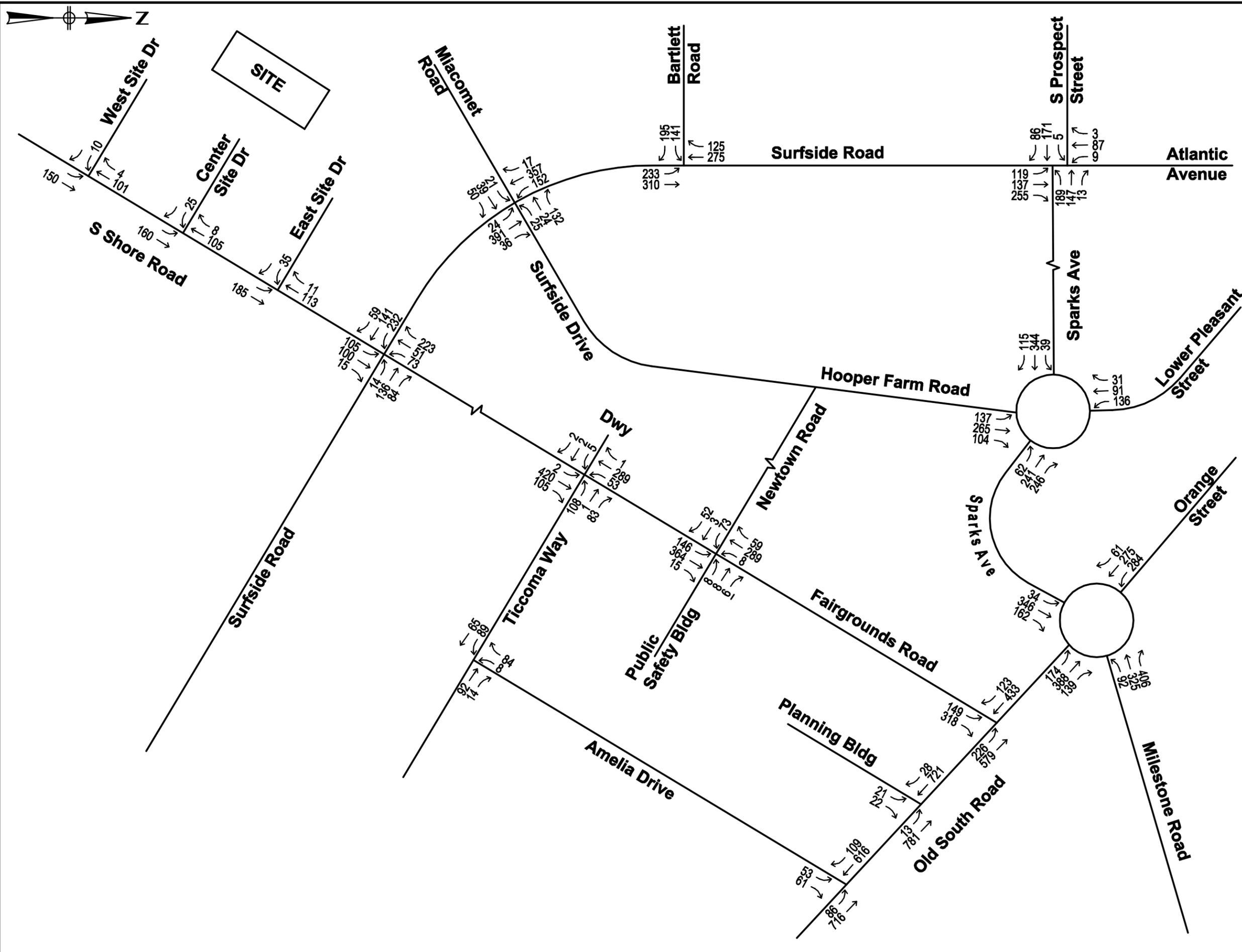
Nantucket, MA

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Figure No. 14

## PM Project Trips

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## Surfside Crossing

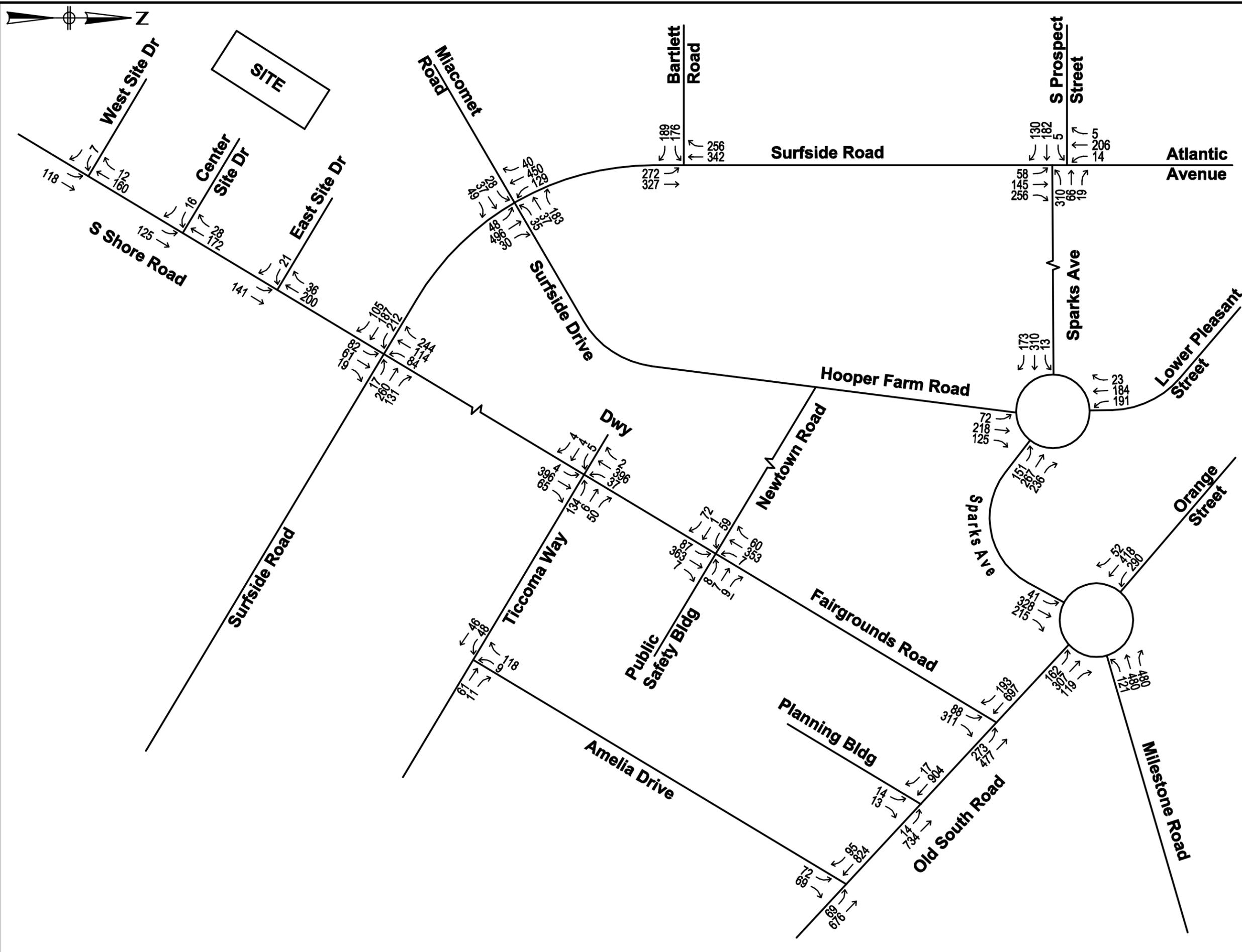
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Figure No. 15

# 2025 Build AM Traffic Volumes

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3.2.3 TRAFFIC VOLUME COMPARISON

The study area roadway peak hour traffic volumes displayed in Table 2 were compared with the projected 2025 No-Build and 2025 Build traffic volumes. A summary of the comparison is provided in Table 7. A graphical representation of the AM peak hour and PM peak hour volumes is provided in Figure 17 and Figure 18, respectively. The comparison shows the total peak hour volume, in both directions, for each study area roadway.

Table 7 : Study Area Roadway Traffic Volume Comparison

Location	AM Peak Hour					PM Peak Hour				
	2018 EX	2025 NB	2025 BD	% EX to NB	% NB to BD	2018 EX	2025 NB	2025 BD	% EX to NB	% NB to BD
South Shore Road w/o Surfside Road	229	251	344	10%	37%	252	278	398	10%	43%
Fairgrounds Road w/o Old South Road	696	793	816	14%	3%	722	835	865	16%	4%
Surfside Road s/o Sparks Avenue	765	840	873	10%	4%	960	1,062	1,105	11%	4%
Old South Road s/o Fairgrounds Road	1,295	1,542	1,556	19%	1%	1,430	1,740	1,758	22%	1%
Sparks Avenue w/o Old South Road	983	1,102	1,102	12%	0%	1,133	1,278	1,278	13%	0%
Hooper Farm Road s/o Sparks Avenue	692	754	774	9%	3%	816	897	923	10%	3%

EX = Existing

NB = No-Build

BD = Build

% = Percent increase from:

As seen in the table and subsequent figures, the overall traffic volume change between the 2018 Existing and 2025 No-Build is generally larger than the overall increase in traffic between 2025 No-Build and 2025 Build, with exception of South Shore Road. This is expected as intersections further away from the generator (project site) will experience fewer trips as they spread out across the network. The proposed project would increase traffic volume on South Shore Road west of Surfside Road by 37% in the AM peak hour and 43% in the PM peak hour.

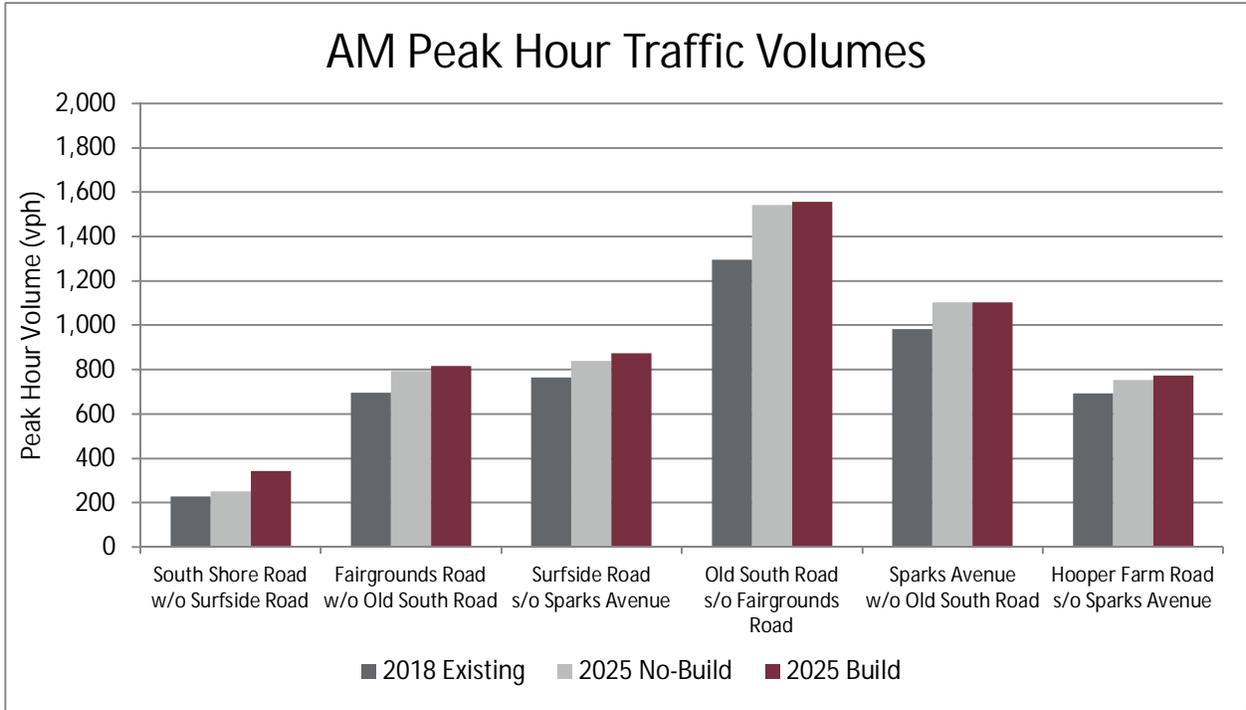


Figure 17: AM Traffic Volume Comparison

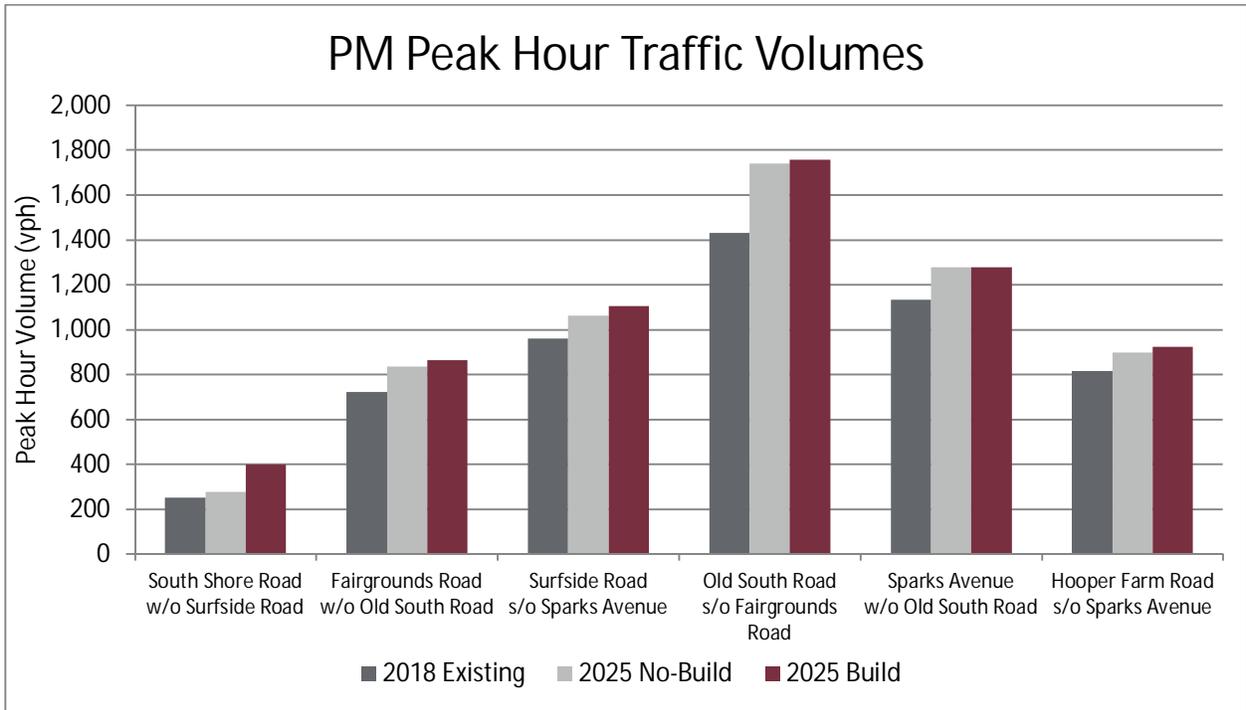


Figure 18: PM Traffic Volume Comparison

## 4.0 TRAFFIC OPERATIONS ANALYSIS

### 4.1 TRAFFIC CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted to assess the quality of traffic flow at each of the study intersections. This was performed for 2018 Existing, 2025 No-Build, and 2025 Build conditions for the weekday AM and PM peak hours.

Capacity analysis was performed for unsignalized study intersections using Trafficware’s Synchro software package (Version 9.0). The Synchro Software analysis utilizes methods of the 2010 *Highway Capacity Manual (HCM 2010)* published by the Transportation Research Board. Roundabout analysis was performed with Sidra Intersection 8.0 software which utilizes methods of the *Highway Capacity Manual 6<sup>th</sup> Edition (HCM 6)* published by the Transportation Research Board.

For intersections, six levels of service (LOS), "A"-“F”, have been established with "A" representing very good operation and "F" representing very poor operation. For signalized and unsignalized intersections, level of service is defined in terms of total delay and is computed for individual intersection turning movements. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The relationship between LOS and delay for unsignalized intersections and roundabouts are summarized in Table 8.

Table 8: Level of Service Criteria

LOS	Unsignalized Intersection and Roundabout Criteria Average Total Delay (Seconds per Vehicle)	General Description
A	< 10.0	Free Flow
B	10.1 to 15.0	Stable flow (slight delays)
C	15.1 to 25.0	Stable flow (acceptable delays)
D	25.1 to 35.0	Approaching unstable flow (tolerable delay)
E	35.1 to 50.0	Unstable flow (intolerable delay)
F	> 50.0	Forced flow (jammed)

In addition to delay and level of service, the analysis examined the volume to capacity ratio (v/c) and 95<sup>th</sup> percentile queues for each lane group. Movements that experience a v/c ratio greater than 1.0 operate over capacity and therefore receive a LOS F ranking regardless of the calculated average delay. The 95<sup>th</sup> percentile queue represents the length of vehicle queuing (in feet) that is only exceeded five percent of the evaluated peak hour.

Capacity analysis worksheets are provided in the Appendix.

### 4.2 TRAFFIC CAPACITY ANALYSIS RESULTS – EXISTING GEOMETRY

For the purposes of these analysis results it was assumed that no improvements or alterations to the study area intersections would be made within the seven year design horizon.

A summary of the AM Peak Hour and PM Peak Hour capacity analysis results are displayed in Table 9 and Table 10, respectively. Movements that were found to operate with level of service (LOS) F, delays with greater than 300 seconds (5 minutes) of delay, and/or volume to capacity ratio larger than 1.0 are highlighted in red text.

Table 9: AM Peak Hour Capacity Analysis Results

INTERSECTIONS	2018 Existing				2025 No-Build				2025 Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
<b>1. South Shore Road/Fairgrounds Road/Surfside Road</b>												
Surfside - NB (S)	B	14.3	0.44	55	C	17.6	0.53	75	C	21.8	0.60	93
S Shore - EB (S)	B	13.6	0.35	38	C	15.4	0.38	45	C	22.7	0.60	93
Fairgrounds - WB (S)	C	16.5	0.55	83	C	23.3	0.69	130	D	31.1	0.79	165
Surfside - SB (S)	D	26.8	0.77	175	E	45.4	0.90	270	F	78.0	> 1.0	373
<b>2. Fairgrounds Road/Ticcoma Way</b>												
Ticcoma - NB (S)	D	34.4	0.64	105	F	57.4	0.81	163	F	70.0	0.87	182
Fairgrounds - EB	A	7.8	0.00	< 25	A	7.8	0.00	< 25	A	7.9	0.00	< 25
Fairgrounds - WB	A	8.8	0.06	< 25	A	9.0	0.07	< 25	A	9.1	0.07	< 25
Driveway - SB (S)	C	21.7	0.05	< 25	D	25.8	0.07	< 25	D	27.5	0.07	< 25
<b>3. Fairgrounds Road/Newtown Road/Public Safety Driveway</b>												
Driveway - NB (S)	D	25.2	0.15	< 25	D	31.8	0.19	< 25	D	34.4	0.21	< 25
Fairgrounds - EB	A	8.3	0.12	< 25	A	8.6	0.14	< 25	A	8.6	0.15	< 25
Fairgrounds - WB	A	8.2	0.01	< 25	A	8.3	0.01	< 25	A	8.4	0.01	< 25
Newtown - SB (S)	D	34.9	0.55	75	F	59.5	0.74	123	F	71.7	0.80	140
<b>4. Fairgrounds Road/Old South Road</b>												
Old South - NB	A	9.6	0.21	< 25	B	10.3	0.28	28	B	10.4	0.28	30
Fairgrounds - EBL (S)	F	> 300	> 1.0	330	F	> 300	> 1.0	503	F	> 300	> 1.0	535
Fairgrounds - EBR (S)	C	21.3	0.63	108	D	31.2	0.77	170	D	33.6	0.79	185
<b>5. Old South Road/Planning Department Drive</b>												
Old South - NB	A	9.2	0.02	< 25	A	9.6	0.02	< 25	A	9.6	0.02	< 25
Driveway - EB (S)	D	31.6	0.39	43	F	51.2	0.53	68	F	52.4	0.54	68
<b>6. Old South Road/Amelia Drive</b>												
Old South - NB	A	9.6	0.10	< 25	B	10.2	0.12	< 25	B	10.2	0.12	< 25
Amelia - EB (S)	F	57.6	0.67	100	F	175.2	> 1.0	195	F	188.3	> 1.0	205
<b>7. Ticcoma Way/Amelia Drive</b>												
Amelia - WB (S)	A	9.6	0.11	< 25	A	9.8	0.12	< 25	A	9.8	0.12	< 25
Ticcoma - SB	A	7.6	0.06	< 25	A	7.7	0.07	< 25	A	7.7	0.07	< 25
Legend: (S) - Stop Sign (Y) - Yield Sign												
Note: Analysis assumes no changes to existing geometry for all conditions.												

Table 9: AM Peak Hour Capacity Analysis Results (Continued)

INTERSECTIONS	2018 Existing				2025 No-Build				2025 Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
8. Orange Street/Milestone Road/Old South Road/Sparks Avenue (Roundabout)												
Old South - NB (Y)	F	59.3	1.00	618	F	159.6	> 1.0	1,704	F	164.6	> 1.0	1,759
Milestone - WBLT (Y)	B	10.5	0.49	81	B	11.1	0.52	94	B	11.2	0.52	95
Milestone - WBR (Y)	B	10.4	0.48	77	B	11.0	0.51	90	B	11.0	0.51	90
Orange - SBL (Y)	A	9.4	0.41	55	B	10.4	0.46	67	B	10.4	0.46	67
Orange - SBTR (Y)	B	10.3	0.46	69	B	12.0	0.53	95	B	12.1	0.54	95
Sparks - EB (S)*	D	31.4	0.83	273	F	59.2	0.98	524	F	59.8	0.99	529
OVERALL	F	26.0	1.00	618	F	58.8	> 1.0	1,704	F	60.5	> 1.0	1,759
9. Sparks Avenue/Hooper Farm Road/Lower Pleasant Street (Roundabout)												
Hooper Farm - NB (Y)	C	20.0	0.74	231	D	28.9	0.84	339	D	31.7	0.87	380
Sparks - WB (Y)	C	16.1	0.68	196	C	24.0	0.80	322	D	25.6	0.82	335
Lwr Pleasant - SB (Y)	A	7.5	0.30	36	A	8.5	0.35	42	A	8.6	0.36	43
Sparks - EB (Y)	A	10.0	0.52	96	B	11.6	0.59	145	B	11.8	0.59	148
OVERALL	B	14.5	0.74	231	C	20.0	0.84	339	C	21.4	0.87	380
10. Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue												
Surfside - NB (S)	D	26.7	0.78	180	E	49.0	0.92	295	F	62.5	0.99	350
S Prospect - EB (S)	B	15.0	0.47	63	C	19.0	0.57	88	C	20.3	0.59	95
Sparks - WB (S)	C	21.8	0.67	125	D	32.5	0.79	188	E	36.0	0.82	203
Atlantic - SB (S)	B	11.9	0.19	< 25	B	13.5	0.24	< 25	B	14.0	0.26	25
11. Surfside Road/Bartlett Road												
Surfside - NB	A	10.0	0.24	< 25	B	10.4	0.27	28	B	10.5	0.28	28
Bartlett - EB (S)	F	> 300	> 1.0	728	F	> 300	> 1.0	893	F	> 300	> 1.0	923
12. Surfside Road/Miacomet Road/Surfside Drive												
Surfside - NB	A	8.2	0.02	< 25	A	8.3	0.02	< 25	A	8.3	0.03	< 25
Miacomet - EB (S)	F	74.2	0.79	133	F	170.3	> 1.0	213	F	229.7	> 1.0	245
Surfside Dr - WB (S)	E	38.9	0.66	110	F	87.7	0.93	200	F	150.1	> 1.0	263
Surfside - SB	A	8.7	0.14	< 25	A	9.0	0.15	< 25	A	9.2	0.16	< 25
Legend: (S) - Stop Sign (Y) - Yield Sign * Analyzed as Yield due to software limitations												
Note: Analysis assumes no changes to existing geometry for all conditions.												

Table 10: PM Peak Hour Capacity Analysis Results

INTERSECTIONS	2018 Existing				2025 No-Build				2025 Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
<b>1. South Shore Road/Fairgrounds Road/Surfside Road</b>												
Surfside - NB (S)	D	25.1	0.71	143	E	44.8	0.89	230	F	66.1	> 1.0	275
S Shore - EB (S)	B	14.6	0.31	33	C	18.0	0.39	43	D	25.5	0.60	78
Fairgrounds - WB (S)	D	26.5	0.73	153	E	47.9	0.93	248	F	86.9	> 1.0	350
Surfside - SB (S)	E	37.2	0.85	223	F	88.0	> 1.0	395	F	156.8	> 1.0	550
<b>2. Fairgrounds Road/Ticcoma Way</b>												
Ticcoma - NB (S)	E	38.1	0.70	123	F	69.3	0.89	195	F	90.6	0.97	228
Fairgrounds - EB	A	8.0	0.00	< 25	A	8.1	0.00	< 25	A	8.1	0.00	< 25
Fairgrounds - WB	A	8.3	0.03	< 25	A	8.5	0.04	< 25	A	8.5	0.04	< 25
Driveway - SB (S)	C	16.9	0.05	< 25	C	19.3	0.06	< 25	C	20.5	0.06	< 25
<b>3. Fairgrounds Road/Newtown Road/Public Safety Driveway</b>												
Driveway - NB (S)	C	20.6	0.12	< 25	D	25.1	0.15	< 25	D	27.3	0.17	< 25
Fairgrounds - EB	A	8.3	0.07	< 25	A	8.6	0.09	< 25	A	8.7	0.09	< 25
Fairgrounds - WB	A	8.1	0.01	< 25	A	8.3	0.01	< 25	A	8.3	0.01	< 25
Newtown - SB (S)	C	21.8	0.36	40	D	31.0	0.52	68	D	34.4	0.56	80
<b>4. Fairgrounds Road/Old South Road</b>												
Old South - NB	B	11.5	0.33	35	B	13.2	0.39	48	B	13.5	0.41	50
Fairgrounds - EBL (S)	F	> 300	> 1.0	185	F	> 300	> 1.0	275	F	> 300	> 1.0	300
Fairgrounds - EBR (S)	D	27.7	0.66	118	F	75.2	0.97	268	F	82.4	1.00	288
<b>5. Old South Road/Planning Department Drive</b>												
Old South - NB	A	9.5	0.02	< 25	B	10.3	0.02	< 25	B	10.3	0.02	< 25
Driveway - EB (S)	D	29.8	0.23	< 25	F	51.0	0.37	38	F	52.8	0.38	38
<b>6. Old South Road/Amelia Drive</b>												
Old South - NB	A	9.8	0.09	< 25	B	10.9	0.11	< 25	B	11.0	0.12	< 25
Amelia - EB (S)	F	91.3	0.86	150	F	> 300	> 1.0	293	F	> 300	> 1.0	310
<b>7. Ticcoma Way/Amelia Drive</b>												
Amelia - WB (S)	A	9.6	0.16	< 25	A	9.8	0.17	< 25	A	9.8	0.18	< 25
Ticcoma - SB	A	7.5	0.03	< 25	A	7.5	0.03	< 25	A	7.5	0.04	< 25
Legend: (S) - Stop Sign (Y) - Yield Sign												
Note: Analysis assumes no changes to existing geometry for all conditions.												

Table 10: PM Peak Hour Capacity Analysis Results (Continued)

INTERSECTION	2018 Existing				2025 No-Build				2025 Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
8. Orange Street/Milestone Road/Old South Road/Sparks Avenue (Roundabout)												
Old South - NB (Y)	D	32.0	0.84	291	E	49.2	0.96	543	E	49.9	0.96	554
Milestone - WBLT (Y)	C	15.0	0.68	201	C	22.0	0.79	306	C	22.5	0.80	314
Milestone - WBR (Y)	B	11.5	0.56	118	B	14.7	0.65	160	B	14.7	0.65	161
Orange - SBL (Y)	B	11.6	0.46	65	B	14.3	0.53	83	B	14.4	0.54	83
Orange - SBTR (Y)	C	17.4	0.65	135	D	33.9	0.86	285	E	35.3	0.87	298
Sparks - EB (S)*	F	67.1	> 1.0	597	F	183.9	> 1.0	1,597	F	189.2	> 1.0	1,629
OVERALL	F	27.5	> 1.0	597	F	58.5	> 1.0	1,597	F	59.9	> 1.0	1,629
9. Sparks Avenue/Hooper Farm Road/Lower Pleasant Street (Roundabout)												
Hooper Farm - NB (Y)	B	11.6	0.52	100	B	15.0	0.62	141	C	15.5	0.63	149
Sparks - WB (Y)	B	14.3	0.68	239	C	19.0	0.78	374	C	19.7	0.78	383
Lwr Pleasant - SB (Y)	B	10.5	0.47	77	B	12.8	0.55	108	B	13.4	0.57	117
Sparks - EB (Y)	B	13.7	0.60	135	C	18.9	0.71	204	C	19.9	0.73	214
OVERALL	B	12.8	0.68	239	C	16.9	0.78	374	C	17.6	0.78	383
10. Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue												
Surfside - NB (S)	E	38.2	0.84	218	F	93.2	> 1.0	380	F	113.2	> 1.0	425
S Prospect - EB (S)	D	26.1	0.70	135	F	54.3	0.94	240	F	64.9	> 1.0	268
Sparks - WB (S)	E	38.4	0.83	203	F	84.4	> 1.0	333	F	93.4	> 1.0	345
Atlantic - SB (S)	C	18.9	0.49	65	D	29.2	0.68	110	D	33.8	0.75	128
11. Surfside Road/Bartlett Road												
Surfside - NB	B	10.1	0.28	30	B	10.8	0.32	32	B	11.0	0.33	38
Bartlett - EB (S)	F	> 300	> 1.0	608	F	> 300	> 1.0	800	F	> 300	> 1.0	845
12. Surfside Road/Miacomet Road/Surfside Drive												
Surfside - NB	A	8.7	0.04	< 25	A	8.9	0.05	< 25	A	9.0	0.05	< 25
Miacomet - EB (S)	F	> 300	> 1.0	248	F	> 300	> 1.0	363	F	> 300	> 1.0	465
Surfside Dr - WB (S)	F	122.4	> 1.0	283	F	> 300	> 1.0	478	F	> 300	> 1.0	613
Surfside - SB	A	8.7	0.11	< 25	A	9.0	0.13	< 25	A	9.1	0.14	< 25
Legend: (S) - Stop Sign (Y) - Yield Sign * Analyzed as Yield due to software limitations Note: Analysis assumes no changes to existing geometry for all conditions.												

The following five intersections operate with at least one movement at LOS F for Existing Conditions in the both AM and PM peak hour:

- Fairgrounds Road/Old South Road
  - Fairgrounds Road Left Turn – AM and PM
- Old South Road/Amelia Drive
  - Amelia Drive – AM and PM
- Orange Street/Milestone Road/Old South Road/Sparks Avenue
  - Old South Road – AM
  - Sparks Avenue – PM
- Surfside Road/Bartlett Road
  - Bartlett Road – AM and PM
- Surfside Road/Miacomet Road/Surfside Drive
  - Miacomet Road – AM and PM
  - Surfside Drive – PM

At least one movement deteriorates to LOS F under No-Build conditions at the following eight intersections:

- South Shore Road/Fairgrounds Road/Surfside Road
  - Surfside Road Southbound – PM
- Fairgrounds Road/Ticcoma Way
  - Ticcoma Way – AM and PM
- Fairgrounds Road/Newtown Road/Public Safety Driveway
  - Newtown Road – AM
- Fairgrounds Road/Old South Road
  - Fairgrounds Road Right Turn – PM
- Old South Road/Planning Dept. Driveway
  - Planning Dept. Driveway – AM and PM
- Orange Street/Milestone Road/Old South Road/Sparks Avenue
  - Sparks Avenue – AM
- Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue
  - Surfside Road – PM
  - South Prospect Street – PM
  - Sparks Avenue – PM
- Surfside Road/Miacomet Road/Surfside Drive
  - Surfside Drive – AM

Project generated traffic will cause at least one intersection movement to deteriorate to LOS F under Build conditions at two intersections:

- South Shore Road/Fairgrounds Road/Surfside Road
  - Surfside Road Southbound – AM
  - Surfside Road Northbound – PM
  - Fairgrounds Road – PM
- Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue
  - Surfside Road – AM

#### 4.3 TRAFFIC CAPACITY ANALYSIS RESULTS – FUTURE IMPROVEMENTS

Coordination with the Town of Nantucket revealed proposed improvements or geometric changes to four of the study area intersections. Future single lane roundabouts are proposed at three locations: Fairgrounds Road/Old South Road; Surfside Road/Sparks Avenue/Atlantic Avenue/South Prospect Street; and Surfside Road/Bartlett Road. An upgraded two-lane hybrid roundabout design is proposed at the Old South Road/Milestone Road/Orange Street/Sparks Avenue roundabout.

While all of these improvements may not all be fully constructed within the seven year design horizon, to provide a comprehensive analysis the 2025 No-Build and 2025 Build conditions were analyzed assuming the proposed improvements were in place.

A summary of the AM Peak Hour and PM Peak Hour capacity analysis results are displayed in Table 11 and Table 12, respectively. Movements that were found to operate with level of service (LOS) F, delays with greater than 300 seconds (5 minutes) of delay, and/or volume to capacity ratio larger than 1.0 are highlighted in red text.

Table 11: AM Peak Hour Capacity Analysis Results (Future Improvements)

INTERSECTIONS	2025 No-Build				2025 Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
<b>4. Fairgrounds Road/Old South Road (Roundabout)</b>								
Old South - NB (Y)	D	29.0	0.90	897	D	31.1	0.91	950
Old South - SB (Y)	B	13.3	0.65	201	B	13.5	0.65	208
Fairgrounds - EBL (Y)	A	7.2	0.24	< 25	A	7.3	0.25	25
Fairgrounds - EBR (Y)	B	10.2	0.47	75	B	10.5	0.48	80
OVERALL	C	18.9	0.90	897	C	19.9	0.91	950
<b>8. Orange Street/Milestone Road/Old South Road/Sparks Avenue (Hybrid Roundabout)</b>								
Old South - NBL (Y)	A	9.6	0.32	31	A	9.6	0.32	31
Old South - NBTR (Y)	D	26.1	0.81	243	D	27.0	0.82	254
Milestone - WBLT (Y)	B	12.9	0.57	103	B	13.0	0.57	104
Milestone - WBR (Y)	C	15.4	0.61	120	C	15.6	0.61	121
Orange - SBL (Y)	B	12.2	0.50	78	B	12.3	0.50	78
Orange - SBTR (Y)	B	12.1	0.53	90	B	12.1	0.54	91
Sparks - EBTL (Y)	B	14.8	0.58	97	B	14.8	0.58	97
Sparks - EBR (Y)	A	9.3	0.29	27	A	9.4	0.29	27
OVERALL	C	15.4	0.81	243	C	15.7	0.82	254
<b>10. Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue (Roundabout)</b>								
Surfside - NB (Y)	A	9.2	0.50	81	A	9.6	0.52	87
Sparks - WB (Y)	A	8.6	0.42	59	A	8.9	0.43	61
Atlantic - SB (Y)	A	6.6	0.15	< 25	A	6.8	0.16	< 25
S Prospect - EB (Y)	A	7.3	0.32	39	A	7.4	0.32	40
OVERALL	A	8.3	0.50	39	A	8.6	0.52	87
<b>11. Surfside Road/Bartlett Road (Roundabout)</b>								
Surfside - NB (Y)	A	8.9	0.50	84	A	9.4	0.53	92
Surfside - SB (Y)	A	9.0	0.47	73	A	9.2	0.48	76
Bartlett - EB (Y)	A	9.7	0.45	61	A	9.9	0.46	65
OVERALL	A	9.1	0.50	84	A	9.4	0.53	92
Legend: (Y) - Yield Sign								
Note: Analysis assumes proposed future geometric improvements.								

Table 12: PM Peak Hour Capacity Analysis Results (Future Improvements)

INTERSECTIONS	2025 No-Build				2025 Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
<b>4. Fairgrounds Road/Old South Road (Roundabout)</b>								
Old South - NB (Y)	B	11.8	0.66	159	B	12.2	0.67	166
Old South - SB (Y)	E	46.1	0.99	1,203	F	51.6	> 1.0	1,348
Fairgrounds - EBL (Y)	A	7.2	0.15	< 25	A	7.3	0.15	14
Fairgrounds - EBR (Y)	B	14.2	0.53	84	B	14.5	0.54	87
OVERALL	D	26.9	0.99	1,203	F	29.3	> 1.0	1,348
<b>8. Orange Street/Milestone Road/Old South Road/Sparks Avenue (Hybrid Roundabout)</b>								
Old South - NBL (Y)	A	9.0	0.28	26	A	9.0	0.28	26
Old South - NBTR (Y)	C	17.0	0.65	130	C	17.2	0.66	133
Milestone - WBLT (Y)	C	20.5	0.78	278	C	21.0	0.78	285
Milestone - WBR (Y)	C	17.3	0.69	184	C	17.4	0.69	185
Orange - SBL (Y)	C	16.1	0.57	90	C	16.2	0.57	91
Orange - SBTR (Y)	D	28.1	0.81	237	D	29.2	0.82	247
Sparks - EBTL (Y)	C	20.8	0.68	129	C	21.2	0.69	131
Sparks - EBR (Y)	B	14.3	0.46	57	B	14.5	0.47	57
OVERALL	C	19.3	0.81	228	C	19.6	0.82	285
<b>10. Sparks Avenue/Surfside Road/S. Prospect Street/Atlantic Avenue (Roundabout)</b>								
Surfside - NB (Y)	A	8.5	0.45	69	A	8.8	0.47	73
Sparks - WB (Y)	A	7.3	0.39	58	A	7.5	0.40	59
Atlantic - SB (Y)	A	8.0	0.32	37	A	8.3	0.34	40
S Prospect - EB (Y)	B	13.3	0.54	100	B	14.3	0.57	111
OVERALL	A	9.3	0.54	100	A	9.8	0.57	111
<b>11. Surfside Road/Bartlett Road (Roundabout)</b>								
Surfside - NB (Y)	B	10.1	0.56	107	B	10.4	0.58	113
Surfside - SB (Y)	B	13.1	0.64	194	B	14.1	0.67	230
Bartlett - EB (Y)	A	8.2	0.39	52	A	8.6	0.40	54
OVERALL	B	10.8	0.64	194	B	11.5	0.67	230
Legend: (Y) - Yield Sign								
Note: Analysis assumes proposed future geometric improvements.								

As seen in the tables, all four of the roundabouts would operate at acceptable conditions (LOS D or better) in the AM peak hour for both the No-Build and Build conditions. In the PM peak hour, three of the roundabouts would operate at LOS D or better in both the No-build and Build conditions. However, the Old South Road southbound approach to the intersection of Fairgrounds Road/Old South Road operates at LOS E in the No-Build and degrades to LOS F in the Build condition. The long queue associated with this approach in the PM peak hour will impact operating conditions at the Orange Street/Milestone Road/Old South Road/Sparks Avenue roundabout.

#### 4.4 TRAFFIC CAPACITY ANALYSIS – PROJECT SCALE SENSITIVITY

The Town of Nantucket requested BETA evaluate the study area intersection of South Shore Road/Fairgrounds Road/Surfside Road assuming the proposed Surfside Crossing project scope is reduced. The intersection was evaluated assuming a 25% reduction and a 50% reduction in dwelling

units and project generated trips. A summary of intersection capacity analysis results are displayed in Table 13 and Table 14 for the AM and PM peak hours, respectively. In addition, each table provides the 2025 No-Build and 2025 Full Build operating conditions for ease of review.

Table 13: AM Peak Hour Capacity Analysis Results (Reduced Project Scope)

INTERSECTIONS	2025 No-Build				2025 Full Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
1. South Shore Road/Fairgrounds Road/Surfside Road								
Surfside - NB (S)	C	17.6	0.53	75	C	21.8	0.60	93
S Shore - EB (S)	C	15.4	0.38	45	C	22.7	0.60	93
Fairgrounds - WB (S)	C	23.3	0.69	130	D	31.1	0.79	165
Surfside - SB (S)	E	45.4	0.90	270	F	78.0	> 1.0	373

INTERSECTIONS	2025 Build (25% Reduction)				2025 Build (50% Reduction)			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
1. South Shore Road/Fairgrounds Road/Surfside Road								
Surfside - NB (S)	C	21.1	0.59	90	C	20.2	0.57	88
S Shore - EB (S)	C	20.6	0.55	80	C	18.9	0.49	68
Fairgrounds - WB (S)	D	30.3	0.77	163	D	28.6	0.74	158
Surfside - SB (S)	F	72.1	1.00	358	F	63.5	0.98	333
Legend: (S) - Stop Sign								

Table 14: PM Peak Hour Capacity Analysis Results (Reduced Project Scope)

INTERSECTIONS	2025 No-Build				2025 Full Build			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
1. South Shore Road/Fairgrounds Road/Surfside Road								
Surfside - NB (S)	E	44.8	0.89	230	F	66.1	> 1.0	275
S Shore - EB (S)	C	18.0	0.39	43	D	25.5	0.60	78
Fairgrounds - WB (S)	E	47.9	0.93	248	F	86.9	> 1.0	350
Surfside - SB (S)	F	88.0	> 1.0	395	F	156.8	> 1.0	550

INTERSECTIONS	2025 Build (25% Reduction)				2025 Build (50% Reduction)			
	LOS	Delay (s/veh)	v/c	95% Q (feet)	LOS	Delay (s/veh)	v/c	95% Q (feet)
1. South Shore Road/Fairgrounds Road/Surfside Road								
Surfside - NB (S)	F	61.7	> 1.0	268	F	55.0	0.96	255
S Shore - EB (S)	C	23.5	0.55	68	C	21.3	0.49	58
Fairgrounds - WB (S)	F	75.8	> 1.0	323	F	65.2	> 1.0	298
Surfside - SB (S)	F	150.1	> 1.0	545	F	126.6	> 1.0	490
Legend: (S) - Stop Sign								

As expected, any reduction in trips generated by the project will decrease delays and queues at the South Shore Road/Fairgrounds Road/Surfside Road intersection when compared to the 2025 Build Condition. The 25% reduction in project trips was found to represent approximately 10% reduction in vehicle delay for approaches operating at LOS F. The 50% reduction in project trips reduced the delay of these approaches by approximately 20%. While these LOS F approaches decreased in delay, they do not improve to LOS E operating conditions experienced in the 2025 No-Build.

As noted in Table 8 in Section 4.1, the threshold for LOS F operations is more than 50 seconds of average delay per vehicle. Under the 2025 No-Build Conditions, one approach (Surfside Road Southbound) in the AM peak hour and three approaches (Surfside Road Northbound/Southbound, and Fairgrounds Road) in the PM peak hour operate at 45 seconds of delay per vehicle or higher. For these approaches, a reduction in project scope (alone) will not significantly improve operating conditions.

#### 4.5 SITE ACCESS, CIRCULATION, AND PARKING

Access to the proposed project would be from three full-access driveways on the north side of South Shore Road along the project frontage (see Figure 19). Each driveway would form a new T-intersection with the driveway being the minor leg of the intersection. It is noted that there is an existing driveway to a home across from the proposed middle site driveway. There is no Stop control indicated on the project site plan. Stop signs and bars should be provided on the driveway southbound approach for each new T-intersection.

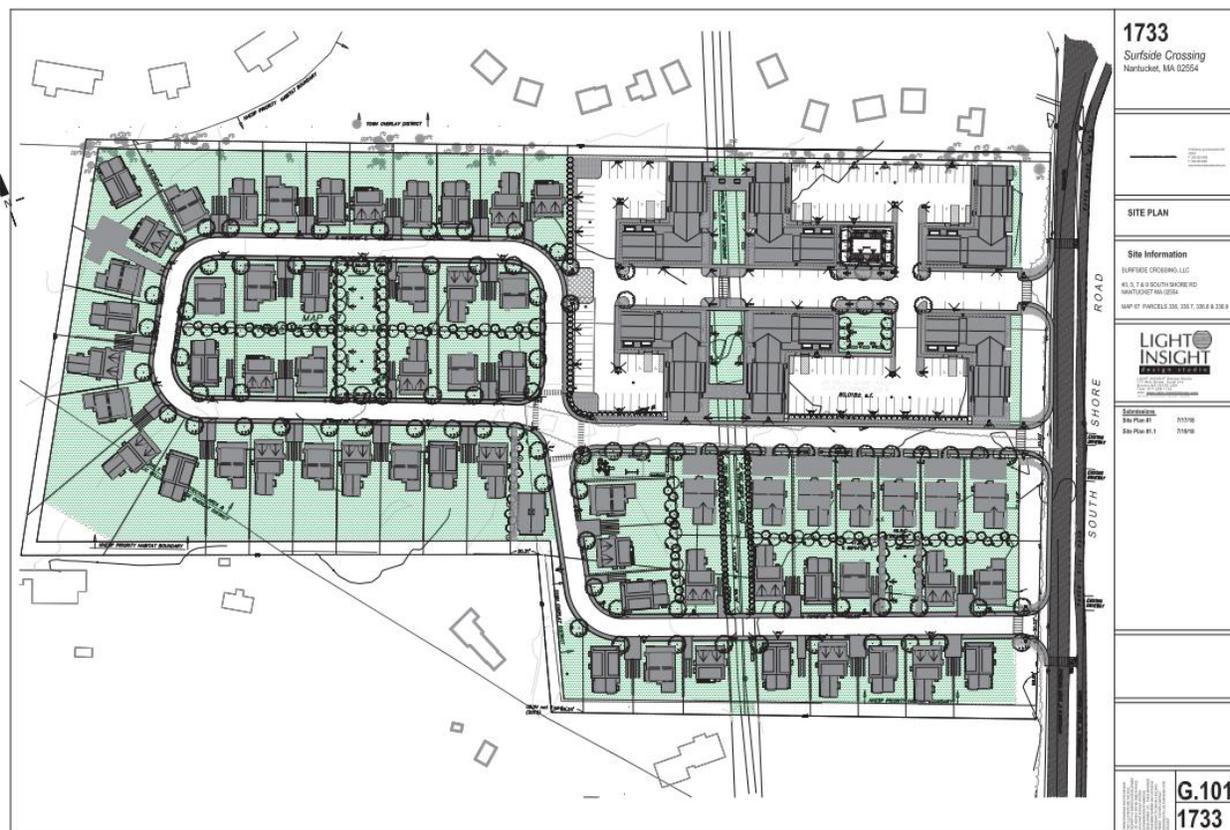


Figure 19: Surfside Crossing Site Plan  
(Source: LIGHT INSIGHT Design Studio, 07/19/2018)

The east driveway provides access to the 96 condominium units. The center driveway provides direct access to seven single-family homes and access to the 36 homes at the north end via a loop roadway. The west driveway provides direct access to 17 homes and access to the 36 homes at the north end via a loop roadway. The three driveways are closely-spaced and may create conflicts between motorists turning left exiting the south and center site driveways with those exiting turning right exiting the center and north driveways, respectively.

Two driveways are not needed to serve the traffic generated by the single-family homes portion of the site (see Section 3.2.1). Consideration should be given to eliminating one of the access driveways. Two potential options for consideration are presented below. Both options would provide two full access driveways that serve all units on the site.

Option 1: Eliminate the east driveway and provide a connection from the center driveway to the condominium units located to the east. A small number of proposed parking spaces within the condominium area would need to be relocated or eliminated.

Option 2: Eliminate the center driveway and connect the condominium access roadway on the west end with the north half of the loop roadway for the single-family homes. The connection between the condominium and single-family roadways would also improve circulation for emergency vehicles. Eliminating the center drive would require 1) providing a cul-de-sac at the south end of the center roadway; or 2) eliminating the seven units along the center roadway.

BETA evaluated traffic operations conditions at the proposed site driveways and found all three site driveways to operate at LOS B or better during the AM and PM peak hours. The project site was also evaluated assuming one site driveway instead of three. Applying all of the site generated trips to one driveway did not significantly degrade operating conditions, with the driveway experiencing LOS B or better in the AM and PM peak hour.

There is a hammer-head type parking area that serves three single-family houses in the northwest corner of the project site. The Fire Department should indicate if this area provides adequate emergency access, even when the spaces are occupied.

#### 4.5.1 SIGHT DISTANCE EVALUATION

Sight distance was evaluated for the three proposed site driveways along South Shore Road based on the American Association of State Highway and Transportation Officials' (AASHTO's) *A Policy on Geometric Design of Highways and Street, 2011 Edition (Green Book)*. The *Green Book* discusses two types of sight distance: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD).

Stopping Sight Distance refers to the minimum required distance a vehicle can see an obstruction such that they have an adequate time to perceive and react to the obstruction and successfully apply the brake and stop the vehicle without striking the obstruction. Intersection Sight Distance refers to the minimum desired distance an entering vehicle can see an oncoming vehicle such that they can safely enter the roadway. According to AASHTO, if the provided ISD is equal to or greater than the required SSD for an oncoming vehicle, then adequate sight distance is available to avoid a crash.

Based on the posted 30 MPH speed limit along South Shore Road, the AASHTO recommended SSD is 200 feet for an approaching vehicle. The AASHTO recommended ISD for exiting vehicles is 290 feet (looking left) and 335 feet (looking right). Field observations conducted in July 2018 confirmed South Shore Road's straight and relatively level profile that provides clear views ( $\geq 500$  feet) in both directions. With subsequent clearing and grubbing of trees and vegetation, adequate sight distance can be provided for each driveway.

#### 4.5.2 PEDESTRIAN ACCESSIBILITY

Crosswalks on South Shore Road are proposed east of the East Site Drive and west of the West Site Drive. Each of the two new crosswalks on South Shore Road should include handicap ramps, detectable warning panels, MUTCD pedestrian crosswalk signs and advance crosswalk signs and Stop signs for the South Shore Bike path northbound approach to South Shore Road.

Sidewalks are proposed on the north side of South Shore Road between the three proposed driveways. Consideration should be given to extending the sidewalk east to the intersection of with Surfside Road and Fairgrounds Road. This would provide pedestrian access to the NRTA bus stop.

There are sidewalks provided within the site to all residential units. However, there are no pedestrian connections provided between the condominium units and the single-family homes on-site or to adjacent developments. The Nantucket Regional Transportation Plan (2016) includes the following policy: Coordinate the Town's efforts to construct bicycle and pedestrian facilities with those of private developers who contribute to the construction of on-site and off-site paths as a condition of approval.<sup>3</sup> Consideration should be given to utilizing the sewer easement to provide pedestrian facilities to connect:

- The condominium units with the single-family homes on-site;
- The north end of the site with the Nanina Drive development to the north; and
- The south end of the site with the Wherowhero Lane development to the south.

#### 4.5.3 PARKING

There are a total of 148 parking spaces proposed for the condominium portion of the site. This represents 1.54 parking spaces per dwelling unit and exceeds the Town's requirement of 138 spaces by 10 spaces. The site plan shows two tandem style parking spaces for each single-family home which meets the zoning regulation of two spaces per unit for this area. The spaces closest to the road are shown to be fully paved and the spaces closest to the houses are shown to have two paved strips for wheel tracks. There is no separation between parking spaces for adjacent homes. The Town should determine if the proposed parking arrangement for the single-family homes is adequate.

The project internal roadways serving the single-family homes are 20 or 24 feet wide. No on-street parking is indicated on the roadways serving the single-family homes. The proposed width of the internal roadways would not be adequate to allow on-street parking on both sides. The project proponent should identify the intended use for on-street parking on-site and have approved by the Nantucket Fire Department.

The project proponent should indicate if parking spaces within the condominium area meet the Town's standard of not less than nine feet wide by 20 feet in length and for aisle width. The project proponent should indicate if the proposed screening of parking for the condominiums meets the Town's Zoning Regulations.

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<sup>3</sup> Nantucket Regional Transportation Plan, 2016, Multi-Modal, 3.2.2.2.

## 5.0 RECOMMENDATIONS

BETA Group, Inc. recommends the following:

1. Consider a roundabout at the intersection of South Shore Road/Fairgrounds Road/Surfside Road

The following movements at this intersection will deteriorate to LOS F conditions in the Build condition as a result of project generated traffic:

- Surfside Rd SB AM: LOS E 45 seconds No-Build; LOS F 78 seconds Build
- Surfside Rd SB PM: LOS F 88 seconds No-Build; LOS F 157 seconds Build
- Surfside Rd NB PM: LOS E 45 seconds No-Build; LOS F 66 seconds Build
- Fairgrounds Rd SB PM: LOS E 48 seconds No-Build; LOS F 87 seconds Build

This intersection was evaluated for the Build conditions assuming a single-lane roundabout geometry. As a roundabout, the intersection would operate at LOS A in the AM peak hour and LOS A in the PM peak hour for the Build condition.

It is also recommended that consideration be given to relocate the NRTA bus stop on the Fairgrounds Road westbound approach of the intersection to the Surfside Road southbound departure lane.

2. Consider safety and capacity improvements at the intersection of Surfside Road/Miacomet Road/Surfside Drive

This intersection has experienced 12 crashes including one pedestrian/bicycle crash between 2012 and 2016, falls within a MassDOT HSIP Crash Cluster (2013-2015), and experiences high pedestrian and bicycle volumes. Motorists on Miacomet Road must edge into the Surfside Bike Path to see oncoming traffic on Surfside Road. The eastbound and westbound approaches at the intersection operate at LOS F for both peak hours for the No-Build and Build conditions. Consider providing better separation between the Miacomet Road Stop bar and the Bike Path and intersection capacity improvements such as a roundabout in the long-term.

3. Consider eliminating one project site access driveways on South Shore Road

Two driveways are not needed to serve the traffic generated by the single-family homes portion of the site. Consideration should be given to eliminating one of the access driveways.

4. Address Pedestrian Accessibility Concerns

Sidewalks are proposed on the north side of South Shore Road between the three proposed site driveways. Consideration should be given to extending the sidewalk east to the intersection of with Surfside Road and Fairgrounds Road.

Each of the two new proposed crosswalks on South Shore Road should include handicap ramps, detectable warning panels, MUTCD pedestrian crosswalk signs and advance crosswalk signs and Stop signs for the South Shore Bike path northbound approach to South Shore Road.

There are sidewalks provided within the site to all residential units. However, there are no pedestrian connections provided between the condominium units and the single-family homes

on-site or to adjacent developments. Consideration should be given to utilizing the sewer easement to provide pedestrian facilities to connect:

- The condominium units with the single-family homes on-site;
- The north end of the site with the Nanina Drive development to the north; and
- The south end of the site with the Wherowhero Lane development to the south

5. Address Site Circulation and Parking Concerns

- There is no Stop control indicated on the three project site driveways on South Shore Road. Stop signs should be installed at the project site driveway approaches to South Shore Road.
- The Town should determine if the proposed tandem parking spaces and separation between spaces at adjacent single-family homes is acceptable.
- The project proponent should indicate if the Town's Standards are met for parking aisle width (12 feet) and parking space dimensions (not less than nine feet wide by 20 feet in length) for the condominium parking area. The project proponent should indicate if the proposed screening of parking for the condominiums meets the Town's Zoning Regulations.
- The project internal roadways serving the single-family homes are 20 or 24 feet wide. No on-street parking is indicated on the roadways serving the single-family homes. The proposed width of the internal roadways would not be adequate to allow on-street parking on both sides. Backing out of driveways with vehicles parked on-street may be difficult. The project proponent should identify the intended use for on-street parking on-site and obtain approval by the Nantucket Fire Department.
- There is a hammer-head type parking area that serves three single-family houses in the northwest corner of the project site. The Nantucket Fire Department should indicate if this area provides adequate emergency access, even when the spaces are occupied.