



# MAIN STREET/CR 533

## ROAD SAFETY AUDIT

### Manville, Somerset County, New Jersey

#### REPORT

>> August 2015

RSA facilitated by the Transportation Safety Resource Center (TSRC) at the Rutgers Center for Advanced Infrastructure and Transportation (CAIT) in partnership with the North Jersey Transportation Planning Authority (NJTPA) and Somerset County, with funding provided by FHWA and NJDOT.

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## >> INTRODUCTION

### **WHAT IS A ROAD SAFETY AUDIT (RSA)?**

The Center for Advanced Infrastructure and Transportation's (CAIT) Transportation Safety Resource Center (TSRC) and New Jersey Local Technical Assistance Program (NJ LTAP) offer a statewide Road Safety Audit (RSA) service at no charge to New Jersey towns and counties. Interested parties can request an RSA conducted by a team of engineers, planners, and law enforcement officers to help municipalities and counties make cost-effective safety improvements.

A multidisciplinary team of professionals offers assessments on roadway issues such as pedestrian and bicycle safety, intersection analyses, rural roads, human factors, speed management, and sign visibility and retroreflectivity standards.

RSAs include data-driven considerations and analysis of crashes. To determine the best safety solutions, RSA professionals perform incisive crash data evaluations on the target area using Plan4Safety, TSRC's award-winning crash database and software.

The RSA team provides a final report that includes long- and short-term countermeasure recommendations that fit within the requestor's budget. Furthermore, RSAs pay off. According to the Federal Highway Administration (FHWA), countermeasures applied after RSAs can reduce crashes by about 60 percent.

For more information, contact Safety Program Manager Andy Kaplan at [andy.kaplan@rutgers.edu](mailto:andy.kaplan@rutgers.edu).

### **DISCLAIMER**

A Road Safety Audit report provided by the CAIT staff does not constitute an engineering report. The agency responsible for design and construction should consult a professional engineer licensed by the State of New Jersey in preparing the design and construction documents to implement any of the safety countermeasures in this report.

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Rutgers' Center for Advanced Infrastructure and Transportation. This report does not constitute a standard, specification, or regulation. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. The US government assumes no liability for the contents or use thereof.

## EXECUTIVE SUMMARY

The Road Safety Audit (RSA) along a one-mile corridor of County Route 533, Main Street in Manville, Somerset County, was chosen as a result of the 2014 NJTPA network screening of crashes on county and municipal roadways. The network screening ranking was created utilizing the database in Plan4Safety of the New Jersey Department of Transportation, developed and maintained by Rutgers Transportation Safety Resource Center. The crashes were weighted according to severity. The segment of Main Street between Kennedy Boulevard and Dukes Parkway was ranked the number one most dangerous pedestrian corridor in Somerset County. On the list of pedestrian spots, Main Street at Beekman Street ranked number two in the county. The RSA process helped to identify safety issues, evaluate risks and suggest countermeasures. This document is the final report for the RSA conducted in Manville. The result, detailed in this report, is a summary of the corridor's safety history from 2010-2012 and a list of the RSA team's recommended improvements.

Main Street (CR 533) is a heavily traveled north-south roadway, an Urban Minor Arterial. In the RSA area it connects with NJ 22 in the north. The cross section of the roadway varies between two and five lanes, with parking in many locations, and sidewalks throughout; the speed limit varies from 25 mph to 40 mph.

Along the one-mile segment, there are numerous small businesses, Manville municipal offices, and two large mall parking lots. There is no NJ Transit bus traffic along Main Street, but there is Somerset County bus service. Six of the intersections are signalized, and nine are unsignalized.

As this corridor ranked as a pedestrian crash corridor, the RSA team's emphasis was on the issues facing pedestrians, and improvements for their safety. Additional issues included speeding, difficulty with lane delineation, and a significant number of left-turn crashes with injuries.

An evaluation was undertaken on alternatives for improving facilities for pedestrians. A road diet in the north section of the RSA (with the wide cross section) has been recommended. This would help with speeding, lane delineation, and pedestrian accommodations. At the unsignalized intersections, bulbouts would help with pedestrian crossing, and better define the intersection.

## >> 1.0 CORRIDOR DESCRIPTION AND ANALYSIS

### 1.1 SITE SELECTION

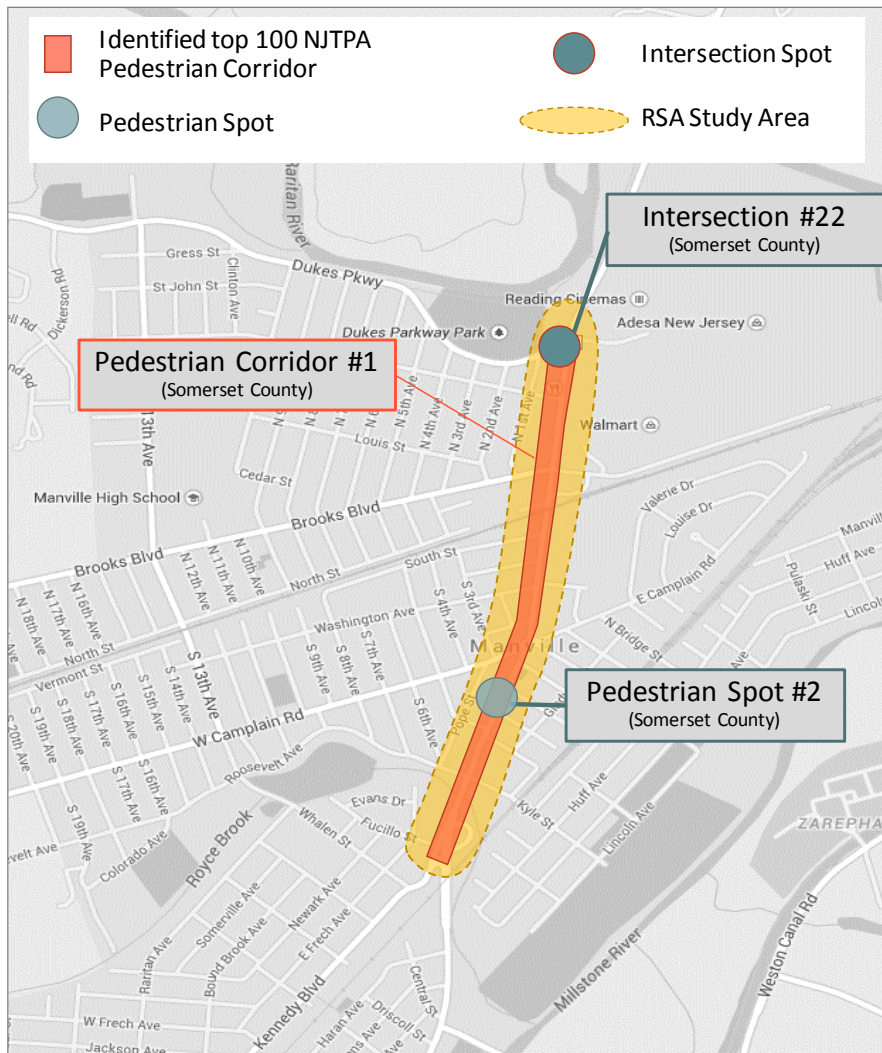


Figure 1 – Network Screening crash locations

As a result of a network screening analysis completed by TSRC for NJTPA, Somerset County requested that a Road Safety Audit be conducted in this corridor in order to improve safety for vehicular traffic and pedestrians. The network screening revealed that on the ranked list for pedestrian corridors, the segment from Kennedy Boulevard to Dukes Parkway ranked number one in Somerset County and number 46 in all of NJTPA. In addition, the pedestrian spot at Beekman Street ranked number two in Somerset County and number 164 in all of NJTPA. One intersection along the corridor, Dukes Parkway, ranked number 22 within Somerset County.

Safety Focus	NJTPA 2014 Ranking	County 2014 Ranking
Pedestrian Corridor	46	1
Pedestrian Hot Spot (Beekman Street)	164	2
Intersection (Dukes Parkway)	813	22

Figure 2 – RSA Network Screening rankings

## 1.2 TRAFFIC VOLUMES

The traffic count for Main Street at South Street was 22,061 in 2013. The south AADT was 11,312 and the north AADT was 10,750 (see Appendix C for Traffic Volumes)

## 1.3 TRANSIT SERVICE

There are a few bus lines operated by Somerset County that connect Hillsborough Township in the southwest with Somerville and Bedminster Township to the north. These buses operate Monday through Friday only.

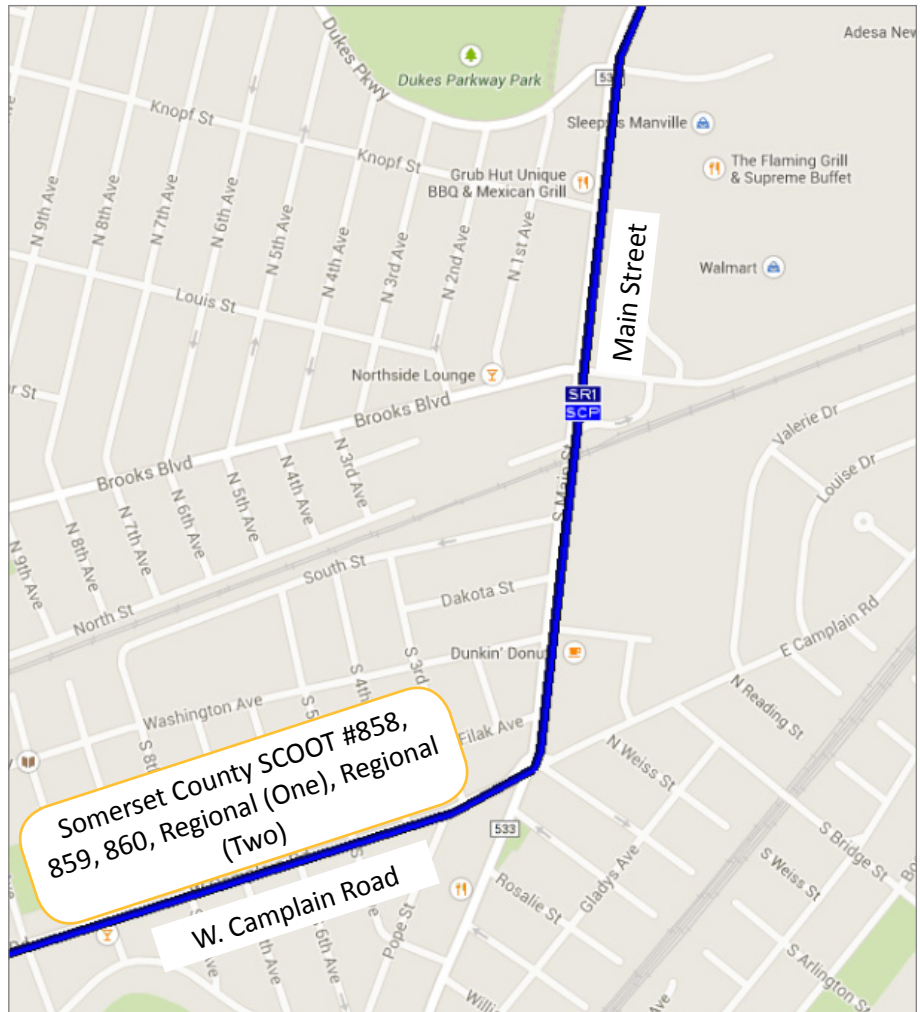


Figure 4 – Transit route in RSA corridor

## 1.4 AREA CHARACTERISTICS

Main Street (County Route 533) is an Urban Minor Arterial that runs 15 miles from Route 206 in the south to the Manville/Bridgewater border in the north (CR 533 changes to CR 633). North of Manville, it connects to I-287 and NJ 22. In the area of the Road Safety Audit, the cross section of the roadway varies between two and five lanes and the speed limit varies between 25 mph to 40 mph.

Main Street is a heavily traveled roadway both for accessing the adjacent businesses as well as an alternative north-south route (such as Route 206). There are numerous small businesses along the road, Manville municipal offices, and two large mall parking lots (including the ADESA Auto Auction, which generates a lot of traffic.)

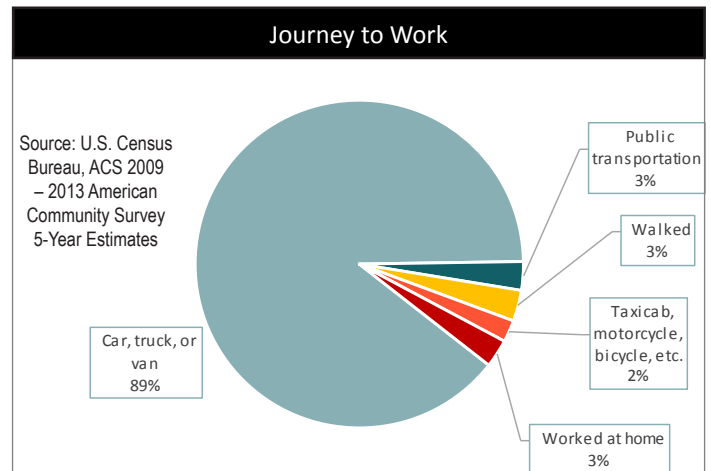


Figure 3 – Identified modes of travel to work

## 1.5 INTERSECTION CHARACTERISTICS

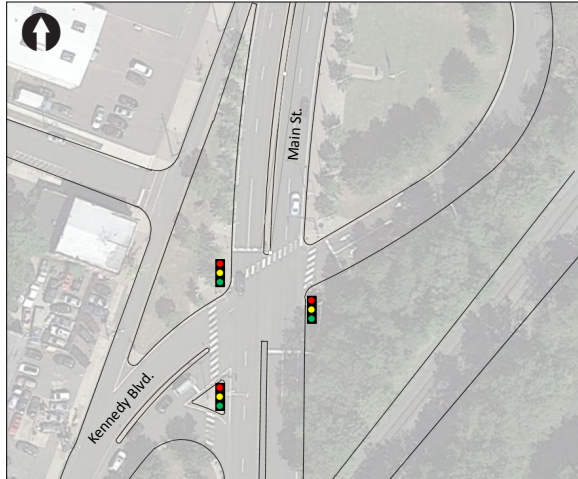


Figure 5 – Kennedy Boulevard & Main Street

### Kennedy Boulevard

- Signalized
- Main Street—two lanes in each direction with no turns
- Ramp for northbound traffic to westbound Kennedy Boulevard
- Kennedy Boulevard—eastbound all turning movements allowed
- No parking



Figure 6 – Roosevelt Avenue/Kyle Street & Main Street

### Roosevelt Avenue/ Kyle Street

- Signalized
- Left turn lanes on Main Street
- No parking south of intersection; north of the intersection there is parking on west side of roadway
- One lane in each direction north of intersection, two southbound lanes south of the intersection
- Very wide southbound lane, north of the intersection

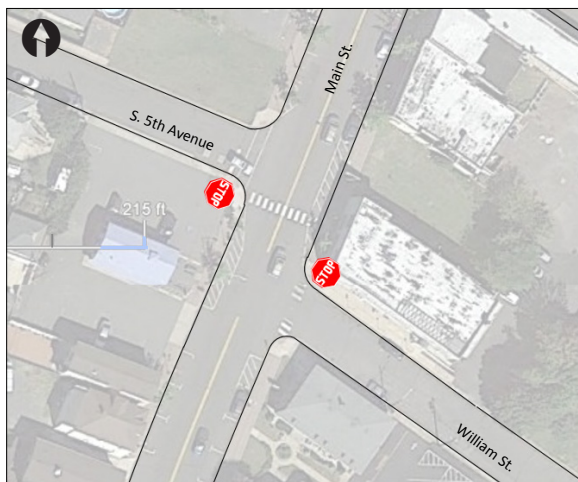


Figure 7 – S. Fifth Avenue/William Street & Main Street

### South Fifth Avenue/William Street

- Stop controlled
- Offset cross streets
- Two way traffic on cross streets

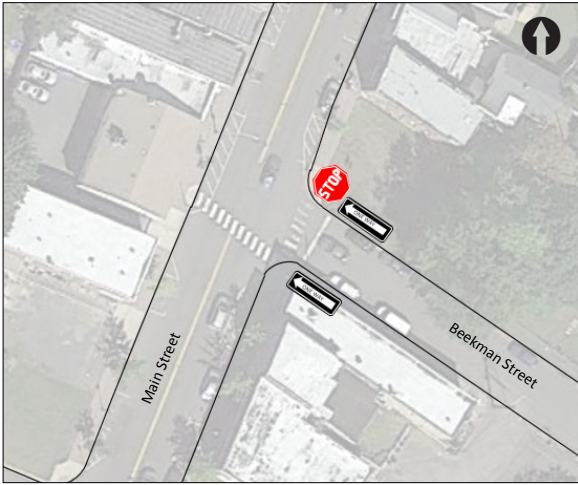


Figure 8 – Beekman Street & Main Street

**Beekman Street**

- Stop controlled
- T-intersection
- One-way westbound (toward Main Street)

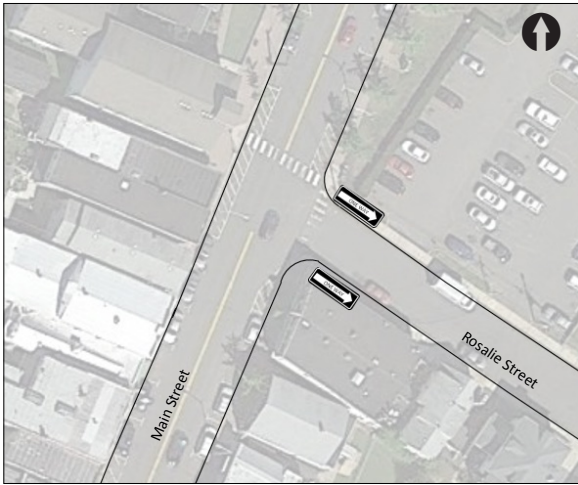


Figure 9 – Rosalie Street & Main Street

**Rosalie Street**

- T-intersection
- One way eastbound (away from Main Street)

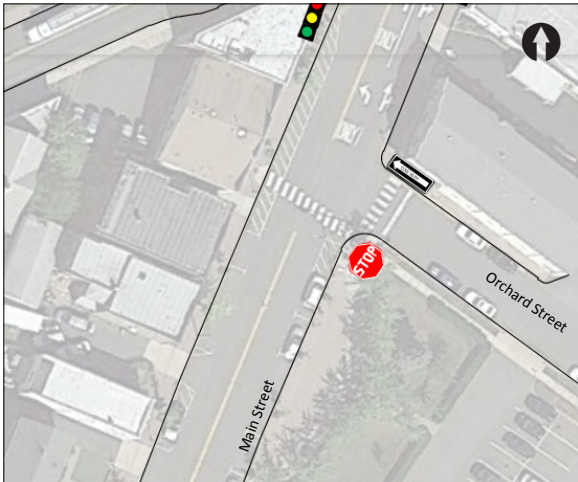


Figure 10 – Orchard Street & Main Street

**Orchard Street**

- Stop controlled
- T-intersection
- One way westbound (toward Main Street)



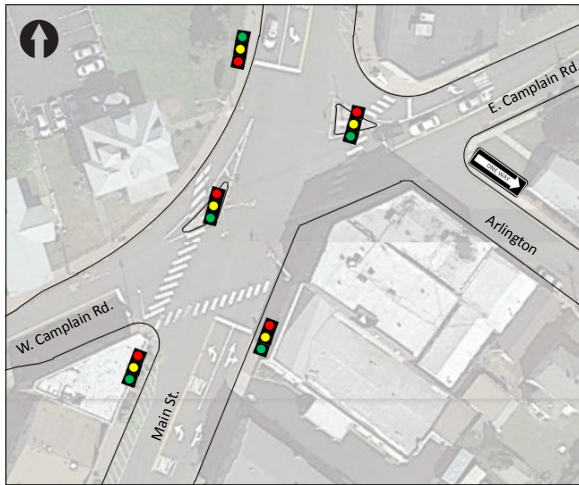


Figure 12 – Camplain Road & Main Street

### Camplain Road

- Signalized—Camplain Road eastbound is protected/permitted
- Skewed intersection
- New traffic signal installed fall 2011
- Buildings close to edge of pavement
- Dedicated left-turn lanes on Main Street
- Dedicated left-turn lane on East Camplain Road westbound
- Long skewed crosswalks

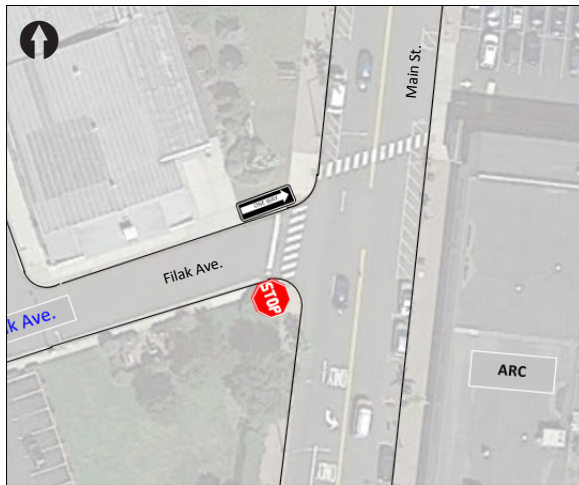


Figure 13 – Filak Avenue & Main Street

### Filak Avenue

- Stop controlled
- T-intersection
- One way eastbound (toward Main Street)

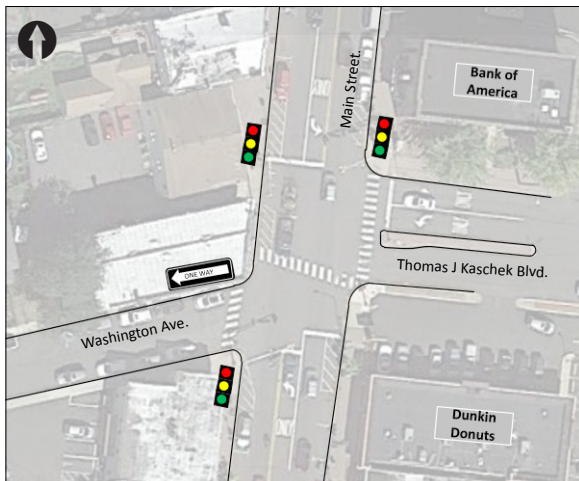


Figure 11 – Washington Avenue & Main Street

### Washington Avenue

- Signalized—Washington Avenue southbound is protected / permitted
- One way westbound (away from Main Street)
- This will be the entrance to the future Rustic Mall development
- One crosswalk between offset intersections
- Dedicated left-turn lanes on Main Street; one lane in each direction

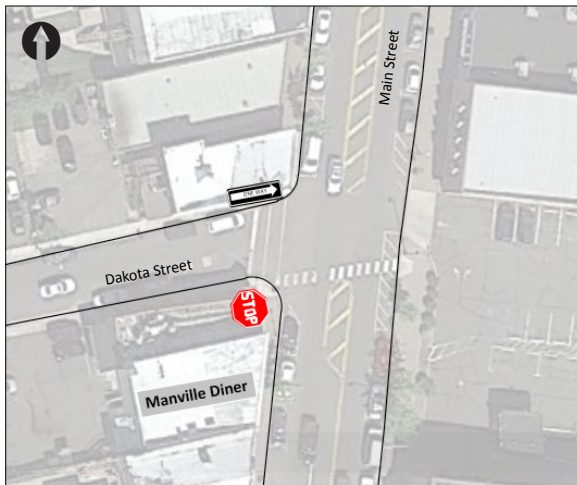


Figure 14 – Dakota St. & Main St.

### **Dakota Street**

- Stop controlled
- T-intersection
- One way eastbound (toward Main Street)
- One lane in each direction
- Hatched median
- Parking both sides of street

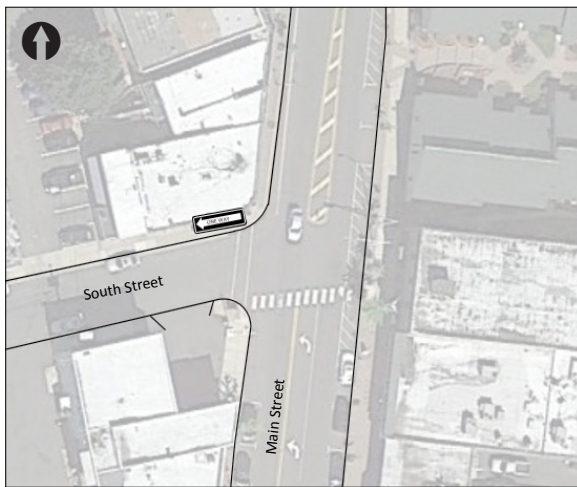


Figure 15 – South St. & Main St.

### **South Street**

- T-intersection
- One way westbound (away from Main Street)
- Dedicated left-turn lane northbound; hatched median north side of intersection
- Parking both sides of street

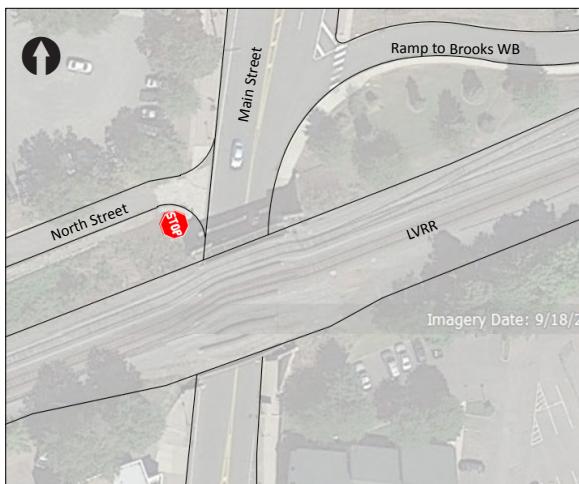


Figure 16 – LVRR/North St. & Main St.

### **LVRR/North Street**

- Southbound roadway narrows from four lanes to two lanes north of the bridge
- Maximum allowable height 12' 3"
- Over height truck detector was installed in 2012
- North street is not a municipal roadway; owned by LVRR
- Sag vertical curve under bridge

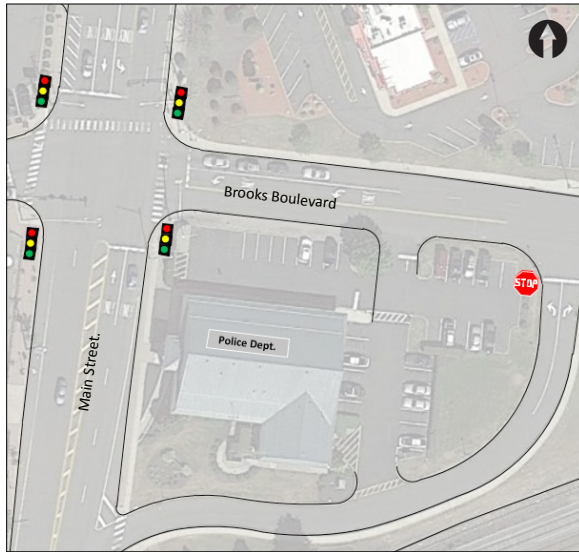


Figure 17 – Brooks Blvd. & Main St.

### **Brooks Boulevard**

- Signalized—Main Street southbound protected/permitted turns; Brooks Boulevard both directions protected/permitted
- Two lanes in each direction
- Dedicated left-turn lane southbound; northbound, no left turns permitted (jughandle designated for left turns)
- Dedicated left-turn lanes on Brooks Boulevard
- No parking south of the intersection; parking on west side only, north of the intersection
- Three marked crosswalks



Figure 18 – Knopf St. & Main St.

### **Knopf Street**

- T-intersection
- Stop controlled
- Two lanes in each direction
- Dedicated left-turn lane for northbound traffic
- Parking on west side of Main Street
- No marked crosswalk



Figure 19 – Dukes Pkwy. & Main St.

### **Dukes Parkway**

- Signalized—Main Street northbound and southbound are protected/permitted turns; Dukes Parkway eastbound is protected/permitted
- Northbound left-turn phase added summer 2013
- Westbound yield-controlled right-turn slip ramp added end of 2014
- Two lanes in each direction on Main Street
- Dedicated left-turn lanes in all directions
- Parking on west side of Main Street; right-turn lane southbound at intersection
- Skewed intersection, primarily western leg
- Very long marked crosswalks

## 1.6 CROSS SECTION GEOMETRY



Figure 20 – Cross section north

The cross section between Dukes Parkway and Brooks Boulevard is approximately 70 feet wide. It has two lanes in each direction with left turn lanes or hatched median. There is parking on the west side of roadway.

The cross section north of Roosevelt Boulevard to the LVRR bridge is approximately 48 feet wide. It has one lane in each direction with left turn lanes or hatched median. There is parking on both sides of the roadway.



Figure 21 – Cross section middle



Figure 22 – Cross section south

The cross section in the southern part of the RSA corridor is approximately 48 feet wide, north of the jughandle, and 54 feet wide in the area of the jughandle, with a concrete median. It has two lanes in each direction. There is no parking.

# Cross Sections – RSA Corridor, Existing Conditions



Figure 23 – Cross sections along corridor

## >> 2.0 CRASH FINDINGS IN THE RSA CORRIDOR \*

### 2.1 CHRONOLOGY

According to the NJDOT database there were 291 crashes (after removing crashes that occurred in parking lots) during the three-year analysis period of 2010 to 2012. The percentage of crashes increased in 2011 and decreased somewhat in 2012, as seen in Figure 21; when compared to crashes in Somerset County, the crashes at the county level have remained relatively constant.

Examining concentrations by month over the three-year period, the monthly number varied between 15 to 37 crashes per month. June was the month with the most crashes.

As to day of the week, the crashes varied between 20 to 58 with Thursday being the most common crash day followed by Friday. (The auto auction at ADESA occurs on Thursdays.)

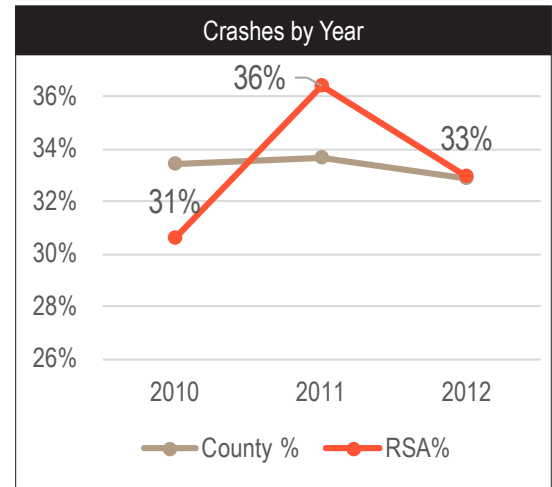


Figure 24 – Crashes by year

### 2.2 SEVERITY

Severity	All Other Crashes	Pedestrians	Pedalcyclist	TOTAL
Fatal	-	-	-	-
Incapacitated	-	2	-	2
Moderate Injury	6	2	3	11
Complaint of Pain	40	3	3	46
Property Damage Only	231	-	1	232
<b>TOTAL</b>	<b>277</b>	<b>7</b>	<b>7</b>	<b>291</b>

Figure 25 – Severity

Two incapacitated pedestrian crashes occurred, one at Beekman Street and one at South Street. The moderate injury pedestrian crashes occurred at Roosevelt Avenue and Washington Avenue. The moderate injury pedcyclist crashes occurred at Dakota Street, Knopf Street and LVRR. Two moderate injury left-turn crashes occurred at Roosevelt Avenue. There were two fatalities that are not included in this crash data. One occurred south of Brooks Boulevard in 2007 and the other was south of Roosevelt Avenue in 2014.

### 2.3 COLLISION TYPE - TABLE

A few of the crash types are overrepresented as compared to Somerset County overall: Same-Direction—Sideswipe, Pedestrian, Pedalcyclist, and Left-Turn crashes.

Of the 13 crashes that resulted in Incapacitated and Moderate Injury, more than half of them were Pedestrian and Pedalcyclist crashes.

Crash Type	Count in RSA Area	% in RSA Area	% in Somerset County
Struck Parked Vehicle	22	8%	10%
Same Direction - Sideswipe	45	15%	10%
Same Direction - Rear End	95	33%	32%
Right Angle	38	13%	11%
Pedestrian	7	2%	1%
Pedalcyclist	7	2%	1%
Opposite Direction - Head On/Angular	3	1%	1%
Left Turn / U Turn	19	7%	3%
Fixed Object	38	13%	13%
Backing	12	4%	8%
Other	5	2%	10%
<b>Grand Total</b>	<b>291</b>	<b>100%</b>	<b>100%</b>

Figure 26 – Crash type in RSA area and county

\* Crash data by intersection can be seen in Appendix D

### 2.3 COLLISION TYPE - GRAPH

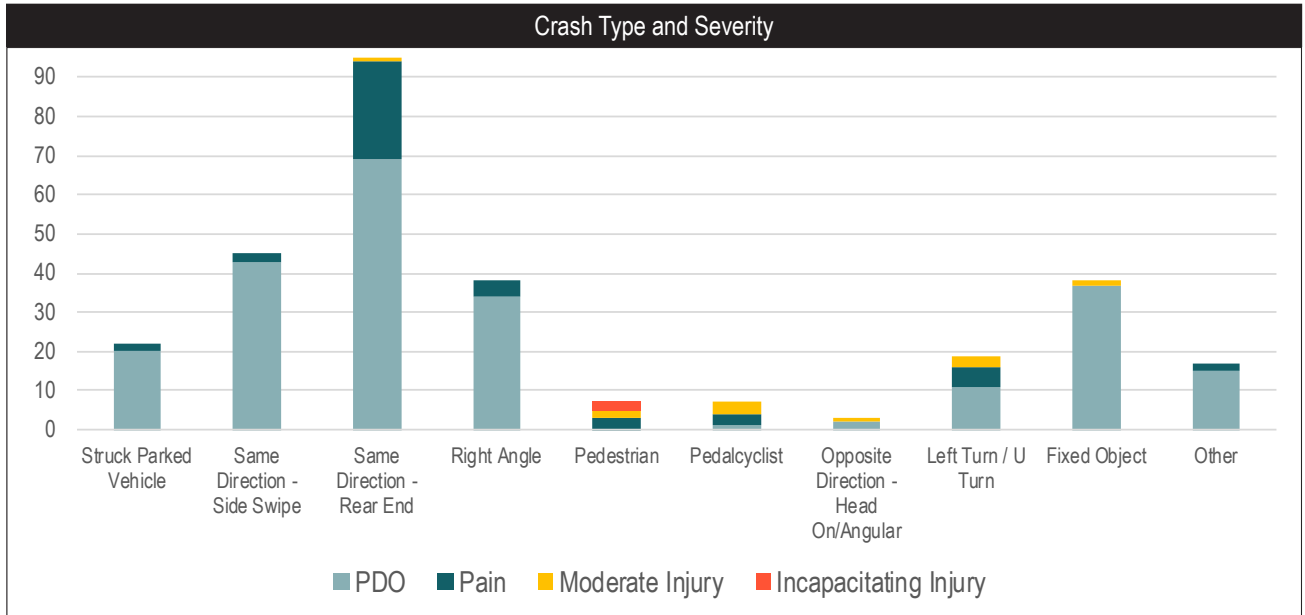


Figure 27 – Crash type and severity

### 2.4 ROADWAY SURFACE AND LIGHTING CONDITIONS

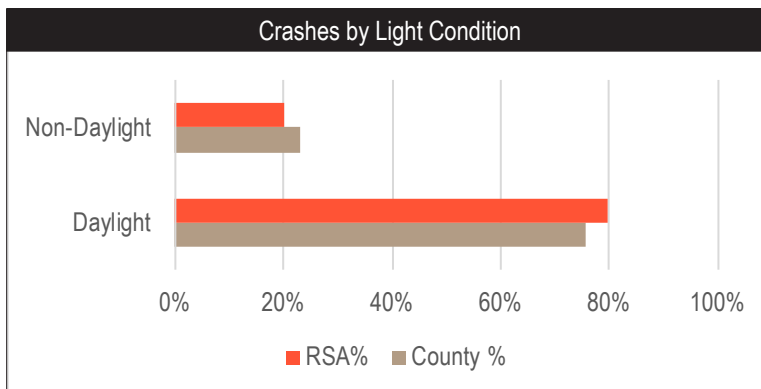


Figure 28 – Crashes by light condition

Light conditions do not appear to be a significant factor in the crash history.

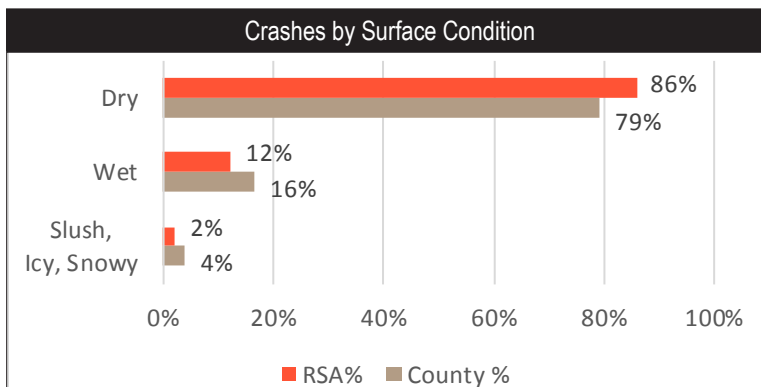


Figure 29 – Crashes by surface condition

The surface conditions do not appear to be a significant factor in the crash history.

## >> 3.0 IDENTIFIED ISSUES

Issue #	Issues
<b>Corridorwide</b>	
<b>Pedestrians</b>	
1	Number and location of marked crossings may not adequately reflect pedestrian travel demands, especially at northern end of corridor.
2	Mid-block crossings, especially at northern end of corridor.
3	Difficulty crossing at unsignalized intersections because of gapping between vehicles, cars not slowing down.
4	Long and/or skewed crosswalks at a few of the signalized intersections (Camplain Road, Washington Avenue, Dukes Parkway) may create a situation where pedestrians do not feel safe crossing.
5	Lack of ADA facilities (curb ramps, truncated domes).
6	The location of the pedestrian pushbuttons is too far away from the crosswalks.
7	Not all of the pedestrian heads are countdown.
8	Lighting appears to be inadequate for pedestrian needs, especially at crosswalks.
9	The visual appearance of the existing crosswalks may not encourage pedestrians to use them.
10	Pedestrian heads appear to be mounted too high.
<b>Driver Behavior</b>	
11	The wide cross section encourages speeding in the transition to the RSA corridor from both the northern and southern ends of the corridor.
12	There are a significant number of rear-end crashes in the corridor.
13	The corridor has multiple speed-limit zones, which causes confusion (25 mph, 35mph, 40 mph).
14	Drivers may not be aware of marked crosswalks as there is little to highlight their visibility.
15	Drivers of over-height vehicles must bypass the LVRR overpass by following alternate routes that are confusing.
16	There is difficulty making left turns from cross streets at unsignalized intersections.
<b>Signage</b>	
17	Some over-height northbound trucks are prohibited from travelling under the LVRR underpass, and the alternate routes are not clearly posted..
18	There are insufficient wayfinding, guidance and regulatory signs.
<b>Visibility</b>	
19	Some of the traffic signals are not sufficiently visible.
20	There is significant parking too close to the intersection, blocking the view of pedestrians and other drivers.
<b>Maintenance</b>	
21	Many of the pavement markings are faded: striping, stop bars and marked crosswalks.
22	There appear to be stormwater drainage problems and ponding.
<b>Geometry and Infrastructure</b>	
23	The many driveways increase points of conflict.



Issue #	Issues
24	Geometry is an issue in a number of locations and may contribute to crash frequency.
	<b>Bicycle Facilities</b>
25	There are no accommodations for bicycle travel; many bicyclists utilize the sidewalk. There were several bike crashes in which bicycles exiting the sidewalk collided with vehicles entering or exiting side streets. (Roosevelt, Dakota, North Street, Knopf).
	<b>Traffic Signals</b>
26	Red and yellow clearance times in conjunction with large intersections may be a factor in the crash history.
	<b>Dukes Parkway</b>
	<b>Pedestrian Facilities</b>
27	The northern Main Street crosswalk doesn't connect to anything on the east side of Main Street; there is no pedestrian access to the mall area.
	<b>Driver Behavior</b>
28	Drivers exiting the shopping center to travel northbound on Main Street aren't obeying the yield sign at the slip ramp, especially on auto-auction days.
29	Crash history of southbound vehicles turning left from Main Street.
	<b>Traffic Signal</b>
30	The signal may not be sufficiently visible.
	<b>Roadway Markings</b>
31	The location of the stop bar exiting the shopping center does not provide a sufficient turning radius for southbound trucks making a left turn from Main Street.
	<b>Geometry</b>
32	Though not reflected in the crash data, locals familiar with the area reported that left turning vehicles from northbound Main Street occasionally hit the median island on Dukes Parkway.
33	Left turning vehicles (particularly large freight trucks) from Dukes Parkway to NB Main Street need a wide turning radius, and encroach on the right lane, causing sideswipes.
34	The turning radius of the northwest corner is currently very wide, allowing for right-turning vehicles to enter at excessive speeds, possibly endangering pedestrians. The entry lane is also excessively wide, measuring at 50 feet.
	<b>Knopf Street</b>
	<b>Pedestrian Facilities</b>
35	There is a lot of pedestrian demand to cross at Knopf, but there is no marked crosswalk.
	<b>Brooks Boulevard</b>
	<b>Roadway Markings</b>
36	The location of the stop bar on the east leg exiting the shopping center is not set back far enough for the turning radius of trucks coming from southbound Main Street.
	<b>Pedestrian Facilities</b>
37	There is no crosswalk on the south side of the intersection.

Issue #	Issues
<b>Driver Behavior</b>	
38	For southbound traffic, the merge from two lanes to one lane south of the intersection creates conflict during congested conditions, resulting in several sideswipes during the study period. This operation is further complicated by the change in speed limit and the vertical deflection occurring at this location.
39	For southbound traffic, the hatched area north of the intersection functions as a right turn lane.
40	There are a significant number of rear end crashes on all four legs of the intersection.
41	Some northbound drivers make the prohibited left turn, not using the jughandle.
<b>LVRR/North Street</b>	
<b>Driver Behavior</b>	
42	Many vehicles drive at a high rate of speed on the slip ramp from northbound Main Street; the limited visibility of the vertical curve endangers the pedestrians crossing the ramp.
43	The ramp entrance location and the transition from one to two lanes occurring at the same location may be confusing for motorists.
44	Many northbound drivers fail to take the ramp/jughandle in order to travel westbound on Brooks Boulevard.
45	Despite the over-height warning signs, there are still fixed-object crashes in both directions, caused by trucks that exceed the available height.
<b>Signage</b>	
46	The over-height warning signs are not readily visible, neither northbound nor southbound.
<b>Lighting</b>	
47	Lighting under the bridge is dim.
<b>Pedestrian and Bicycle Facilities</b>	
48	Vehicles exiting North Street do not expect bicyclists or pedestrians to emerge from under the overpass.
<b>South Street</b>	
<b>Pedestrian Facilities</b>	
49	Pedestrians crossing Main Street aren't clearly visible to southbound drivers exiting the underpass.
50	Northbound vehicles making left turns are passed by through vehicles on the right, and southbound vehicles making right turn are passed by through vehicles on the left, both of which have the potential for shadow crashes with pedestrians crossing Main Street.
<b>Dakota Street</b>	
<b>Signs</b>	
51	DO NOT ENTER signs: there was only a single sign, and it was not clearly visible..
<b>Driver Behavior</b>	
52	The hatched area is used for either parking, or as a bypass, for vehicles passing in the right lane (northbound).
53	History of right-angle crashes where vehicles turning left from Dakota Street are struck by northbound vehicles.

Issue #	Issues
<b>Washington Avenue</b>	
<b>Pedestrian Facilities</b>	
54	Significant amount of pedestrian activity near this intersection is expected to increase even more with the future development of the Rustic Mall property east of the intersection.
55	Significant amount of midblock crossings on either side of intersection.
56	The location of the single Main Street crosswalk does not accommodate the pedestrian desire lines.
<b>Camplain Road</b>	
<b>Driver Behavior</b>	
57	Vehicles making right from either southbound Main Street or E. Camplain Road utilize slip ramps with excessive speed.
58	There are turning conflicts between left turns and through traffic on Camplain Road.
59	Because of the geometry, the two simultaneous left turns are very close to one another.
<b>Transit</b>	
60	There is no marked bus stop in front of The Arc.
<b>Roosevelt Avenue/Kyle Street</b>	
<b>Driver Behavior</b>	
61	The single southbound lane is very wide and often functions as two lanes.
62	Some vehicles in the southbound left turn lane use it as a through lane.
<b>Unsignalized Intersections: Filak, N. Orchard, Rosalie, Beekman, S. Fifth/William, Knopf</b>	
<b>Pedestrian Facilities</b>	
63	The crosswalk on Filak Avenue is skewed and therefore longer than the pedestrian desire lines.
<b>Driver Behavior</b>	
64	Cars often use the hatched area as an additional lane.
<b>Bus</b>	
65	There is a lack of bus stop facilities (they are lacking corridor-wide).
<b>Kennedy Boulevard</b>	
<b>Pedestrian Facilities</b>	
66	There are no crosswalks to Fucillo Street from the intersection.
<b>Infrastructure</b>	
67	There have been crashes into the guide rail for right turning vehicles (from Kennedy). Guide rail may not be necessary.

## VISUALIZING ISSUES—GENERAL



ADA facilities are lacking



Faded pavement markings



There are many driveways that increase conflict points



Many mid-block pedestrian crossings



Vertical curves limit sight distance



Lack of facilities for bicyclists

## VISUALIZING ISSUES—GENERAL



Volume and congestion contribute to rear end crashes



Parking in hatched areas adjacent to intersections



Wide cross section encourages speeding



Transition on southern end of RSA from higher-speed to lower-speed urban area



Various speed limits throughout the corridor



Pedestrian push button not located near the crosswalk

## VISUALIZING ISSUES—DUKES PARKWAY



Motorists not observing yield sign at slip ramp



Very long crosswalk across Main Street



The median island on west leg is an obstacle for turning radius



Many trucks need a wide turning radius



There is no sidewalk connecting to the crosswalk



Wide cross section encourages speeding

## VISUALIZING ISSUES—BROOKS BOULEVARD



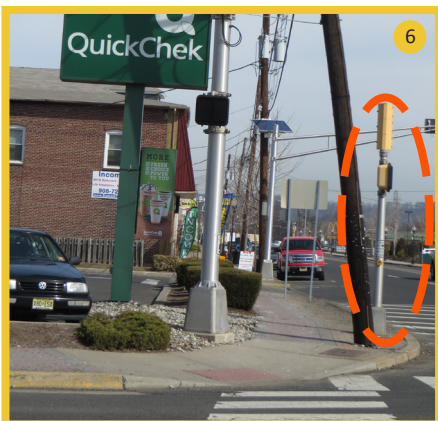
Congestion at the merge from two lanes to one for southbound vehicles before bridge



Same-direction rear-end crashes are the predominant crash type



Some northbound drivers make prohibited left turn



Pedestrian push button located too far from crosswalk



There is no marked crosswalk on the south side of intersection



Some vehicles don't see sign for jughandle and make illegal left turn at intersection

## VISUALIZING ISSUES—CAMPLAIN ROAD



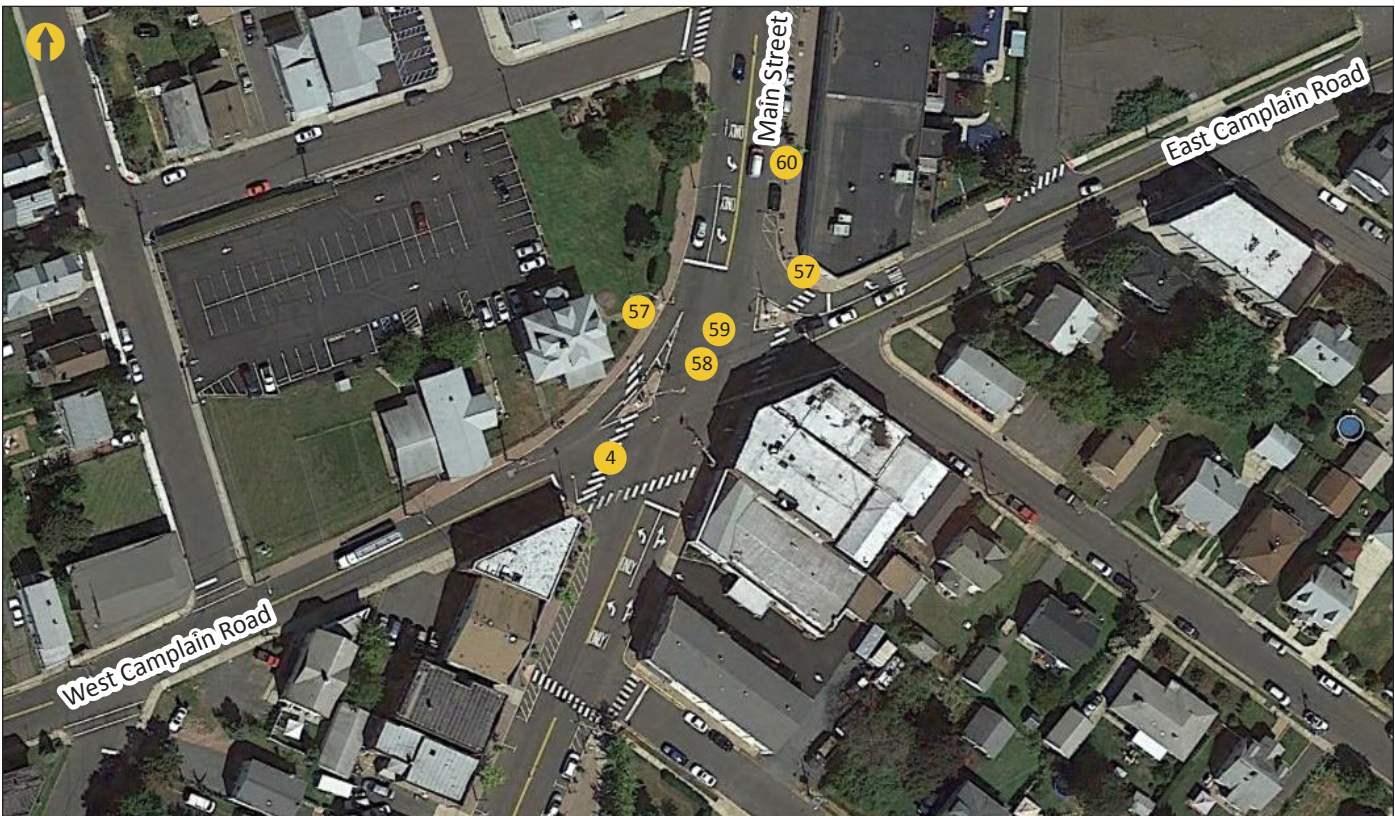
Excessive speed on slip ramp



No marked bus stop



Conflicts between dual left turn movements from Camplain Rd.



The large radius encourages making the turn at high speed



Very long and skewed crosswalk



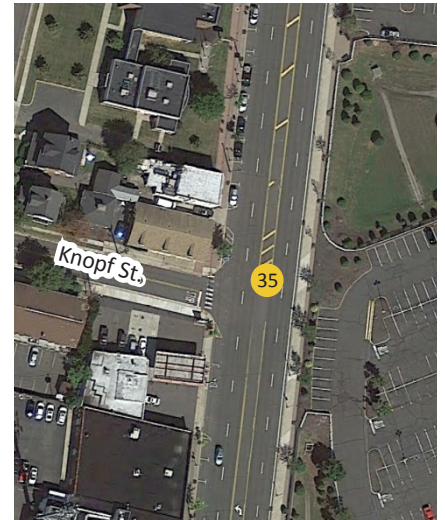
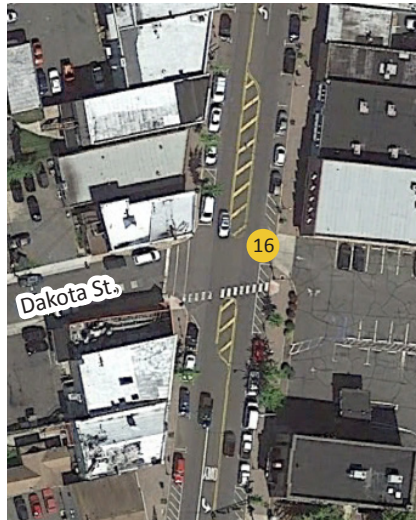
Conflict between left-turning vehicles and through vehicles



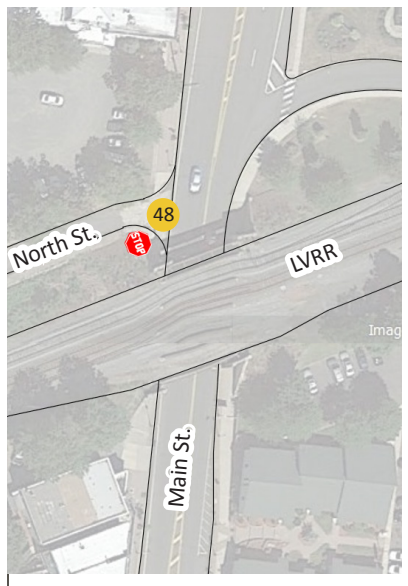
# VISUALIZING ISSUES—UNSIGNALIZED INTERSECTIONS



Main St. at Knopf St. is very wide for pedestrians to cross.



Difficult for pedestrians to cross at the unsignalized intersections



There were two pedcyclist crashes at North Street



Difficulty trying to make left turns onto Main Street

## >> 4.0 RECOMMENDATIONS

Rec. #	Recommendations List	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
A	Corridor-wide					
	Road Diet					
1	Implementation of a road diet would help to reduce excessive speeding and aggressive driving. The wide cross section (two lanes in each direction) in the northern half of the RSA would be reduced to three-lane section, two lanes with a left turn lane. The limits of the road diet would be determined during the design phase. Alternatives:	High	Medium/Long	\$\$	Somerset Co.	11
a	Reverse angle parking	Low	Short	\$	Somerset Co.	11
b	Install bicycle lanes	High	Medium	\$	Somerset Co.	11
c	Install median	High	Long	\$\$	Somerset Co.	11
	Pedestrians					
2	Install ADA facilities where lacking and improve the existing ADA facilities (curb cuts, truncated domes, etc.)	Medium	Medium	\$\$	Somerset Co.	5
3	Upgrade all pedestrian heads to countdown timers and adjust their height, if necessary.	Medium/High	Medium/Long	\$\$	Somerset Co.	7,10
4	Consider the addition of pedestrian refuge islands where possible.	High	Medium	\$\$	Somerset Co.	3,4,9
5	Narrowing the cross section with bulbouts would place the pedestrian more prominently in the viewshed of oncoming vehicles and decrease the length of the crosswalk distance.	High	Medium/Long	\$\$	Somerset Co.	2,4,14
6	Relocate pedestrian pushbuttons adjacent to the crosswalks.	Medium/Low	Long	\$\$	Somerset Co.	6
7	Re-evaluate the signal timing for adequate pedestrian crossing time.	High	Short	\$	Somerset Co.	4
8	Consider increasing the visibility of crosswalks with high-visibility striping, pedestrian crossing signs, and improved lighting.	Medium/High	Medium	\$	Somerset Co.	8,21
9	Evaluate the location of the crosswalks; consider revising location and type of crosswalks (such as ergonomic crosswalks).	Medium/High	Medium/Short	\$	Somerset Co.	1
	Operations					
10	Install a gateway treatment at the northern end of the corridor to communicate to drivers that this is a lower-speed section of Main Street.	Medium	Long	\$\$\$	Manville	11
11	Improve the gateway entrance at the south end of the corridor to communicate to drivers that this is a lower-speed section of Main Street.	Medium	Long	\$\$	Manville	11
12	Evaluate the requirements for speed limits, the location of transitional speed and consider a more uniform speed along the corridor.	Medium	Medium	\$	Somerset Co.	13
13	Evaluate the unsignalized intersections for possible prohibition of left-turn movements at selected intersections.	Medium/High	Short	\$	Somerset Co.	16
	Traffic Signals					
14	Examine the red and yellow clearance times.	High	Medium	\$	Somerset Co.	26
15	Install back plates with retro-reflective borders on the signal heads.	Medium	Medium	\$\$	Somerset Co.	19
	Signage					
16	Improve wayfinding, especially for trucks bound for ADESA, and to clarify alternate route for those exceeding height restrictions.	High	Medium	\$	Somerset Co.	15
17	Consider adding NO PARKING signage.	Medium/Low	Short	\$	Somerset Co.	20

Rec. #	Recommendations List	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
	Visibility					
18	Installation of stanchions or bulbouts would prevent parking in the hatched area adjacent to the intersection.	Medium/Low	Short/Medium	\$\$	Somerset Co.	20
	Maintenance					
19	Refresh pavement markings: striping, stop bars and crosswalks.	Medium/Low	Short	\$	Somerset Co.	21
20	Address areas where there appears to be drainage problems and ponding.	Low	Medium	\$\$	Somerset Co.	22
	Lighting					
21	Professional staff should conduct a formal engineering review of existing lighting conditions to evaluate where both vehicular- and pedestrian-level lighting can be enhanced.	Medium	Long	\$\$	Somerset Co.	8
	Geometry and Infrastructure					
22	Restricting some turning movements will reduce conflict points.	Medium/High	Medium	\$	Somerset Co.	16
23	There may be locations that would benefit from geometry revisions.	Medium	Long	\$\$\$	Somerset Co.	24
	Bicycle Facilities					
24	Evaluate how to more adequately accommodate bicycle use along the corridor with sharrows, bicycle lanes and appropriate signage or explore alternate bicycle routes to CR 533.	High	Medium	\$	Somerset Co.	25

B	Dukes Parkway					
	Pedestrian Facilities					
1	Consider eliminating the northern crosswalk across Main Street.	Low	Short	\$	Somerset Co.	27
2	If the northern crosswalk is to remain, provide connectivity to the shopping center on the northeast corner.	Low	Medium/Long	\$\$	Somerset Co.	27
	Traffic Operations					
3	Consider replacing the YIELD sign with a STOP sign at the slip ramp.	Medium	Short	\$	Somerset Co.	28
4	If the number of lanes are reduced along the corridor to accommodate a road diet, consider repurposing one of the eliminated lanes for an acceleration lane for cars merging with northbound traffic from the slip ramp.	Medium/High	Medium	\$	Somerset Co.	28
	Roadway Markings					
5	Move the stop bar back on the east leg to accommodate the turning radius of trucks coming from southbound Main Street.	Medium	Short	\$	Somerset Co.	31
6	Move the stop bar back from the northbound left turn lane to accommodate the turning movement of vehicles traveling southbound from the shopping center.	Medium	Short	\$	Somerset Co.	24
	Traffic Signal					
7	Consider revising the phasing on Main Street to provide protected-only left turns for northbound and southbound vehicles.	High	Medium	\$	Somerset Co.	29
	Geometry					
8	Consider shortening the median island or shifting it north on Dukes Parkway to improve the turning radius for vehicles turning left from northbound Main Street. (Note that the island technically has no dedicated refuge space for pedestrians, but it provides a protected area for pedestrians crossing the long, skewed crosswalk at that location.)	Medium	Long	\$\$	Somerset Co.	32
9	Consider tightening the radius of the northwest corner to slow right-turning southbound vehicles (shorten the crosswalk, and narrow the entry lane).	High	Long	\$\$\$	Somerset Co.	34
	Signage					
10	Consider improving the signage directing trucks to the ADESA Auto Auction.	Medium	Medium	\$	Somerset Co.	18

Rec. #	Recommendations List	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
<b>C</b>	<b>Knopf Street</b>					
	<b>Pedestrian Facilities</b>					
1	Consider installing a marked crosswalk.	High	Medium	\$	Somerset Co.	3, 35
2	Consider installing a Rectangular Rapid Flash Beacon (RRFB), actuated by the crossing pedestrians.	High	Medium/Long	\$\$	Somerset Co.	3, 35
3	Examine the addition of a pedestrian refuge island.	High	Long	\$\$	Somerset Co.	3, 35
4	Consider the installation of bulbouts, painted or poured concrete, to shorten the crosswalk, if a road diet is implemented.	High	Medium	\$\$	Somerset Co.	3, 35
	<b>Traffic Operations</b>					
5	Consider prohibiting left turns from Knopf Street and restricting turns to right in- / right out-only.	Medium/High	Short	\$	Somerset Co.	16

<b>D</b>	<b>Brooks Boulevard</b>					
	<b>Roadway Markings</b>					
1	Step back the stop bar at the shopping center exit (east leg of intersection).	Medium	Short	\$	Somerset Co.	36
2	Step back the stop bar on the southbound left-turn lane.	Medium	Short	\$	Somerset Co.	24
	<b>Traffic Operations</b>					
3	Consider revising the location of the southbound merge (south of the intersection) to north of the intersection.	Medium/High	Short	\$	Somerset Co.	38
4	Installing stanchions in the hatched area adjacent to QuickChek would prohibit that area being used as a right-turn lane.	Medium	Medium	\$	Somerset Co.	39
	<b>Signage</b>					
5	To restrict the prohibited left turn onto Brooks Boulevard, install sufficient and visible signage before the ramp/jughandle and bridge.	High	Medium	\$	Somerset Co.	41

<b>E</b>	<b>LVRR/ North Street</b>					
	<b>Traffic Operations</b>					
1	Consider installing paint, stanchions or a raised area to separate the ramp entrance from the location where the second northbound lane is added.	Medium/High	Medium	\$\$	Somerset Co.	43
2	Consider reducing the entrance speed to the jughandle by reducing the turning radius for the ramp, with texturized pavement or poured concrete.	Medium/High	Long	\$\$\$	Somerset Co.	42
3	Consider closing off North Street for vehicles, or delineating it as a driveway by installing driveway apron.	High	Short	\$	Somerset Co.	48
	<b>Lighting</b>					
4	Install better lighting under the bridge.	Medium	Long	\$\$\$	Somerset Co.	47
	<b>Signage</b>					
5	Consider increasing the visibility of the over-height warning signs by adding flashing lights.	High	Long	\$\$	Somerset Co.	45,46
6	Consider the addition of signage and/or RRFB, to warn motorists of pedestrians crossing ramp/jughandle.	High	Long	\$\$	Somerset Co.	42
7	Improve visibility of signage instructing drivers to use the ramp for making left turn onto Brooks Boulevard.	High	Medium	\$	Somerset Co.	41
	<b>Pedestrian and Bicycle Facilities</b>					
8	Consider configuring the marked crosswalk north of the bridge and east of the roadway to be positioned at 90 degrees, to force pedestrians to turn and face traffic as they cross the jughandle ramp—or alternatively, as shown on p. 34, along the bulbouts.	High	Short	\$	Somerset Co.	42

Rec. #	Recommendations List	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
F	South Street					
	Pedestrian Facilities					
1	Installation of a RRFB would improve visibility of pedestrians crossing in the crosswalk.	High	High	\$\$	Somerset Co.	49
2	Consider adding a crosswalk to the north side of the intersection or relocating it there, where there would be room for a pedestrian refuge island.	High	Medium	\$	Somerset Co.	1,3,9
3	Install a pedestrian sign in the median.	Medium	Short	\$	Somerset Co.	3,9
4	Consider installing bulbouts, texturized pavement or poured concrete, to shorten the crosswalk and increase visibility of the crosswalk.	Medium/High	Medium	\$\$	Somerset Co.	3,9
	Traffic Operations					
5	Consider installing bulbouts or stanchions to restrict vehicles from passing on the right in currently hatched-out areas.	Medium	Medium	\$\$	Somerset Co.	50

G	Dakota Street					
	Pedestrian Facilities					
1	Consider installing a physical pedestrian refuge island in the painted median to accommodate the crossing of one lane at a time.	High	Medium/Long	\$\$	Somerset Co.	3
	Signage					
2	Add an additional DO NOT ENTER sign.	Medium/Low	Short	\$	Somerset Co.	51
	Traffic Operations					
3	Consider prohibiting left turns from Dakota Street.	Medium/High	Short	\$	Somerset Co.	16
4	Consider installing bulbouts to restrict vehicles from passing on the right in currently hatched-out areas.	Medium	Medium	\$\$	Somerset Co.	52
	Traffic Signal					
5	Evaluate doing a signal warrant analysis and/or installing pre-emption for the Fire Station.	Medium	Medium	\$	Somerset Co.	16

H	Washington Avenue					
	Pedestrian Facilities					
1	Consider relocating the current crosswalk so it will be 90 degrees to the curb.	Medium	Short	\$	Somerset Co.	56
2	Consider installing a second marked crosswalk north of the intersection.	Medium	Medium/Short	\$	Somerset Co.	54,55,56
3	The construction of a raised intersection would increase awareness of the active pedestrian usage.	Medium	Long	\$\$\$	Somerset Co.	54
4	A broader discussion concerning the intersection needs to take place as the format of the Rustic Mall development takes shape.	High	Long	\$	Somerset Co.	54
5	Consider implementing an all-pedestrian signal phase.	Medium	Long	\$\$	Somerset Co.	54
	Traffic Operations					
6	Consider installing bulbouts to restrict vehicles from passing on the right in currently hatched-out areas.	Medium	Medium	\$\$	Somerset Co.	54,55

Rec. #	Recommendations List	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
I	Camplain Road					
	Traffic Operations					
1	Reducing the radius on the northwest and northeast corners will decrease the speed of right-turning vehicles.	High	Long	\$\$\$	Somerset Co.	57
2	Consider removing the slip ramp on the northwest corner and making it a right turn.	High	Long	\$\$\$	Somerset Co.	57
3	Split phasing would eliminate the left-turning conflicts.	High	Medium/Long	\$	Somerset Co.	58,59
	Pedestrian Facilities					
4	Consider installing a marked crosswalk on the north side of the intersection.	Low	Medium	\$	Somerset Co.	1
5	Consider replacing skewed marked crosswalk on the western leg, to make it at 90 degrees and/or ergonomic.	Medium/Low	Medium	\$	Somerset Co.	4

J	Roosevelt Avenue/ Kyle Street					
	Traffic Operations					
1	Clearly delineate the one lane of travel on Main Street southbound; the lane is very wide and stanchions may help limit the width.	Medium	Short	\$	Somerset Co.	61
2	Add signage and/or roadway markings to clearly communicate lane use.	Medium	Short	\$	Somerset Co.	61,62
3	Step back northbound left-turn lane stop bar.	Medium/Low	Short	\$	Somerset Co.	24

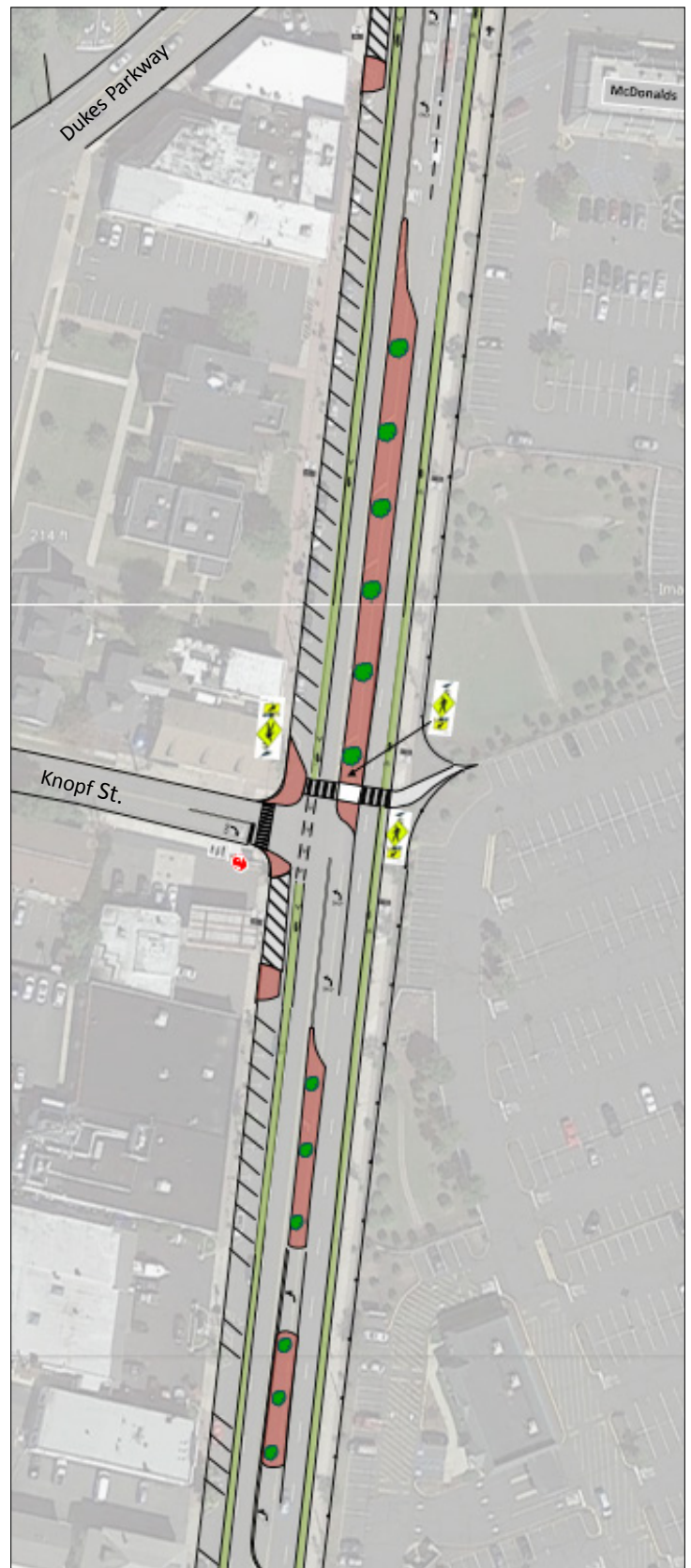
K	Unsignalized Intersections: Filak Avenue, N. Orchard Street, Rosalie Street, Beekman Street, S. Fifth Street / William Street, Knopf Street					
	Pedestrian Facilities					
1	The installation of bulbouts or stanchions would improve pedestrian crossing by shortening the distance and preventing cars from driving in the hatched area.	High	Medium	\$\$	Somerset Co.	9
2	Consider installing an ergonomic crosswalk (Filak Avenue).	Medium	Short	\$	Somerset Co.	63
3	Improved lighting would increase visibility of the pedestrians in the crosswalk.	Medium/High	Long	\$\$\$	Somerset Co.	8
	Transit					
4	Consider increasing the visibility of the SCOOT bus stop in front of The Arc building, such as by adding signage and bus shelter.	Medium/Low	Long	\$\$	Somerset Co.	65

L	Kennedy Boulevard					
	Infrastructure					
1	A guide rail analysis should be completed to evaluate if the existing guide rail is required. If guide rail is warranted, consider revising the location away from the edge of travel-way.	Medium	Medium	\$	Somerset Co.	67
	Pedestrian Facilities					
2	Install a marked crosswalk to access Fucillo Street from the west side of the intersection of Kennedy Boulevard	Medium/low	Short	\$	Somerset Co.	66

## >> APPENDIX A—RECOMMENDATION GRAPHICS

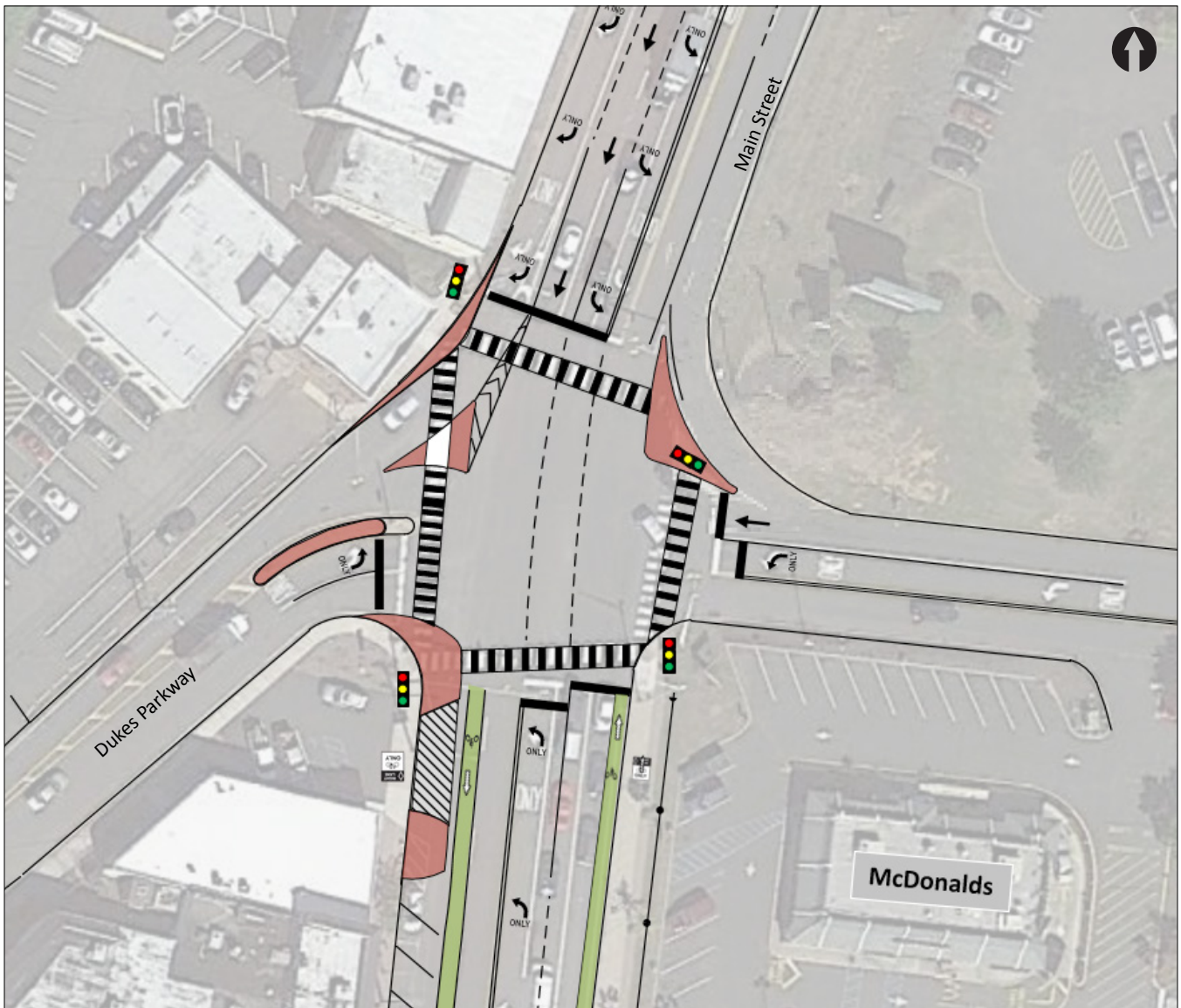
### A.1 ROAD DIET

- One lane in each direction
- Physical median where appropriate
- Left-turn lane or two-way left-turn lane
- Reverse-angle parking—back in; west side only
- Bicycle lanes both sides
- Add sidewalk connectivity to shopping center



## A.2 DUKES PARKWAY

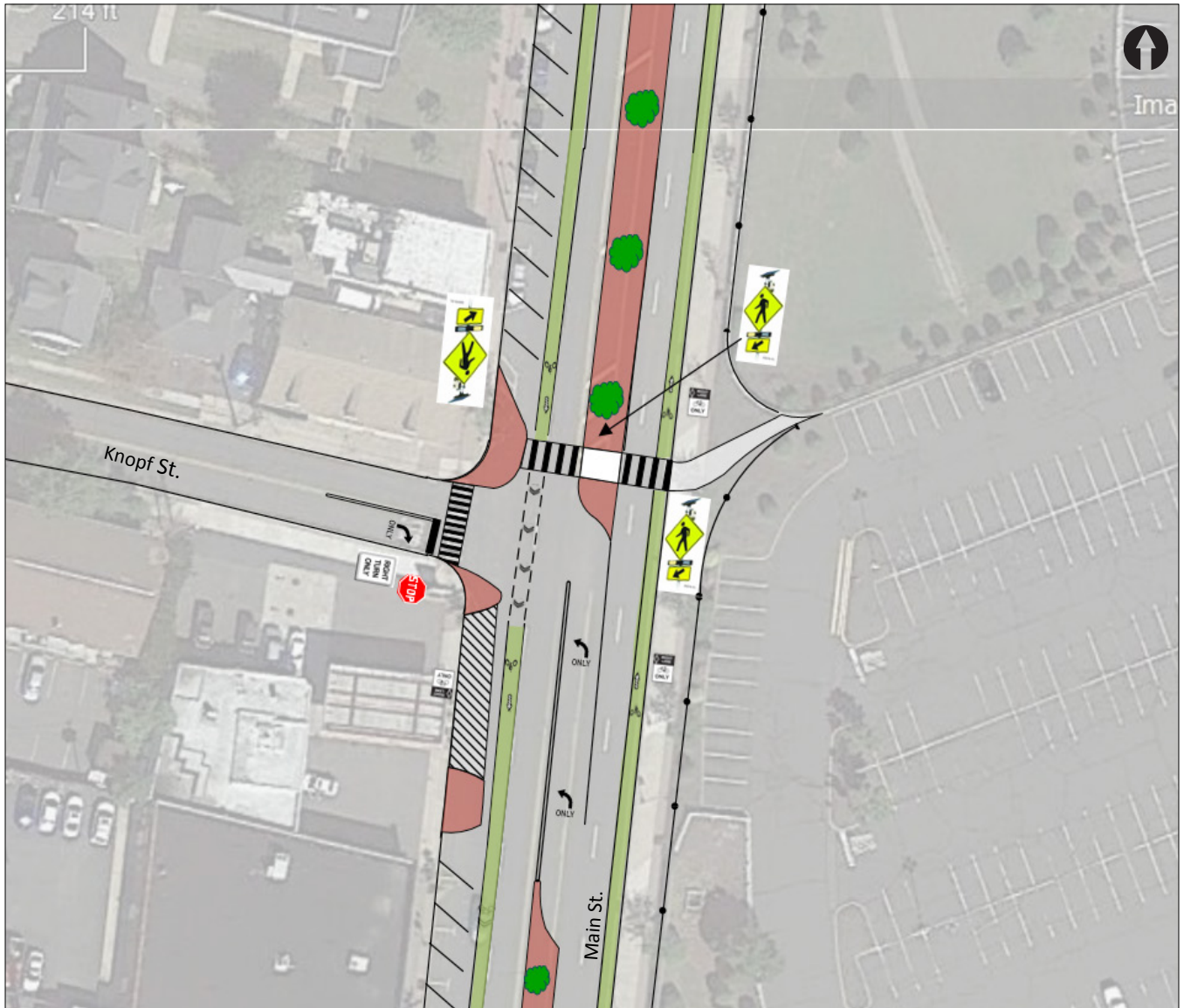
- One through lane in each direction with lanes shifted from existing striping
- Bulbout on southwest corner
- Median island on west leg of Dukes Parkway shortened
- Additional island, with pedestrian refuge, added on western leg of Dukes Parkway to improve channelization
- Dedicated bicycle lanes on both sides of roadway, south of intersection; sharrows, north of intersection
- Stop bars revised to accommodate turning radii





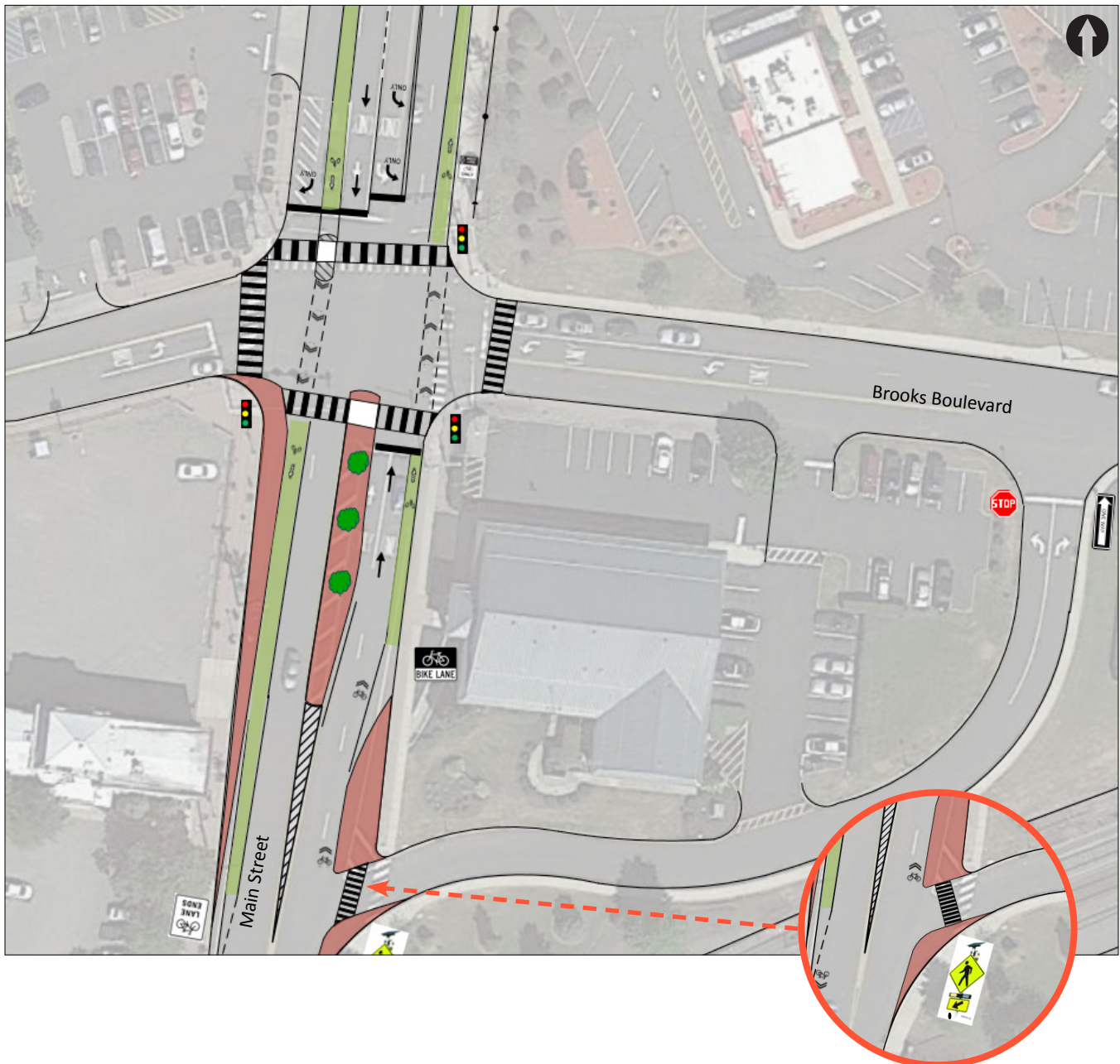
### A.3 KNOPF STREET

- One through lane in each direction with lanes shifted from existing striping
- Left turns prohibited from Knopf Street
- Marked crosswalk added north of intersection
- RRFB installed at crosswalk
- Pedestrian refuge island added in median
- Bulbouts added on west side of intersection
- Bicycle lanes both sides
- Connectivity to shopping center



#### A.4 BROOKS BOULEVARD AND JUGHANDLE

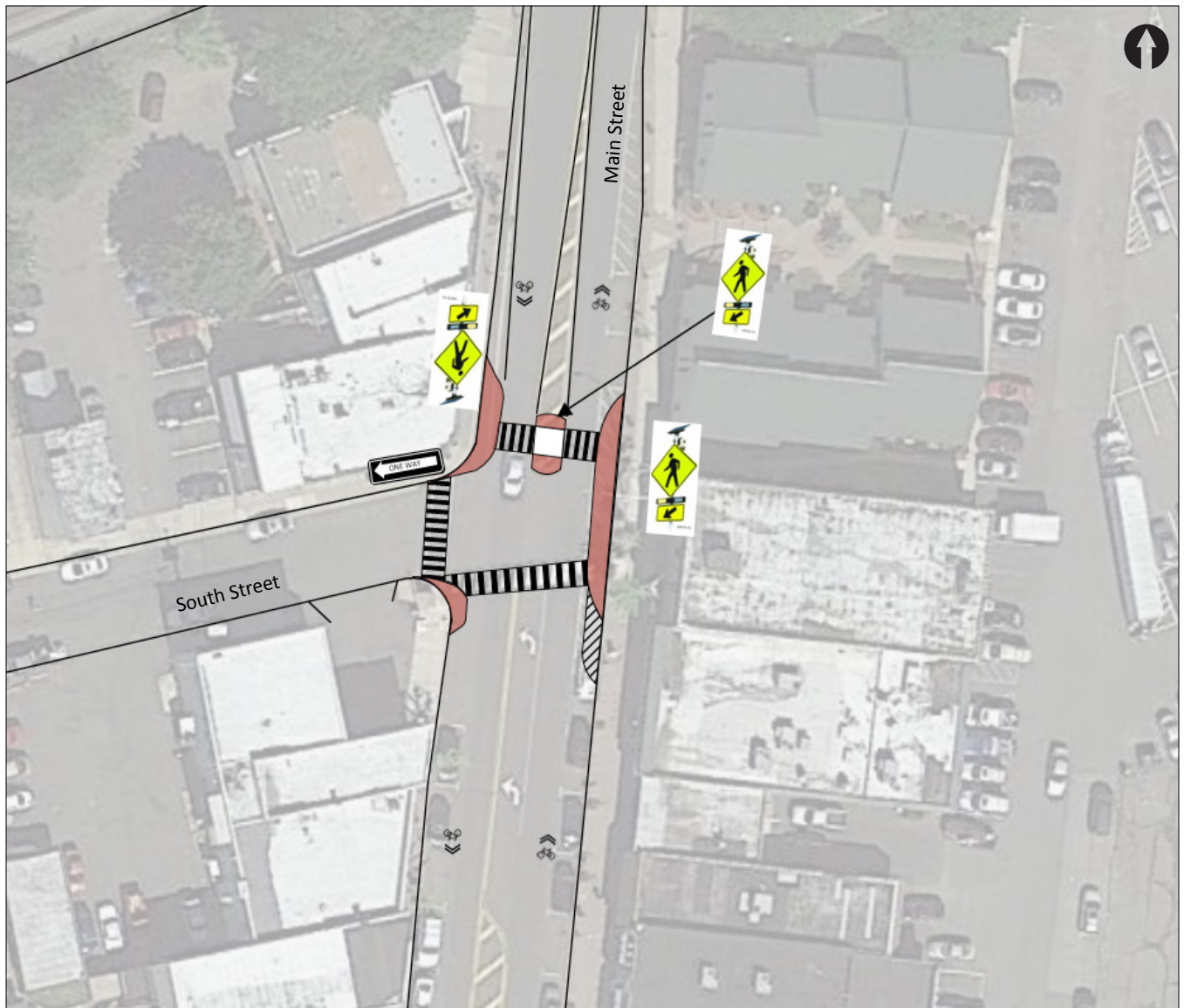
- One lane in each direction
- Physical median on southern leg
- Bulbout on southwest corner
- Added crosswalk with pedestrian refuge island on south side of intersection
- Dedicated bicycle lanes on both sides of roadway, north of intersection; sharrows, south of intersection
- Northbound merge (south of intersection) separated from ramp entrance
- Reconfigured ramp entrance to slow entrance speed



Alternative crosswalk at jughandle

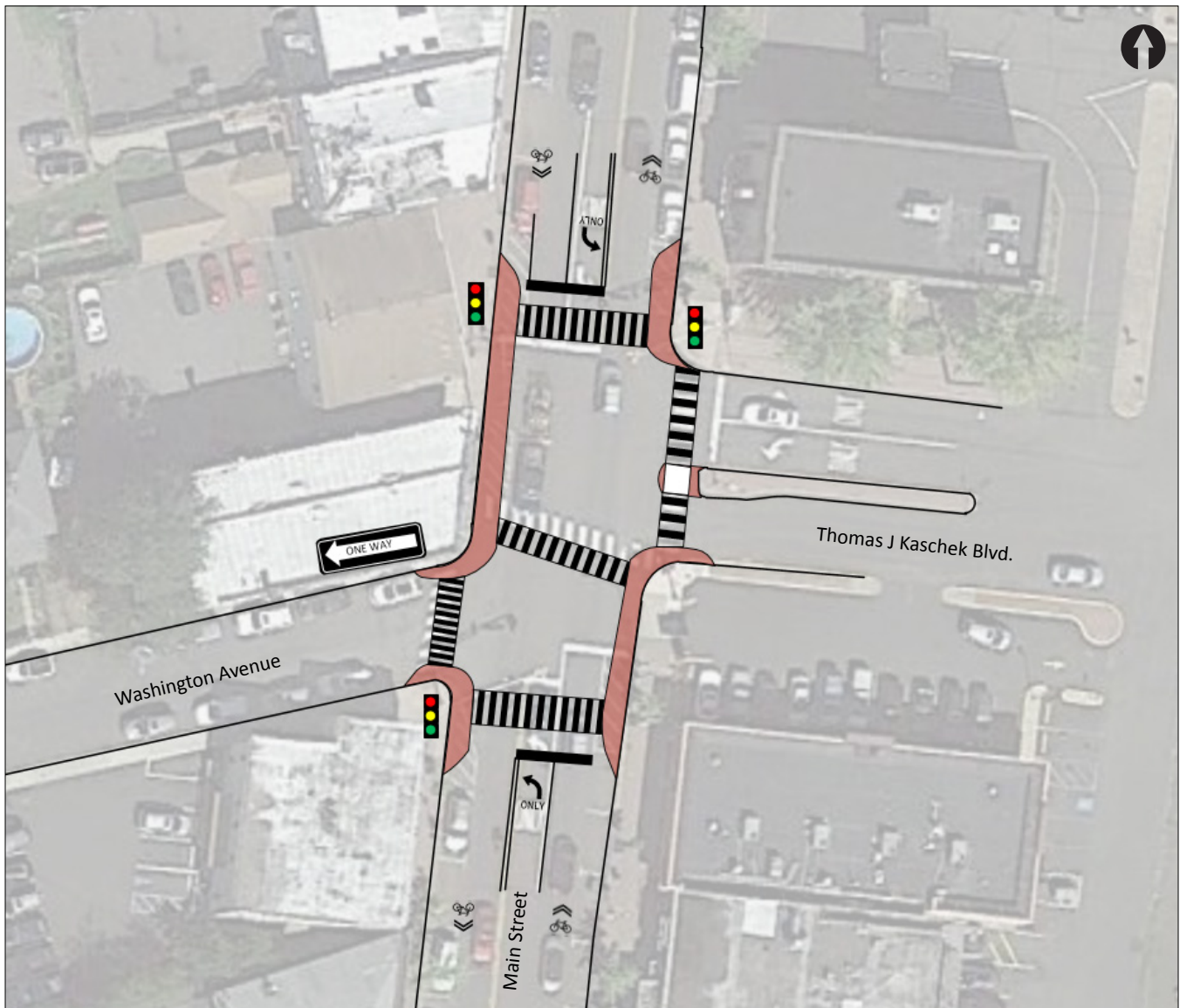
## A.5 SOUTH STREET

- Marked crosswalk added north of intersection
- Pedestrian refuge island in median on north crosswalk
- RRFB installed at crosswalk
- Bulbouts on Main Street added on all sides of intersection
- Sharrows for bicycles



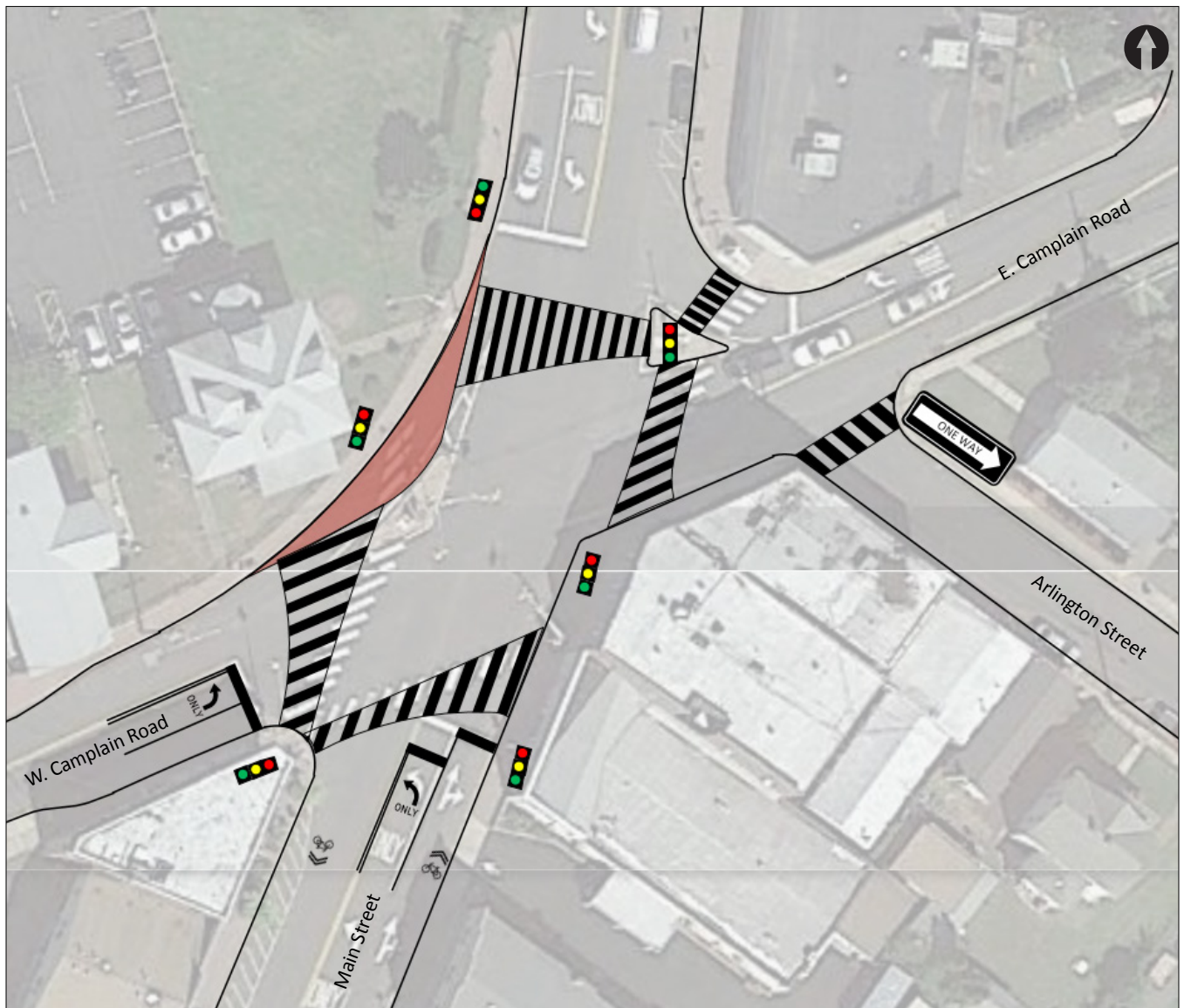
## A.6 WASHINGTON AVENUE

- Bulbouts on all corners of intersection (on Main Street) to restrict parking and to shorten pedestrian crossing
- Crosswalk relocated and another one added
- Signalize crosswalks
- Resolve phasing conflict



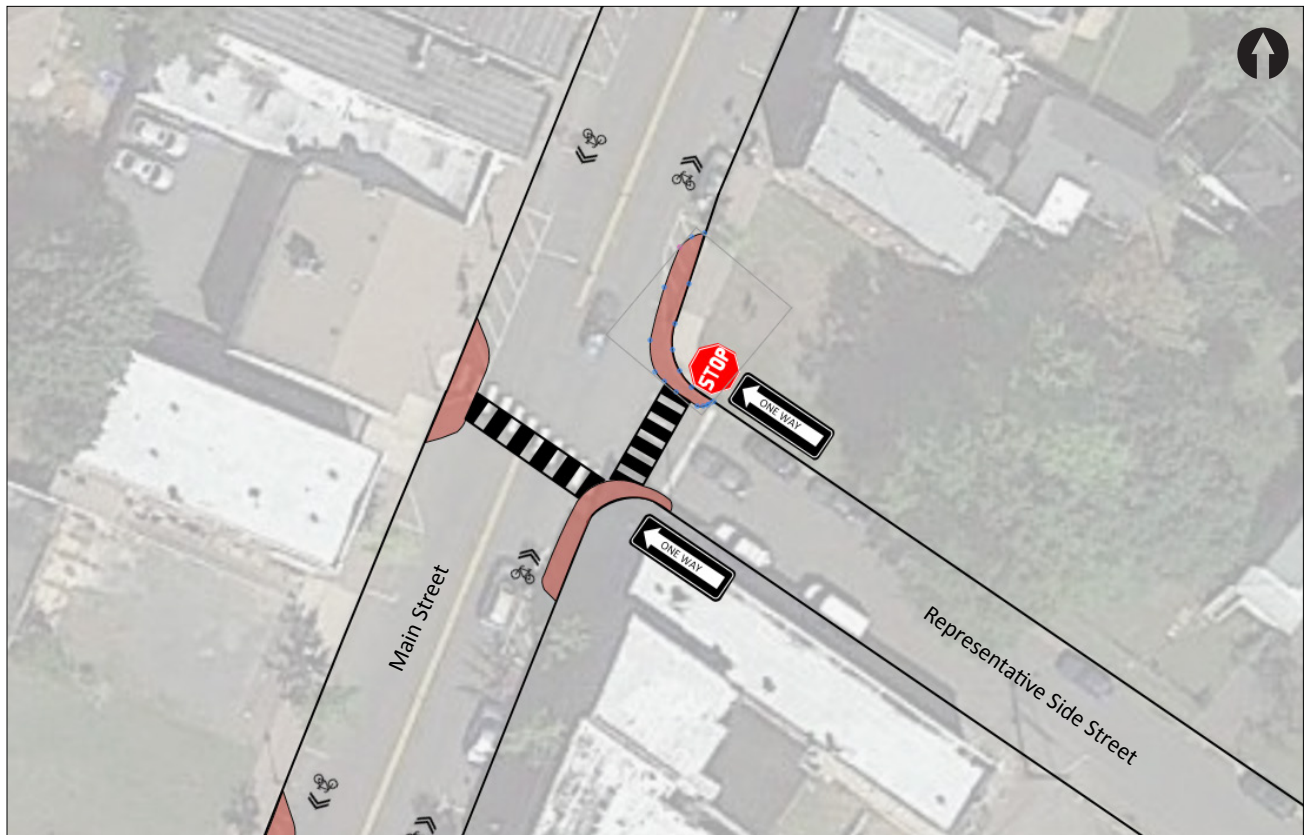
## A.7 CAMPLAIN ROAD

- Revise radius on northwest corner of intersection; remove island
- Add crosswalk north of intersection
- Revise skewed crosswalk on west leg, to ergonomic style
- Additional pedestrian head on southeast corner
- Split phase Camplain Road



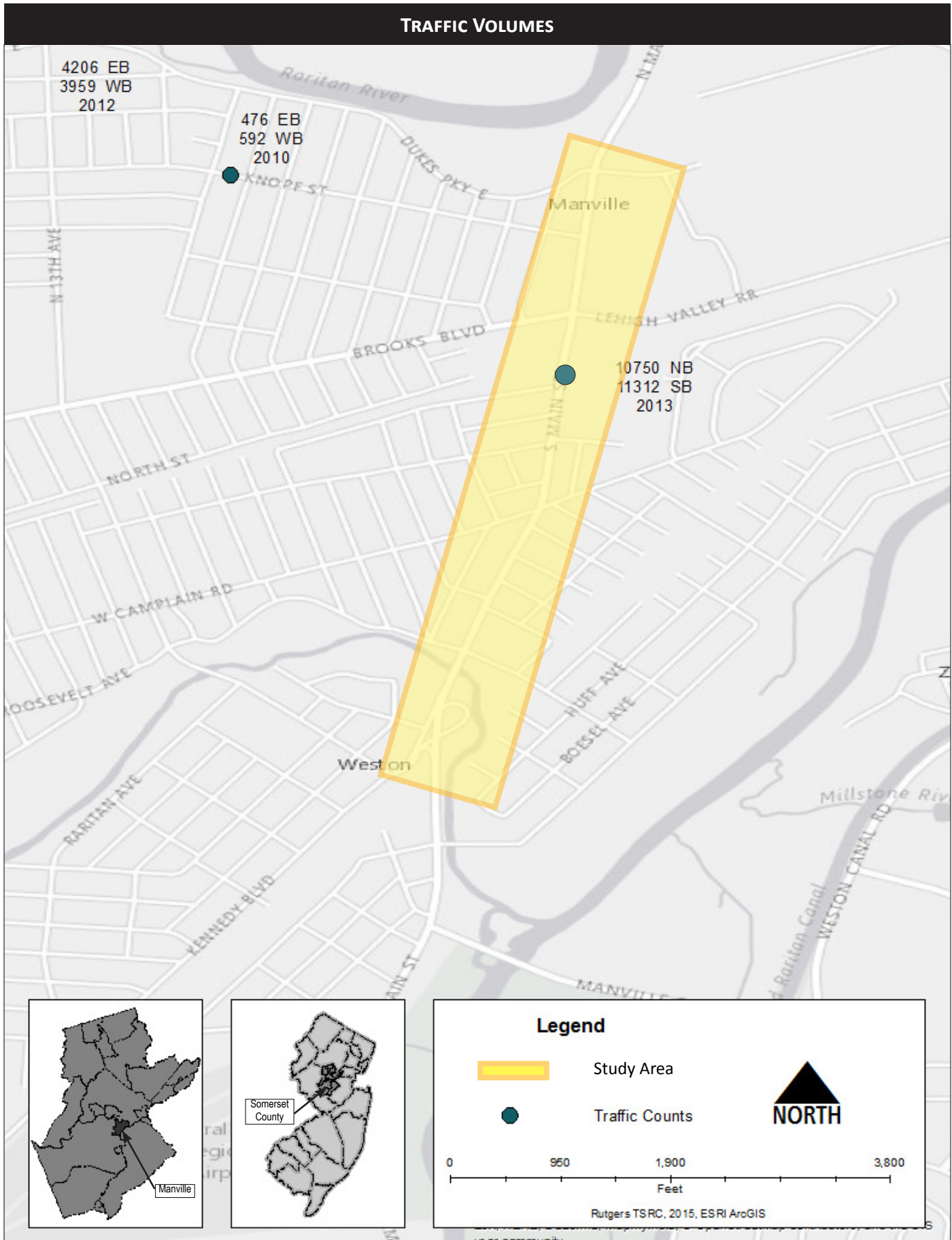
## A.8 UNSIGNALIZED INTERSECTIONS

- Bulbouts on all corners of intersection (on Main Street) to restrict parking and to shorten pedestrian crossing
- Pedestrian crossing signs



>> APPENDIX B—RSA TEAM

Name	Representing	E-mail
James Sinclair	Alan M. Voorhees Transportation Center	james.sinclair@ejb.rutgers.edu
Gary Garwacke	Borough of Manville	ggarwacke@manvillenj.org
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Dayna Camacho	Borough of Manville	dayna3@optonline.net
Vince Lomedico	Borough of Manville	vlomedico@manvillenj.org
Andy Kaplan	Center for Advanced Infrastructure and Transportation	andy.kaplan@rutgers.edu
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Sgt. Jeff Petrone	Manville Police Dept	JPetrone@manvillepd.org
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James Crane	Ridewise	James@ridewise.org
Kenneth Wedeen	Somerset County Planning	Wedeen@co.somerset.nj.us
Adam Bloom	Somerset County Engineering	Bloom@co.somerset.nj.us
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Vic Iulo	Somerset County Engineering	Iulo@co.somerset.nj.us
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Chris Corvino	The Arc of Somerset County	christopherc@thearcofsomerset.org





STUDY AREA

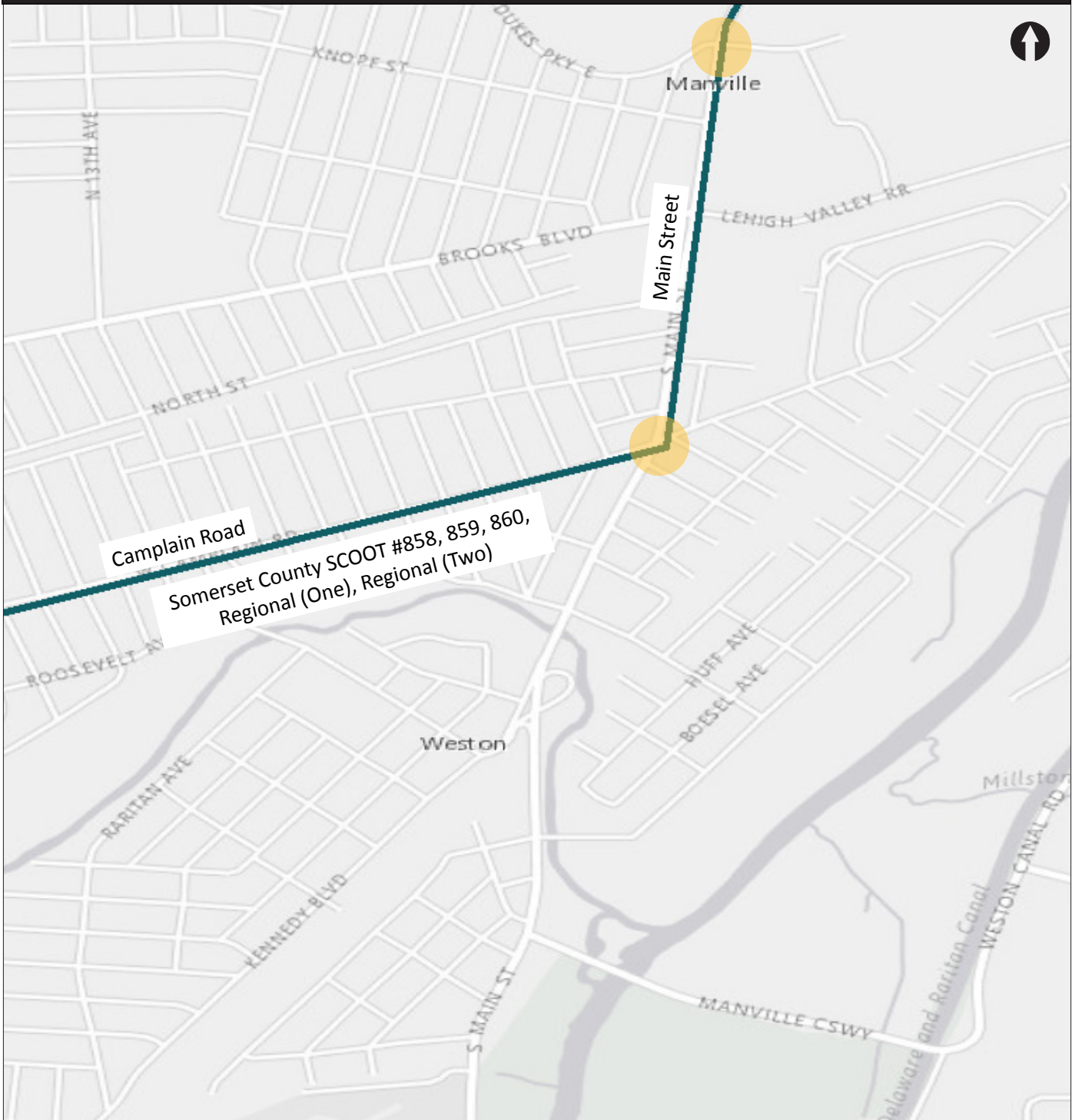


1754 ft

— RSA Corridor

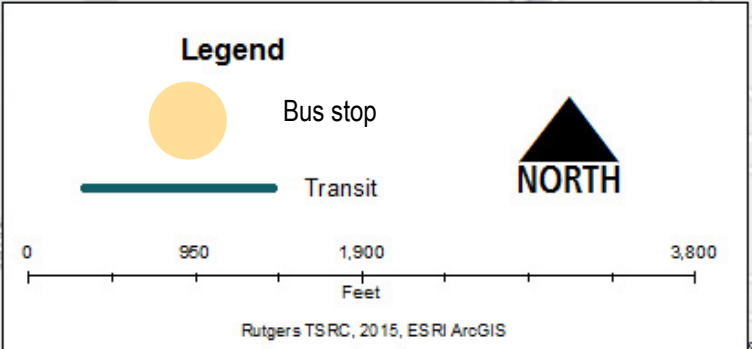
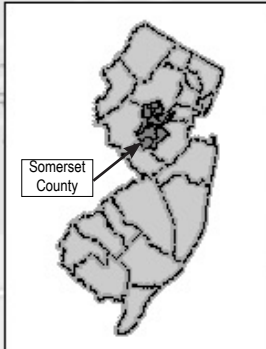
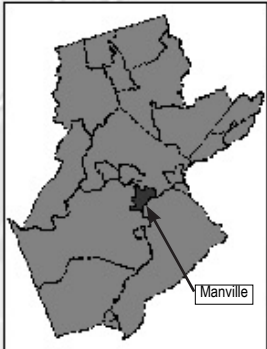
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# AREA TRANSIT

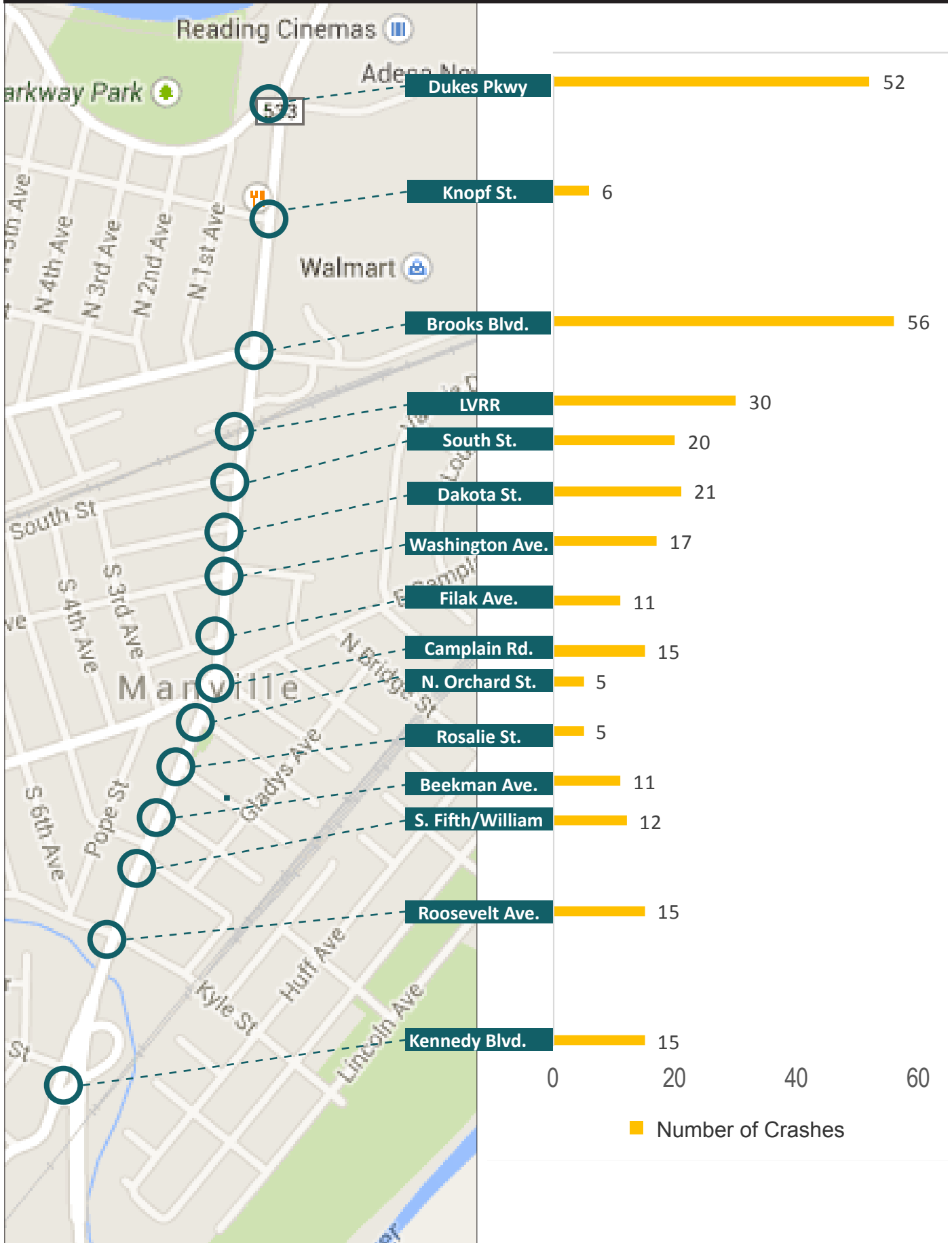


Camplain Road  
Somerset County SCOOT #858, 859, 860,  
Regional (One), Regional (Two)

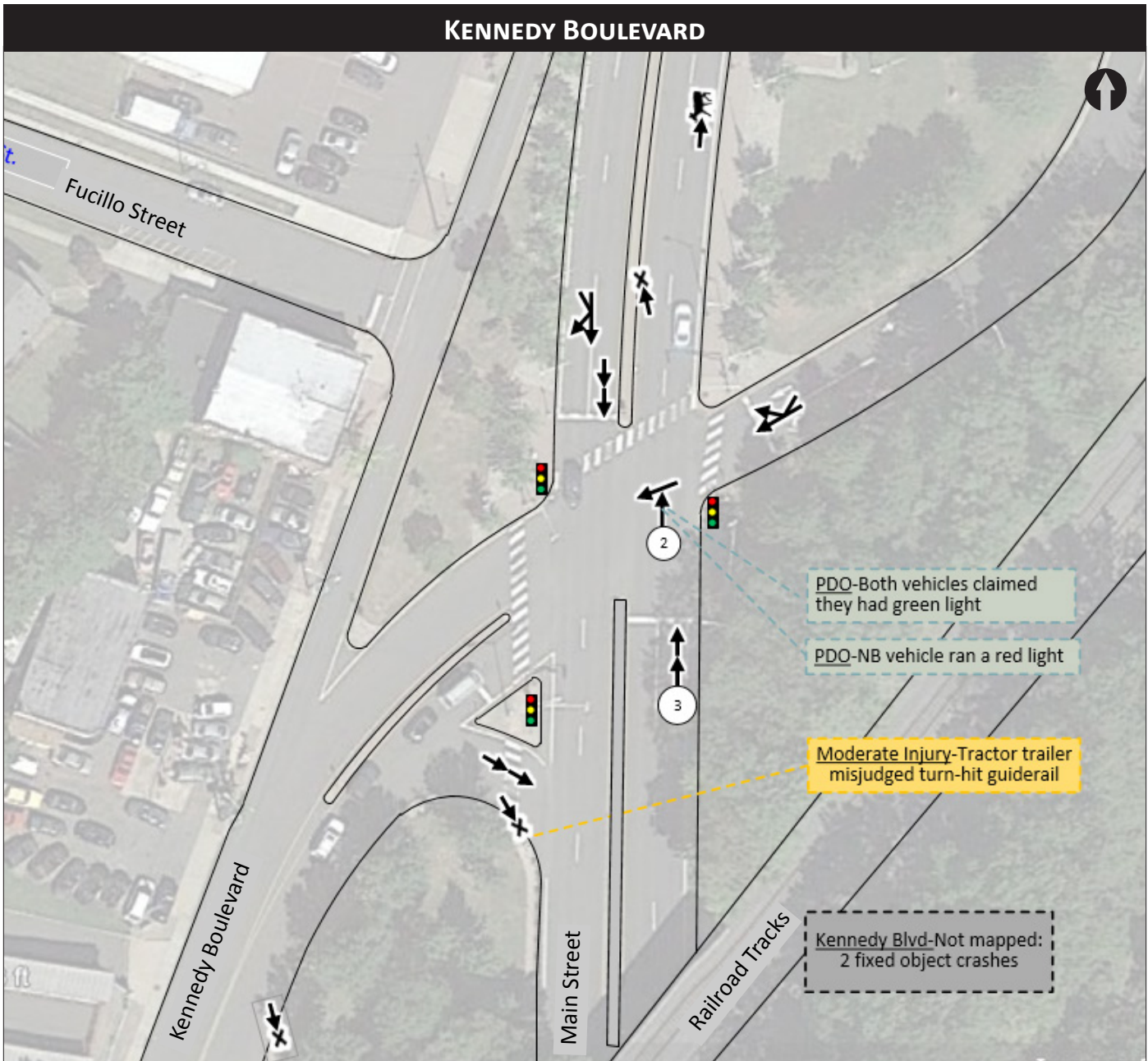
Main Street



# HISTOGRAM OF CRASHES ALONG CORRIDOR



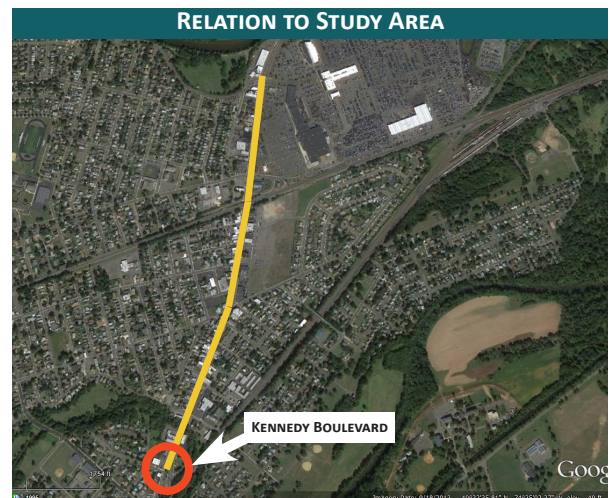
>> APPENDIX D—CRASH DATA AND CRASH DIAGRAMS



#### LEGEND

	Right angle		Same direction - Sideswipe
	Fixed-object		Same direction - Rear End
	Animal		

Google Imagery, 2014  
Crash diagrams based on reports retrieved from NJDOT



## KENNEDY BOULEVARD- CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction - Rear End	5
Same Direction - Sideswipe	2
Right Angle	2
Opposite Direction - Head On/ Angular	-
Opposite Direction - Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	5
Animal	1
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
<b>Total</b>	<b>15</b>

Month	#
January	-
February	2
March	1
April	-
May	-
June	4
July	-
August	-
September	2
October	3
November	3
December	-
<b>Total</b>	<b>15</b>

Severity	#
Property Damage Only (PDO)	13
Pain	1
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>15</b>

Crash Year	#
2010	4
2011	6
2012	5
<b>Total</b>	<b>15</b>

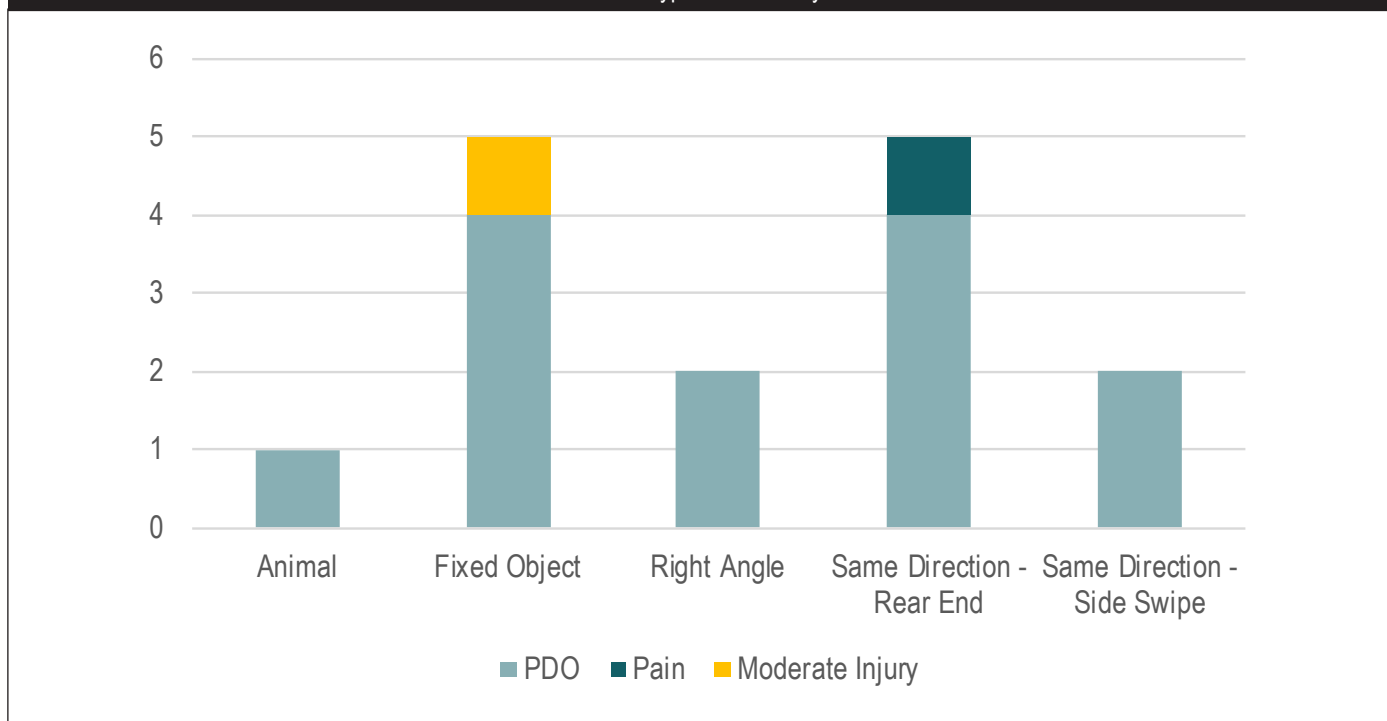
Intersection	#
At intersection	6
Not at intersection	9
At or Near Railroad	-
<b>Total</b>	<b>15</b>

Surface Condition	#
Dry	15
Wet	-
Snowy	-
Icy	-
Slush	-
Water - Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>15</b>

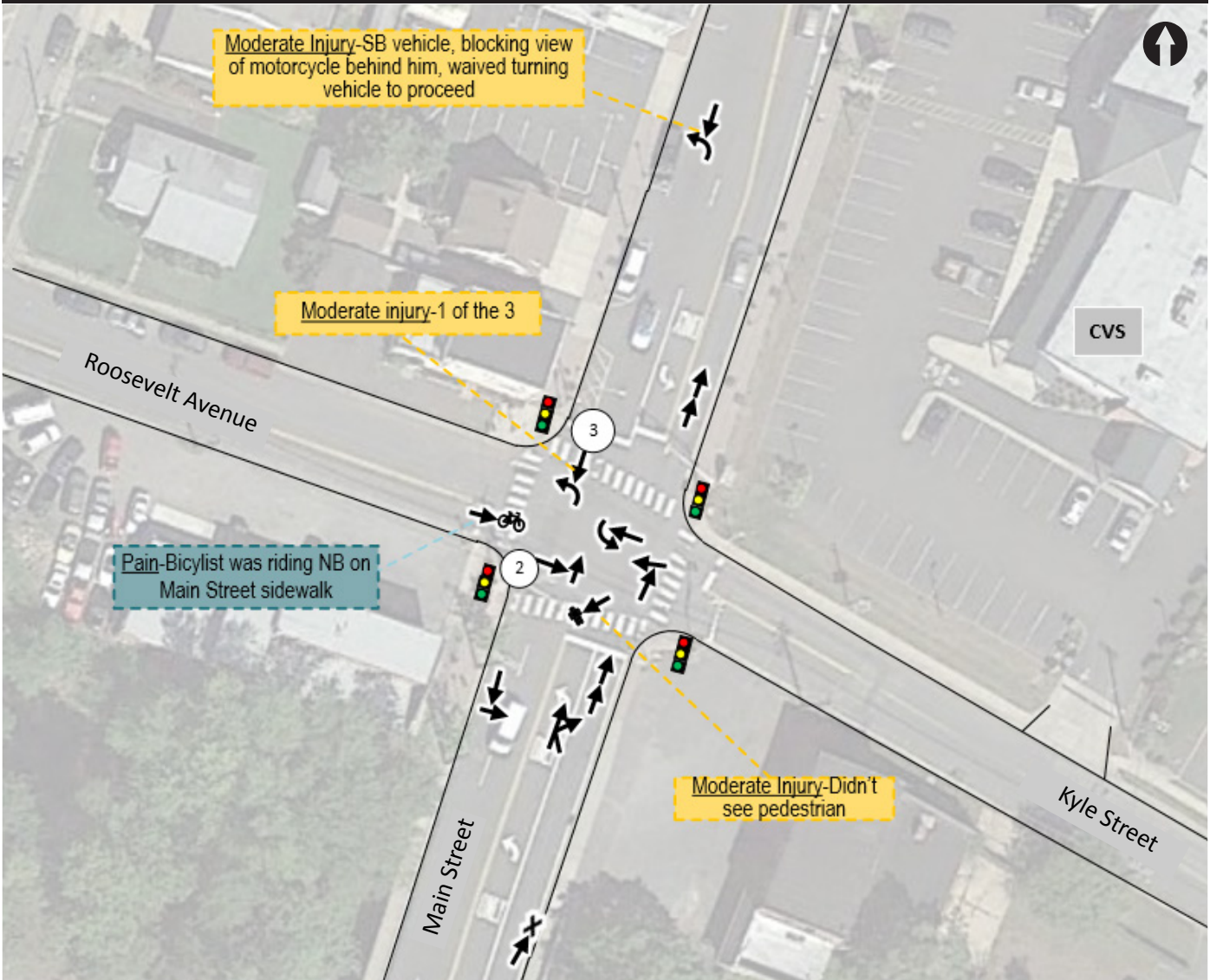
Light Condition	#
Daylight	11
Dawn	-
Dusk	-
Dark - No Street Lights	1
Dark - Street Lights On/ Continuous	3
Dark - Street Lights On/ Spot	-
Dark - Street Lights Off	-
Other	-
<b>Total</b>	<b>15</b>

Day	#
Monday	-
Tuesday	1
Wednesday	2
Thursday	6
Friday	1
Saturday	2
Sunday	3
<b>Total</b>	<b>15</b>

Crash Type and Severity



# ROOSEVELT AVENUE/KYLE STREET



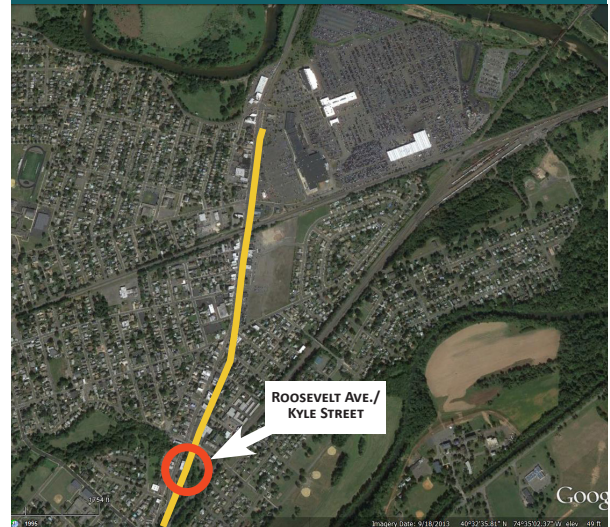
## LEGEND

- ↑ Right angle
- ↔ Same direction - Side swipe
- 🚲 Cyclist
- ➡ Same direction - Rear End
- 🚶 Pedestrians
- ✘ Fixed-object
- ↩ Left-turn

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## ROOSEVELT AVENUE/KYLE STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	2
Same Direction – Sideswipe	1
Right Angle	4
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	5
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	1
Animal	-
Pedestrian	1
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>15</b>

Month	#
January	-
February	1
March	1
April	1
May	2
June	1
July	-
August	1
September	3
October	-
November	4
December	1
<b>Total</b>	<b>15</b>

Severity	#
Property Damage Only (PDO)	10
Pain	2
Moderate Injury	3
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>15</b>

Crash Year	#
2010	3
2011	9
2012	3
<b>Total</b>	<b>15</b>

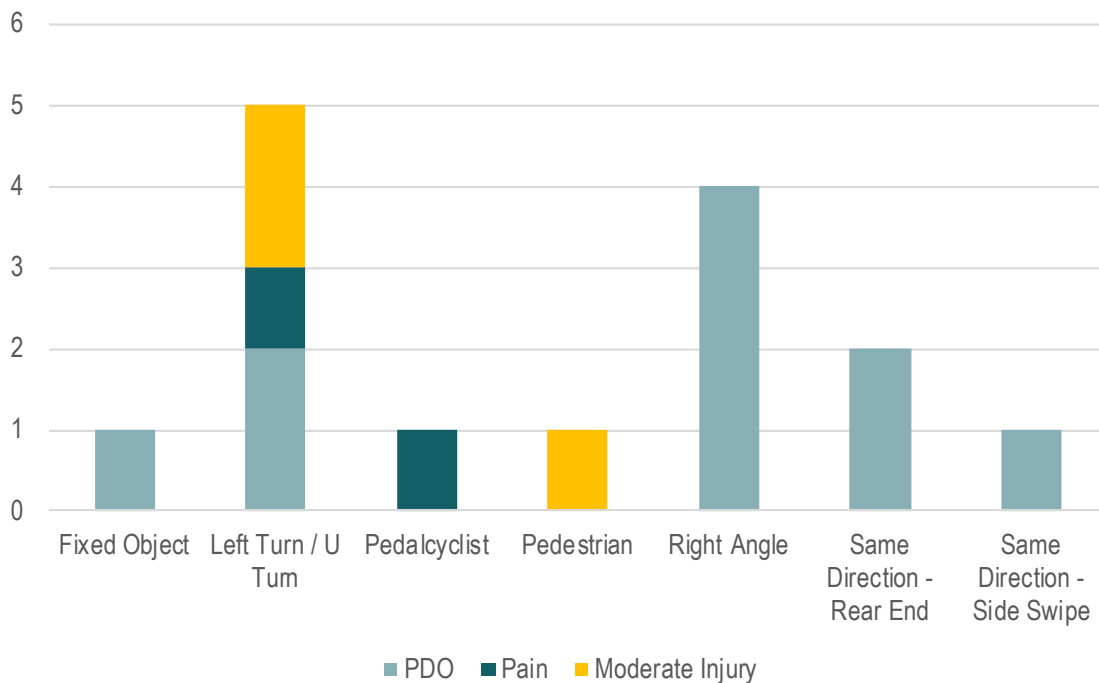
Intersection	#
At intersection	8
Not at intersection	7
At or Near Railroad	-
<b>Total</b>	<b>15</b>

Surface Condition	#
Dry	10
Wet	5
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>15</b>

Light Condition	#
Daylight	9
Dawn	1
Dusk	1
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	4
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>15</b>

Day	#
Monday	2
Tuesday	1
Wednesday	3
Thursday	4
Friday	2
Saturday	1
Sunday	2
<b>Total</b>	<b>15</b>

Crash Type and Severity



# SOUTH FIFTH AVENUE/WILLIAM STREET



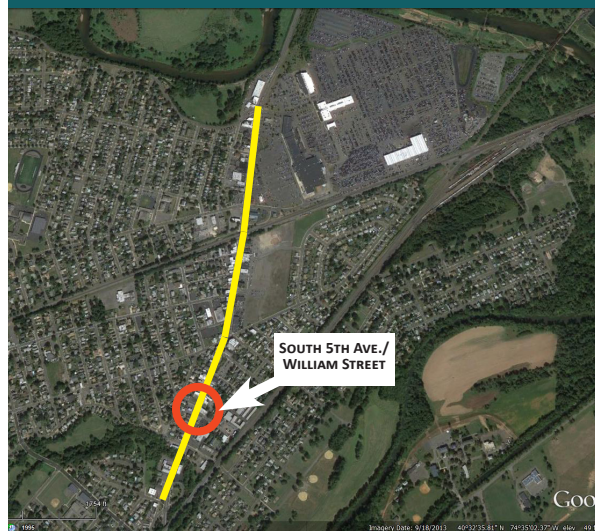
## LEGEND

- Right angle
- Pedestrians
- Same direction - Rear End
- Struck parked vehicle
- Fixed-object

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA





## SOUTH 5TH AVENUE/WILLIAM STREET - CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	<b>7</b>
Same Direction – Sideswipe	-
Right Angle	<b>1</b>
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	<b>2</b>
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	<b>1</b>
Animal	-
Pedestrian	<b>1</b>
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>12</b>

Month	#
January	<b>1</b>
February	-
March	<b>2</b>
April	<b>1</b>
May	<b>2</b>
June	<b>1</b>
July	<b>1</b>
August	<b>1</b>
September	<b>1</b>
October	<b>2</b>
November	-
December	-
<b>Total</b>	<b>12</b>

Severity	#
Property Damage Only (PDO)	<b>8</b>
Pain	<b>3</b>
Moderate Injury	<b>1</b>
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>12</b>

Crash Year	#
2010	3
2011	4
2012	5
<b>Total</b>	<b>12</b>

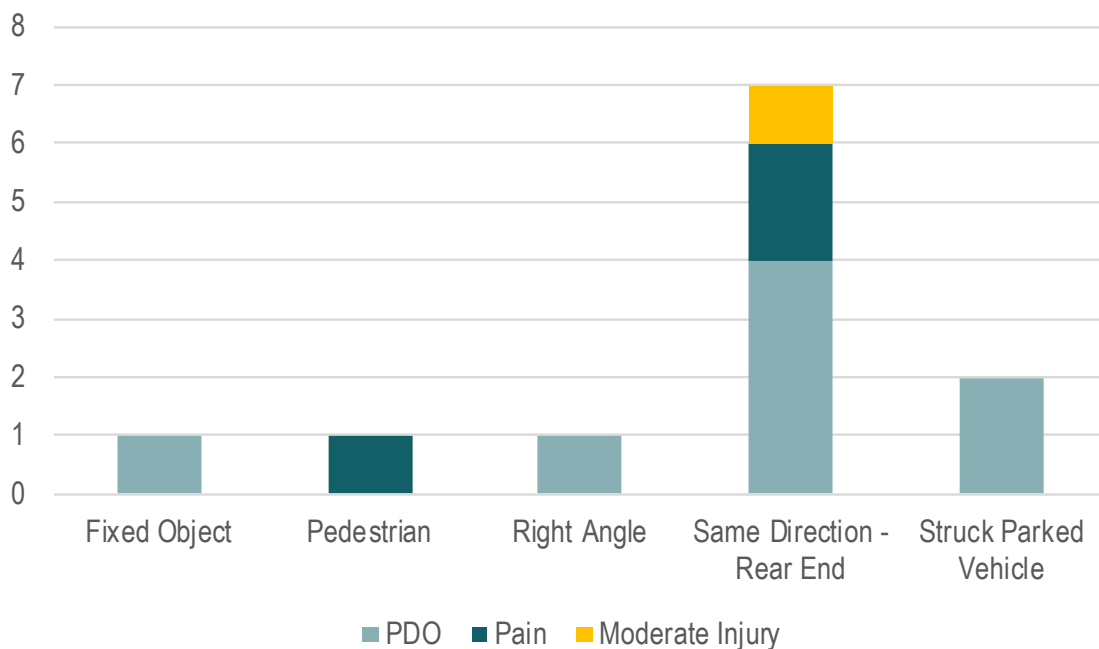
Intersection	#
At intersection	<b>3</b>
Not at intersection	<b>9</b>
At or Near Railroad	-
<b>Total</b>	<b>12</b>

Surface Condition	#
Dry	<b>12</b>
Wet	-
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>12</b>

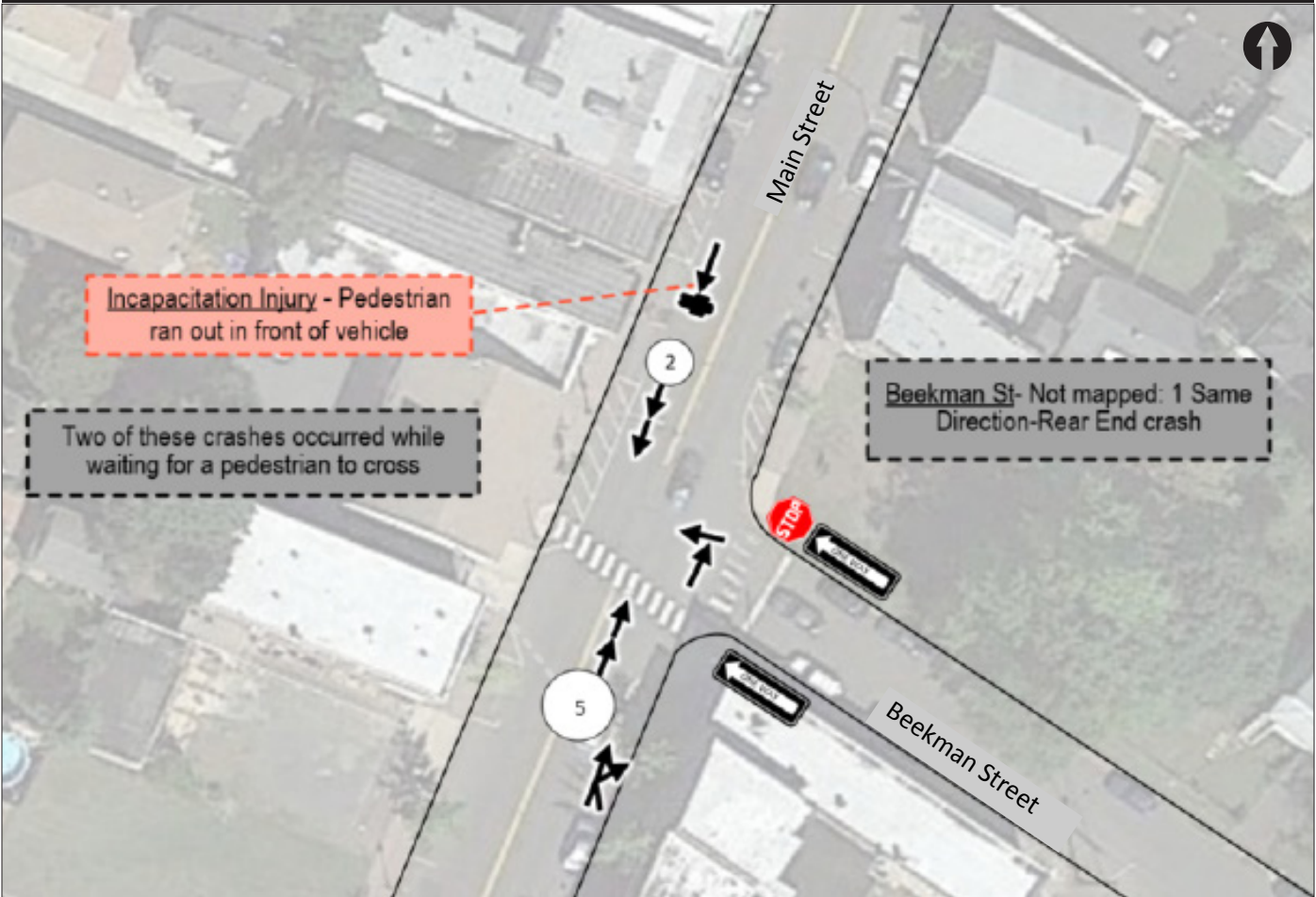
Light Condition	#
Daylight	<b>10</b>
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	<b>2</b>
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>12</b>

Day	#
Monday	<b>1</b>
Tuesday	-
Wednesday	<b>2</b>
Thursday	<b>2</b>
Friday	<b>1</b>
Saturday	<b>4</b>
Sunday	<b>2</b>
<b>Total</b>	<b>12</b>

Crash Type and Severity



# BEEKMAN STREET



## LEGEND

- Right angle
- Pedestrians
- Same direction - Rear End
- Same direction - Sideswipe

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## BEEKMAN STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	<b>8</b>
Same Direction – Sideswipe	<b>1</b>
Right Angle	<b>1</b>
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	<b>1</b>
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>11</b>

Month	#
January	-
February	<b>1</b>
March	-
April	-
May	<b>1</b>
June	<b>3</b>
July	<b>1</b>
August	<b>1</b>
September	<b>1</b>
October	-
November	<b>1</b>
December	<b>2</b>
<b>Total</b>	<b>11</b>

Severity	#
Property Damage Only (PDO)	<b>8</b>
Pain	<b>2</b>
Moderate Injury	-
Incapacitating Injury	<b>1</b>
Fatal	-
<b>Total</b>	<b>11</b>

Crash Year	#
2010	<b>5</b>
2011	<b>3</b>
2012	<b>3</b>
<b>Total</b>	<b>11</b>

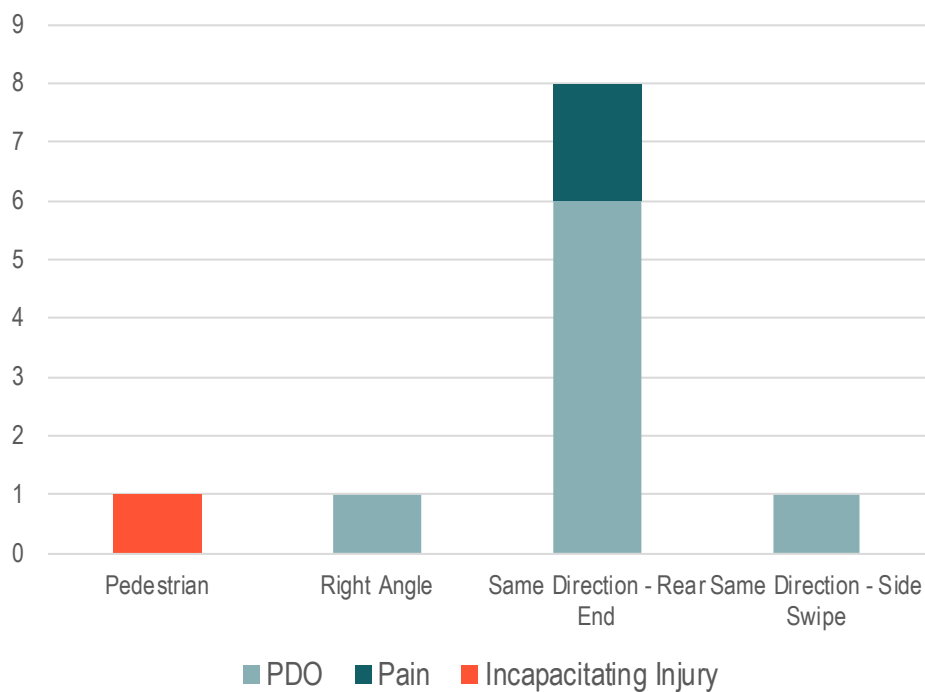
Intersection	#
At intersection	<b>1</b>
Not at intersection	<b>10</b>
At or Near Railroad	-
<b>Total</b>	<b>11</b>

Surface Condition	#
Dry	<b>7</b>
Wet	<b>3</b>
Snowy	<b>1</b>
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>11</b>

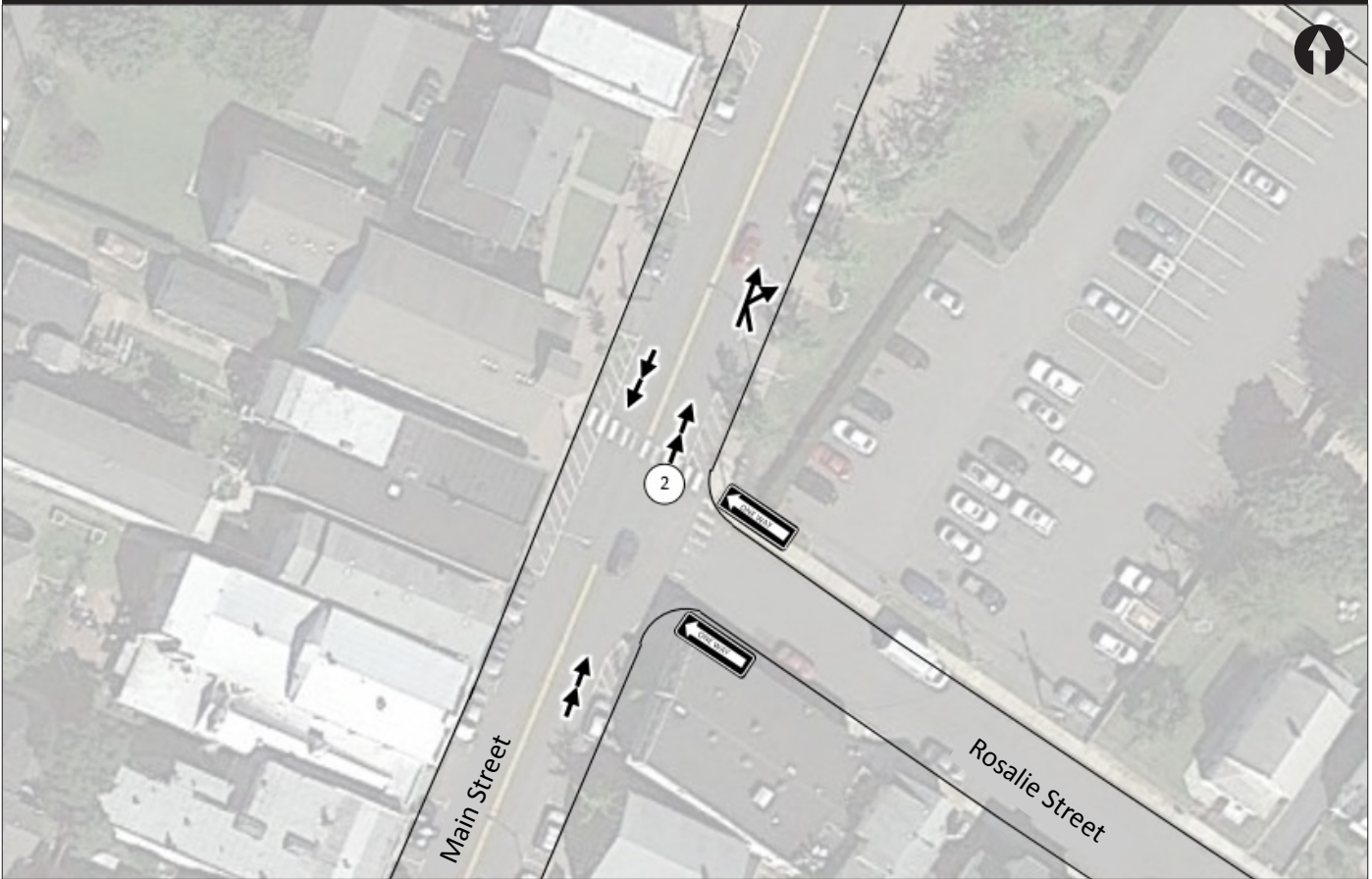
Light Condition	#
Daylight	<b>10</b>
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	<b>1</b>
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>11</b>

Day	#
Monday	<b>5</b>
Tuesday	<b>2</b>
Wednesday	-
Thursday	<b>1</b>
Friday	<b>1</b>
Saturday	<b>1</b>
Sunday	<b>1</b>
<b>Total</b>	<b>11</b>



Crash Type and Severity



# ROSALIE STREET



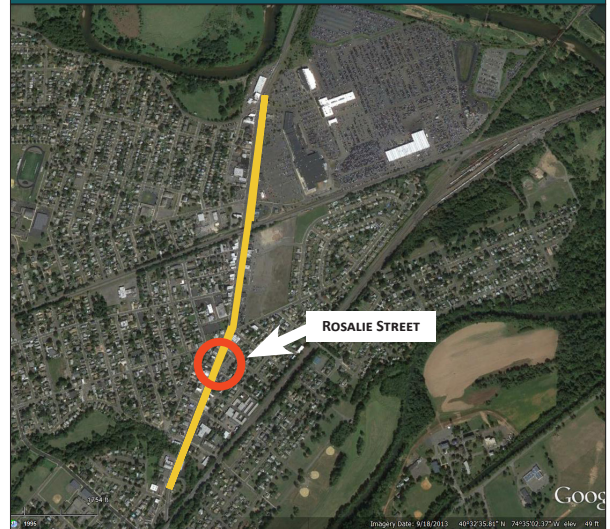
## LEGEND

-  Same direction - Rear End
-  Same direction - Sideswipe

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## ROSALIE STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	4
Same Direction – Sideswipe	1
Right Angle	-
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>5</b>

Month	#
January	-
February	-
March	1
April	-
May	-
June	-
July	-
August	1
September	1
October	-
November	1
December	1
<b>Total</b>	<b>5</b>

Severity	#
Property Damage Only (PDO)	4
Pain	1
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>5</b>

Crash Year	#
2010	-
2011	3
2012	2
<b>Total</b>	<b>5</b>

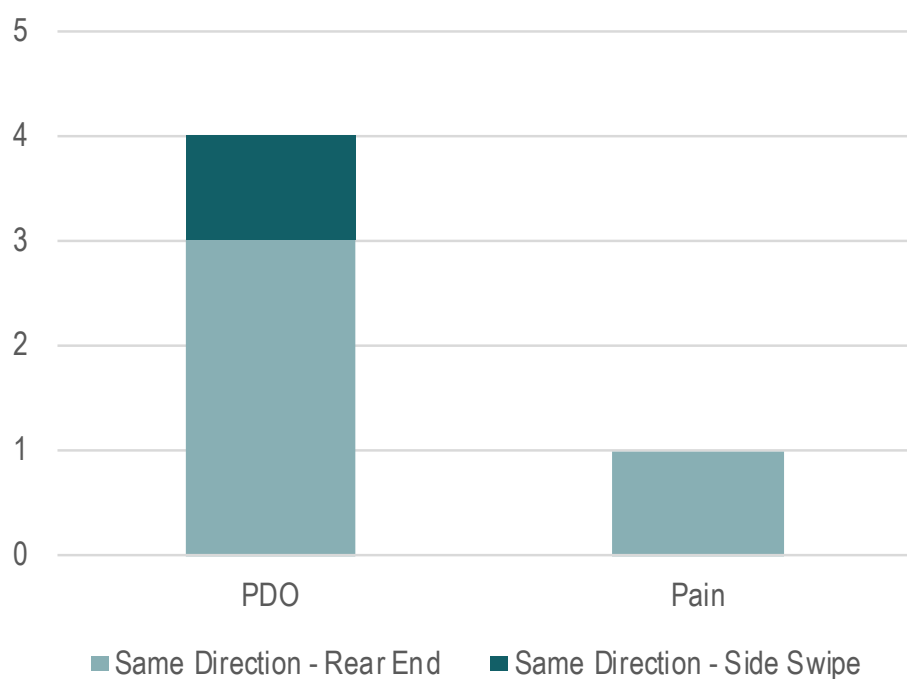
Intersection	#
At intersection	-
Not at intersection	5
At or Near Railroad	-
<b>Total</b>	<b>5</b>

Surface Condition	#
Dry	4
Wet	1
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>5</b>

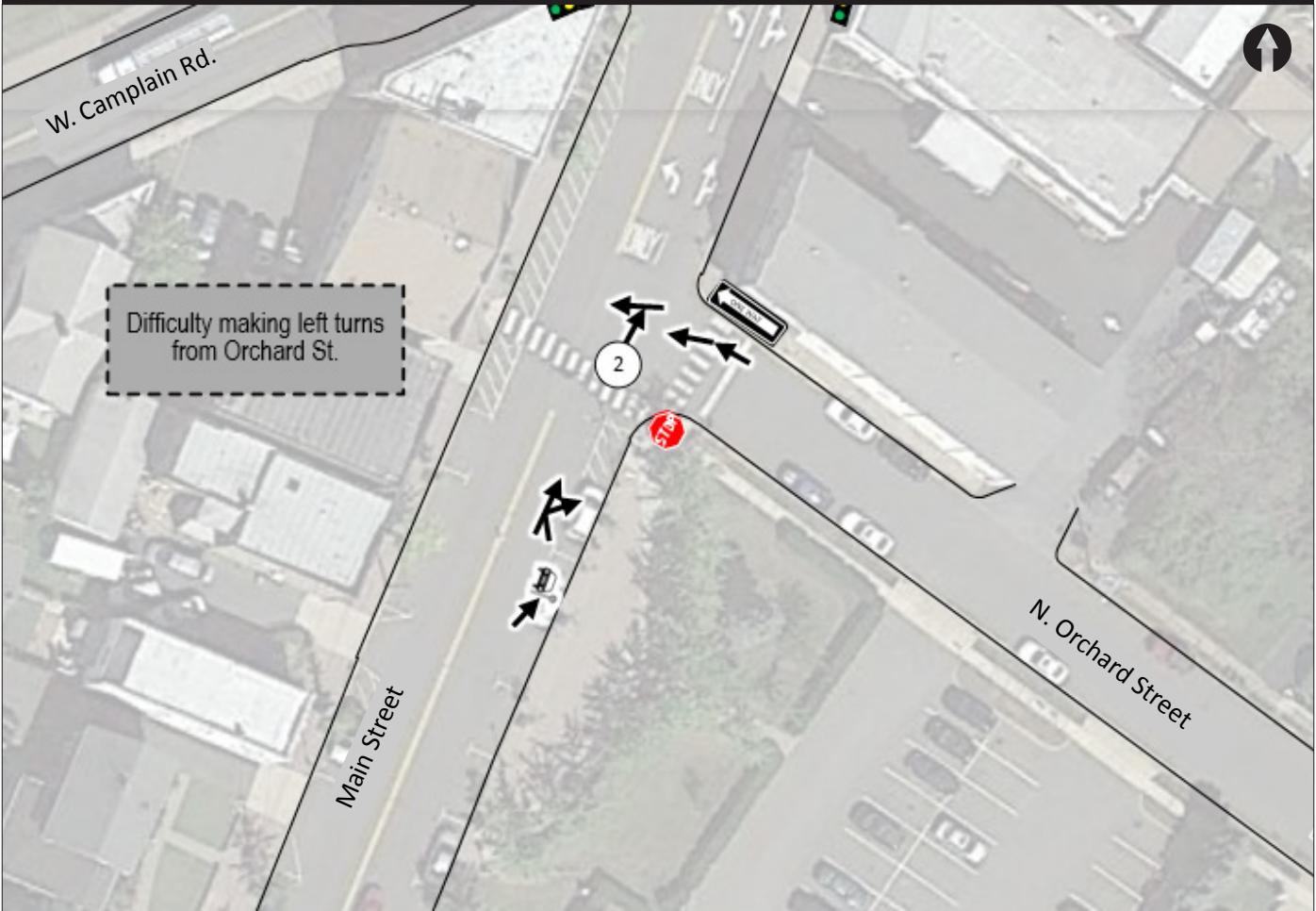
Light Condition	#
Daylight	3
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	2
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>5</b>

Day	#
Monday	1
Tuesday	1
Wednesday	1
Thursday	2
Friday	-
Saturday	-
Sunday	-
<b>Total</b>	<b>5</b>

Crash Type and Severity



# N. ORCHARD STREET



## LEGEND



Right angle



Same direction - Rear End



Struck parked vehicle

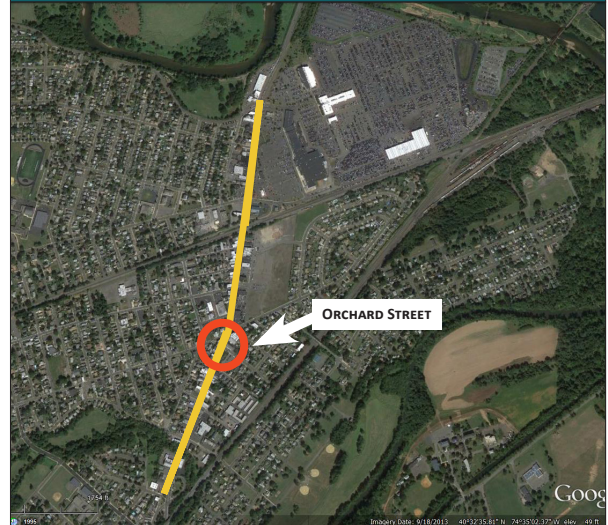


Same direction - Sideswipe

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## N. ORCHARD STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	4
Same Direction – Sideswipe	1
Right Angle	-
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>5</b>

Month	#
January	-
February	-
March	1
April	-
May	-
June	-
July	-
August	1
September	1
October	-
November	1
December	1
<b>Total</b>	<b>5</b>

Severity	#
Property Damage Only (PDO)	4
Pain	1
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>5</b>

Crash Year	#
2010	2
2011	2
2012	1
<b>Total</b>	<b>5</b>

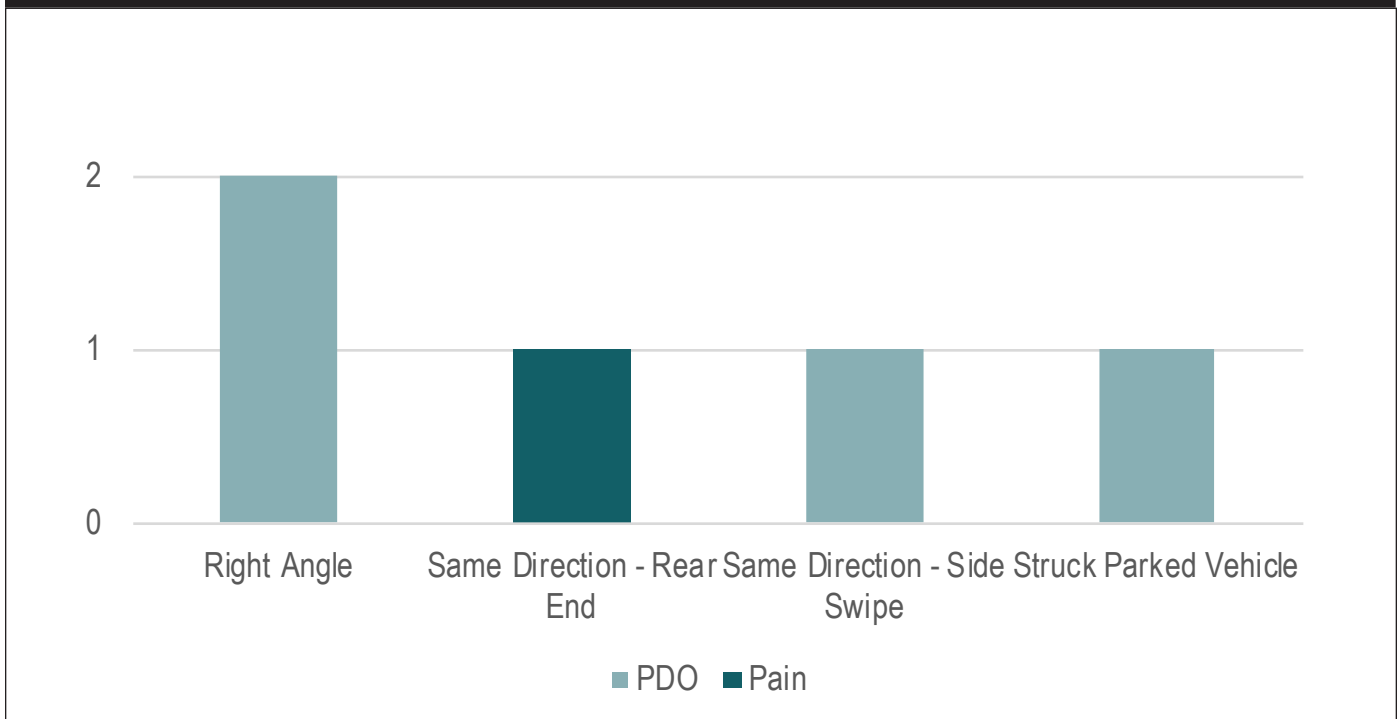
Intersection	#
At intersection	-
Not at intersection	5
At or Near Railroad	-
<b>Total</b>	<b>5</b>

Surface Condition	#
Dry	4
Wet	1
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>5</b>

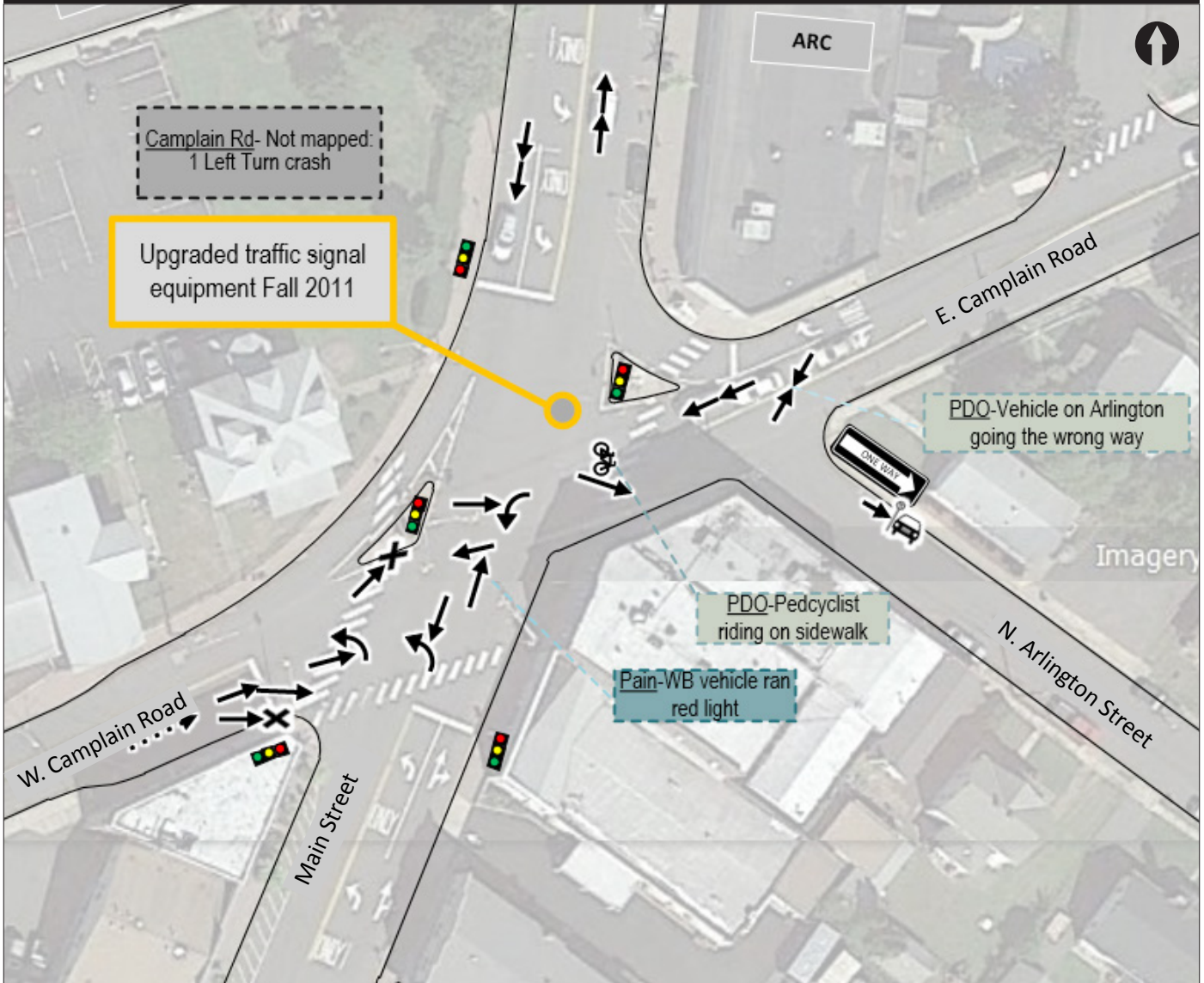
Light Condition	#
Daylight	5
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	-
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>5</b>

Day	#
Monday	1
Tuesday	1
Wednesday	1
Thursday	2
Friday	-
Saturday	-
Sunday	-
<b>Total</b>	<b>5</b>

Crash Type and Severity



# CAMPLAIN ROAD



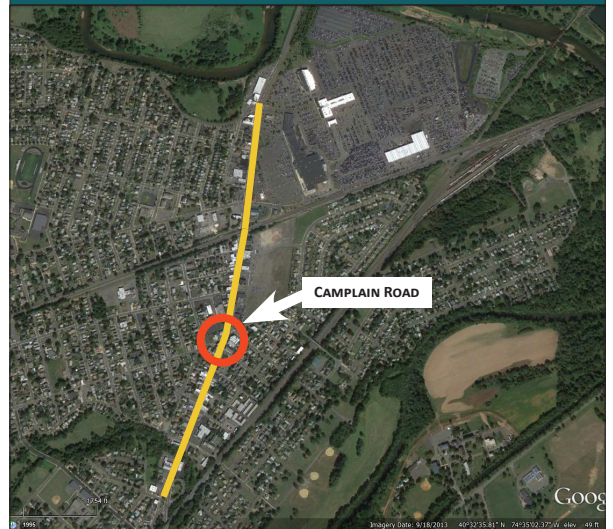
## LEGEND

- ↑ Right angle
- Same direction - Rear End
- 🚲 Cyclist
- 🚗→ Struck parked vehicle
- ←⋯ Backing
- X Fixed-object
- ↙ Left-turn

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA





## CAMPLAIN ROAD—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	4
Same Direction – Sideswipe	-
Right Angle	1
Opposite Direction – Head On/ Angular	1
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	1
Left Turn / U-Turn	4
Backing	1
Encroachment	-
Overtaken	-
Fixed Object	2
Animal	-
Pedestrian	-
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>15</b>

Month	#
January	-
February	2
March	-
April	3
May	2
June	1
July	1
August	1
September	-
October	2
November	-
December	3
<b>Total</b>	<b>15</b>

Severity	#
Property Damage Only (PDO)	10
Pain	5
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>15</b>

Crash Year	#
2010	3
2011	7
2012	5
<b>Total</b>	<b>15</b>

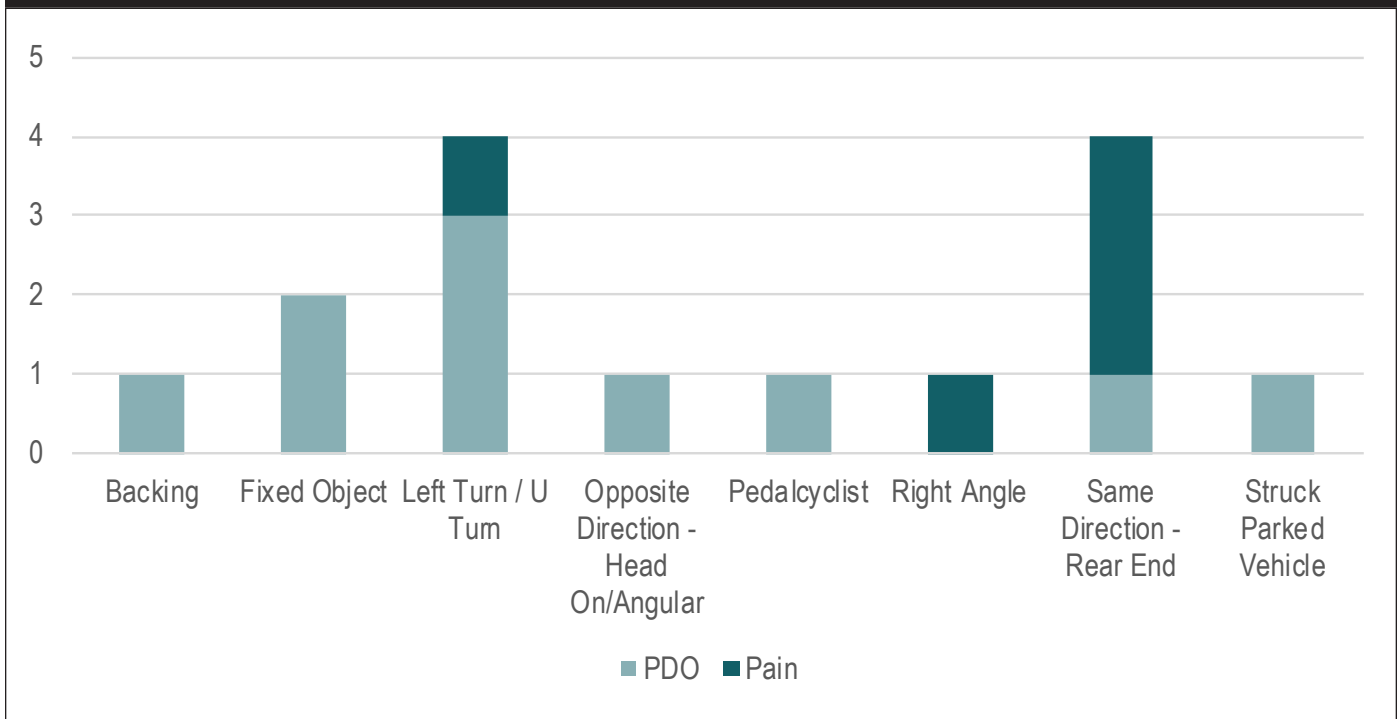
Intersection	#
At intersection	6
Not at intersection	9
At or Near Railroad	-
<b>Total</b>	<b>15</b>

Surface Condition	#
Dry	13
Wet	2
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>15</b>

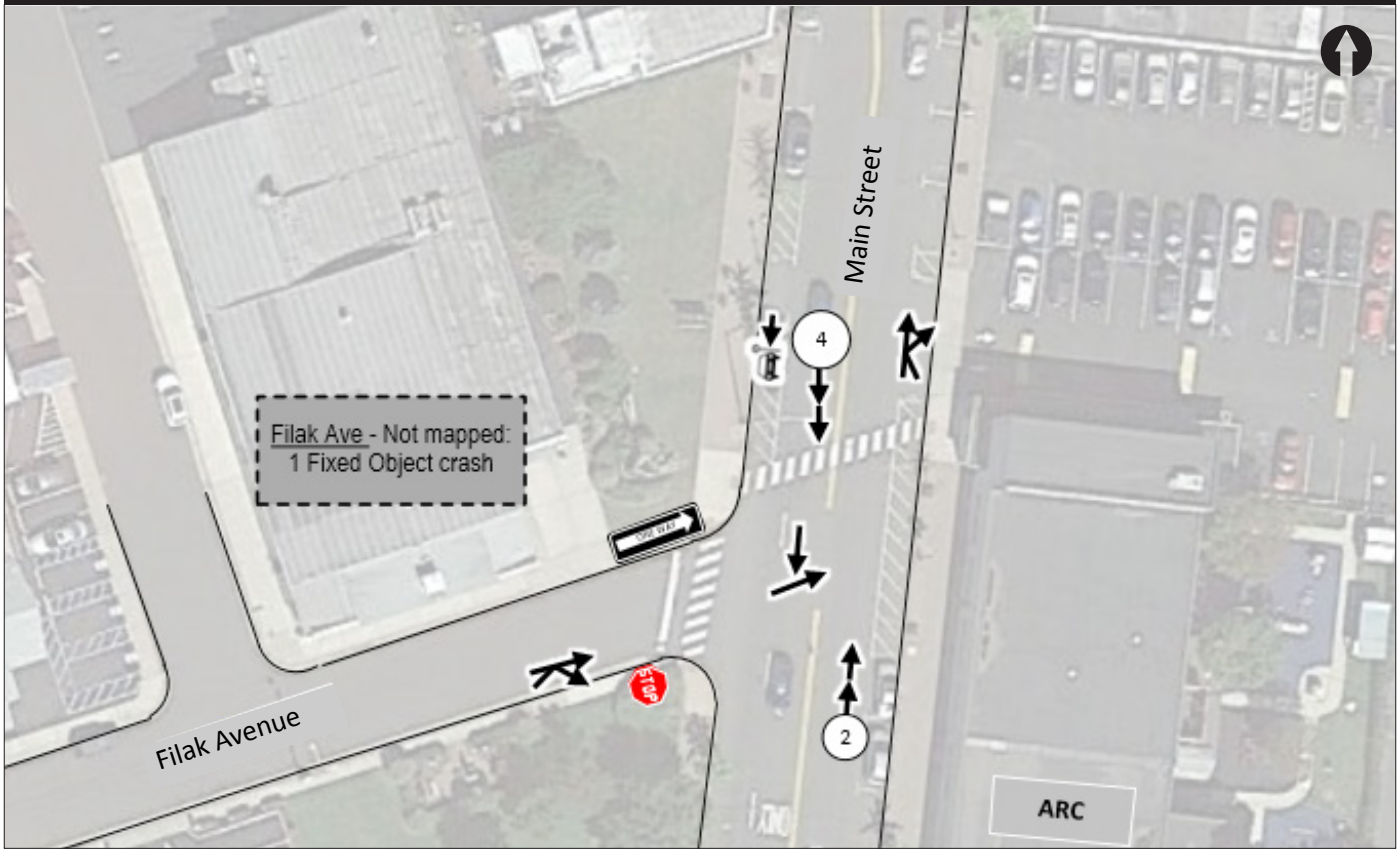
Light Condition	#
Daylight	13
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	2
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>15</b>

Day	#
Monday	2
Tuesday	2
Wednesday	2
Thursday	1
Friday	3
Saturday	3
Sunday	2
<b>Total</b>	<b>15</b>

Crash Type and Severity



# FILAK AVENUE



## LEGEND

- Right angle
- Struck parked vehicle
- Same direction - Rear End
- Same direction - Sideswipe
- Fixed-object

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## FILAK AVENUE—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	<b>6</b>
Same Direction – Sideswipe	<b>2</b>
Right Angle	<b>1</b>
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	<b>1</b>
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	<b>1</b>
Animal	-
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>11</b>

Month	#
January	<b>2</b>
February	<b>1</b>
March	<b>2</b>
April	<b>1</b>
May	-
June	-
July	<b>2</b>
August	<b>1</b>
September	-
October	-
November	-
December	<b>2</b>
<b>Total</b>	<b>11</b>

Severity	#
Property Damage Only (PDO)	<b>8</b>
Pain	<b>3</b>
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>11</b>

Crash Year	#
2010	4
2011	4
2012	3
<b>Total</b>	<b>11</b>

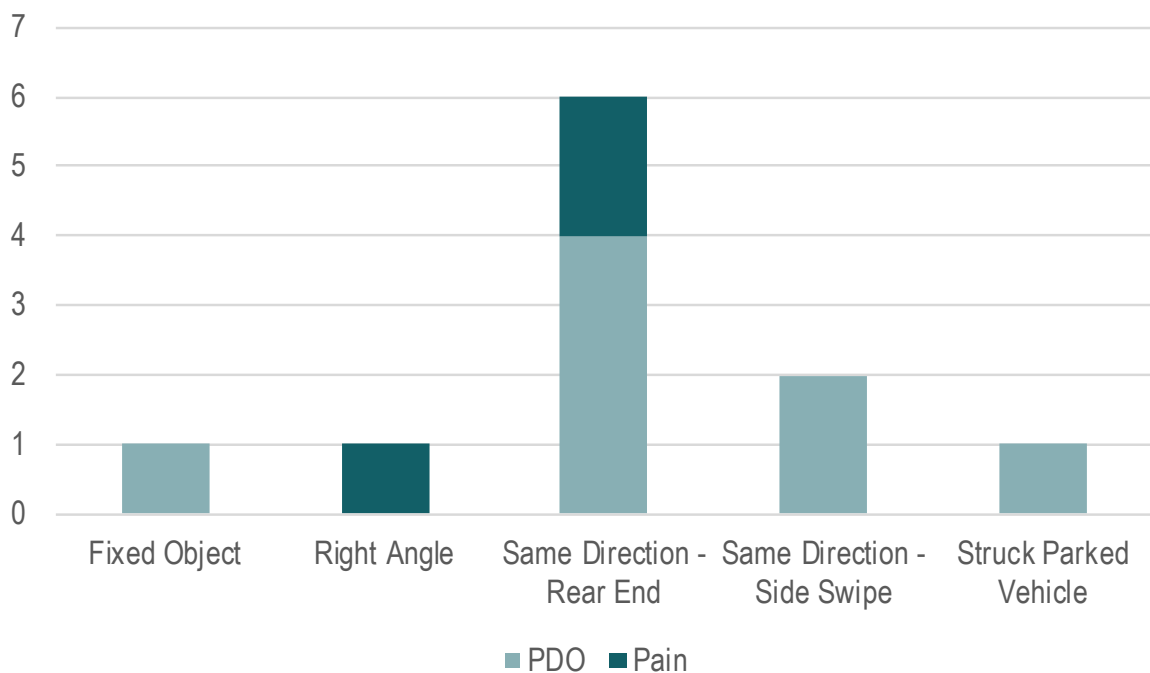
Intersection	#
At intersection	<b>3</b>
Not at intersection	<b>8</b>
At or Near Railroad	-
<b>Total</b>	<b>11</b>

Surface Condition	#
Dry	<b>10</b>
Wet	<b>1</b>
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>11</b>

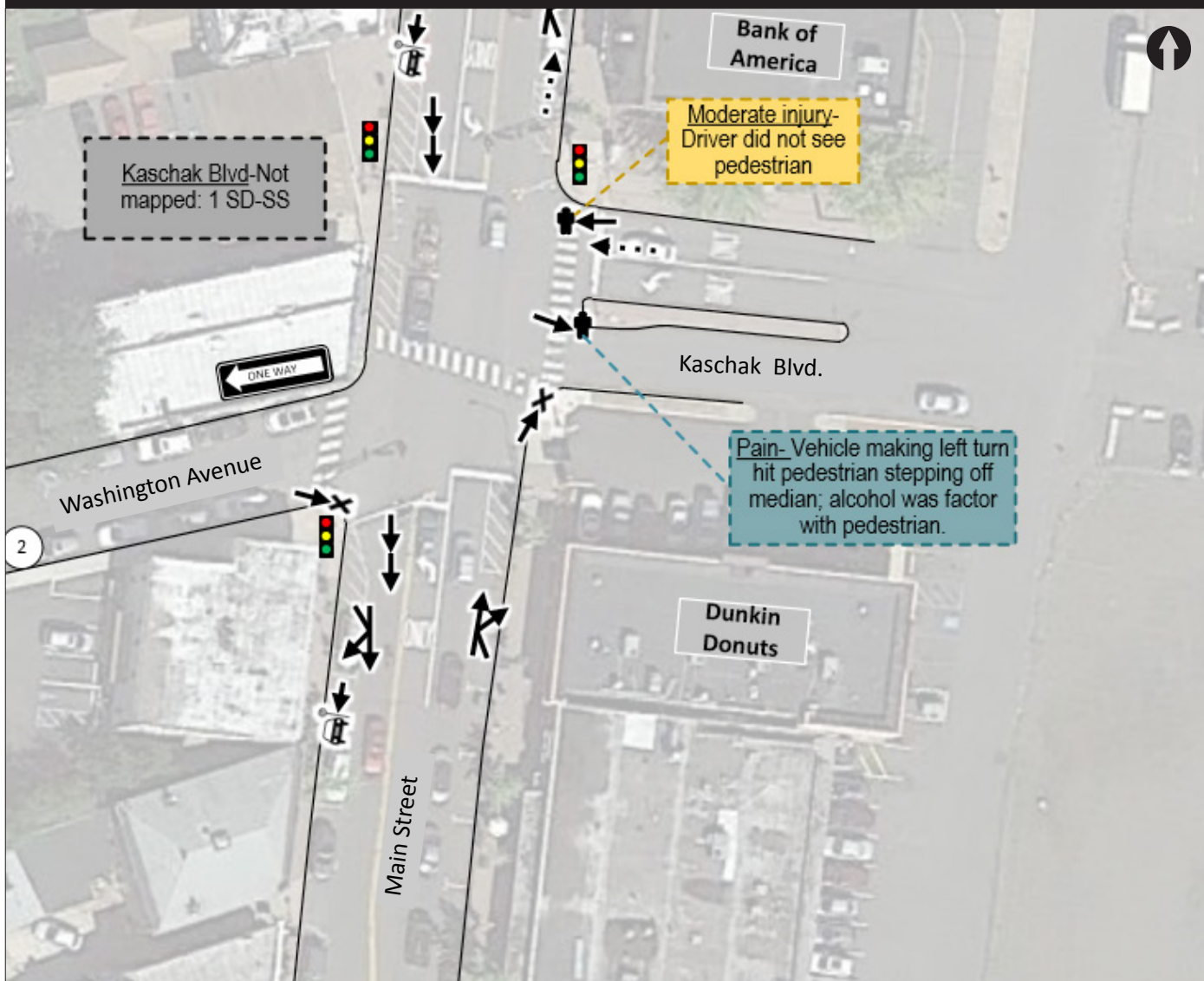
Light Condition	#
Daylight	<b>10</b>
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	<b>1</b>
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>11</b>

Day	#
Monday	<b>2</b>
Tuesday	<b>1</b>
Wednesday	<b>1</b>
Thursday	<b>2</b>
Friday	<b>1</b>
Saturday	<b>3</b>
Sunday	<b>1</b>
<b>Total</b>	<b>11</b>

Crash Type and Severity



# WASHINGTON AVENUE



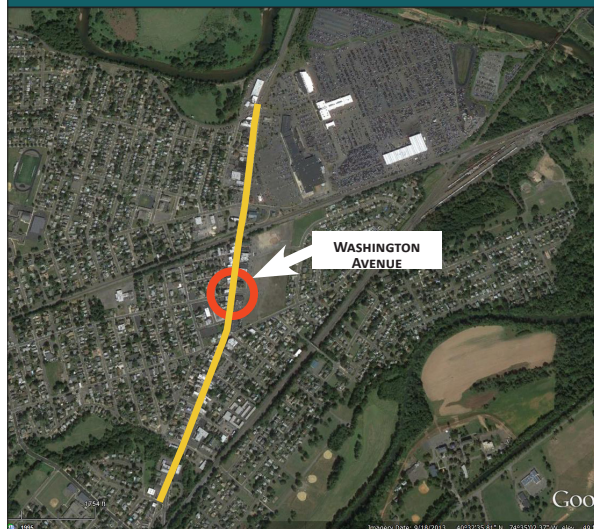
## LEGEND

- Right angle
- Struck parked vehicle
- Pedestrians
- Backing
- Same direction - Rear End
- Same direction - Sideswipe
- Fixed-object

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## WASHINGTON AVENUE—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	2
Same Direction – Sideswipe	5
Right Angle	2
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	2
Left Turn / U-Turn	-
Backing	2
Encroachment	-
Overtaken	-
Fixed Object	2
Animal	-
Pedestrian	2
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>17</b>

Month	#
January	1
February	5
March	2
April	1
May	-
June	2
July	1
August	2
September	-
October	-
November	2
December	1
<b>Total</b>	<b>17</b>

Severity	#
Property Damage Only (PDO)	15
Pain	1
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>17</b>

Crash Year	#
2010	11
2011	3
2012	3
<b>Total</b>	<b>17</b>

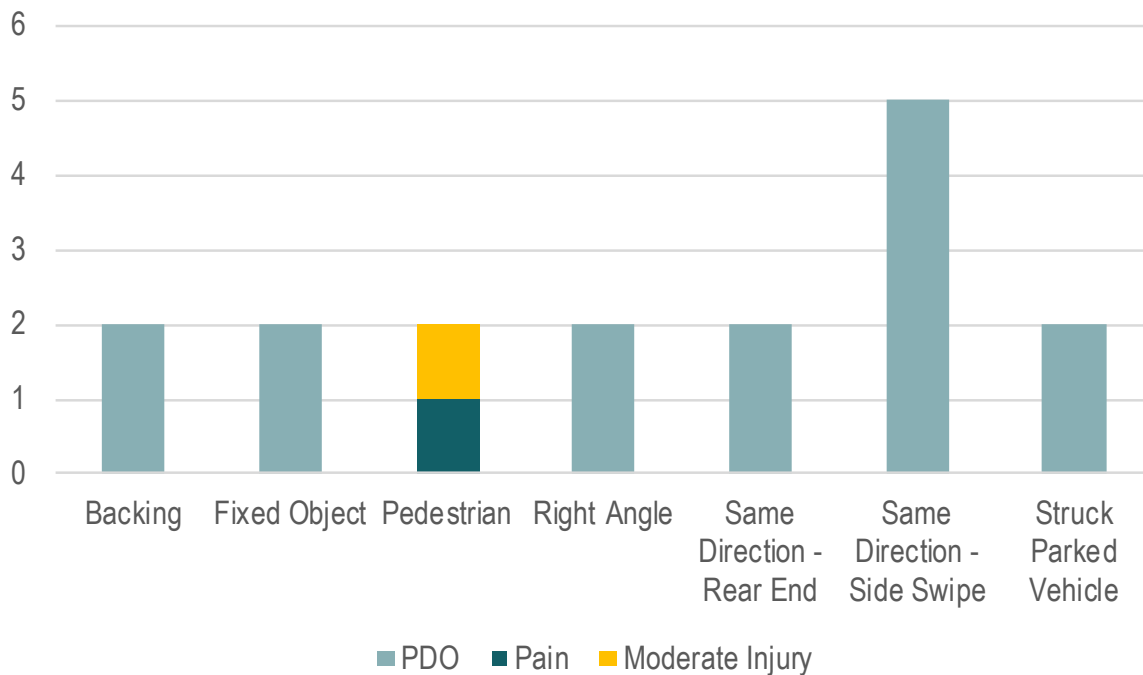
Intersection	#
At intersection	3
Not at intersection	14
At or Near Railroad	-
<b>Total</b>	<b>17</b>

Surface Condition	#
Dry	17
Wet	-
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>17</b>

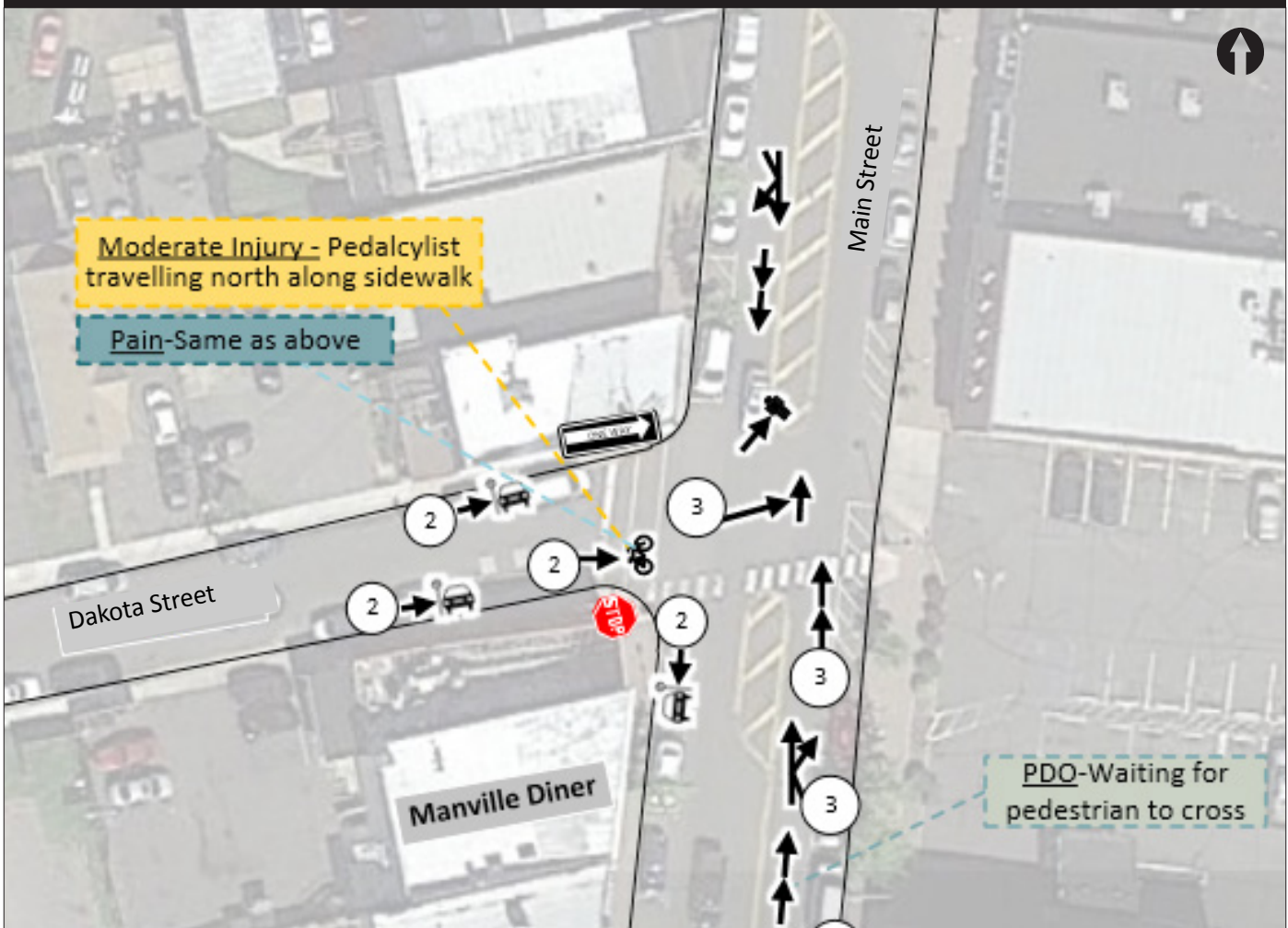
Light Condition	#
Daylight	13
Dawn	-
Dusk	1
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	2
Dark – Street Lights On/ Spot	1
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>17</b>

Day	#
Monday	4
Tuesday	2
Wednesday	1
Thursday	3
Friday	4
Saturday	3
Sunday	-
<b>Total</b>	<b>17</b>

Crash Type and Severity



# DAKOTA STREET



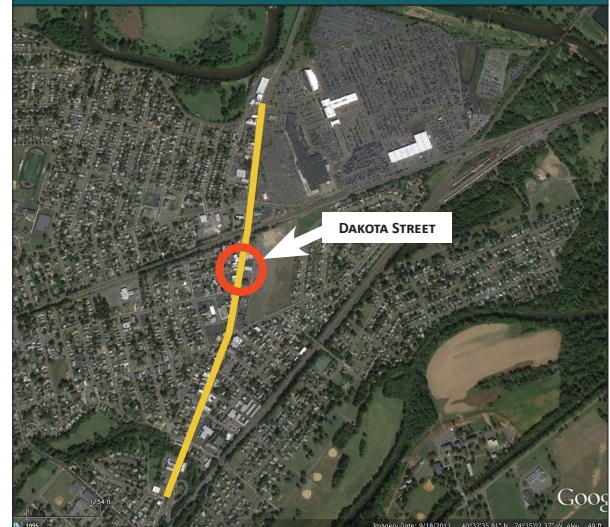
## LEGEND

- |  |                       |  |                            |
|--|-----------------------|--|----------------------------|
|  | Right angle           |  | Same direction - Rear End  |
|  | Struck parked vehicle |  | Same direction - Sideswipe |
|  | Cyclist               |  | Pedestrians                |

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## DAKOTA STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	5
Same Direction – Sideswipe	4
Right Angle	3
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	6
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	1
Pedalcyclist	2
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>21</b>

Month	#
January	1
February	3
March	2
April	1
May	2
June	5
July	2
August	1
September	3
October	-
November	1
December	-
<b>Total</b>	<b>21</b>

Severity	#
Property Damage Only (PDO)	17
Pain	3
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>21</b>

Crash Year	#
2010	4
2011	10
2012	7
<b>Total</b>	<b>21</b>

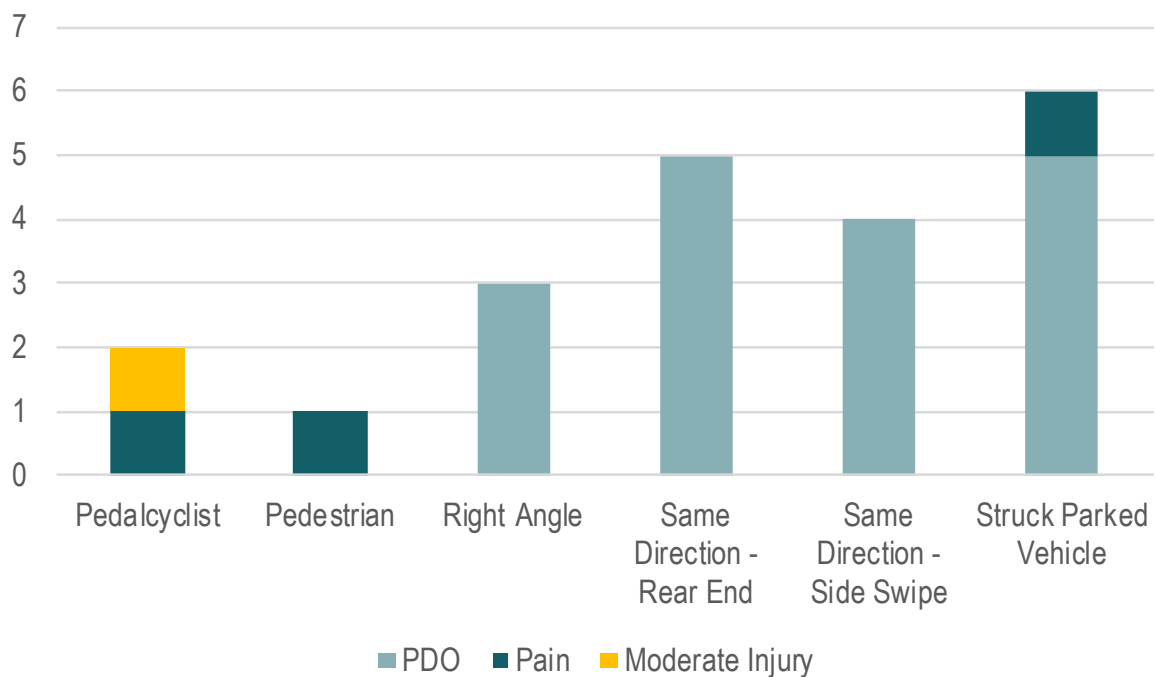
Intersection	#
At intersection	3
Not at intersection	18
At or Near Railroad	-
<b>Total</b>	<b>21</b>

Surface Condition	#
Dry	18
Wet	3
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>21</b>

Light Condition	#
Daylight	18
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	2
Dark – Street Lights On/ Spot	1
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>21</b>

Day	#
Monday	1
Tuesday	4
Wednesday	3
Thursday	3
Friday	3
Saturday	3
Sunday	4
<b>Total</b>	<b>21</b>





Crash Type and Severity



# SOUTH STREET



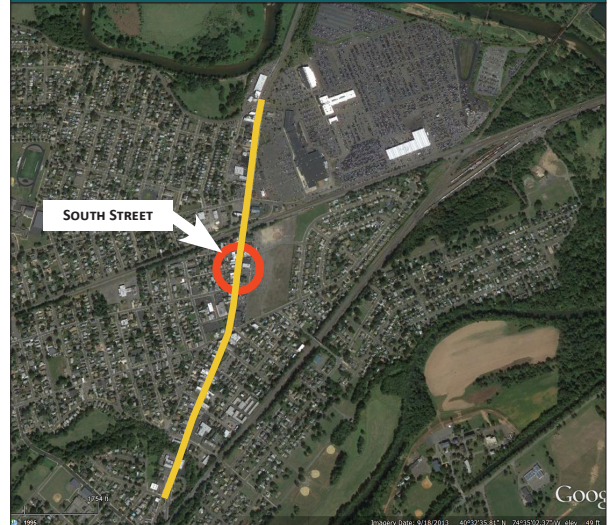
## LEGEND

-  Struck parked vehicle
-  Same direction - Rear End
-  Backing
-  Pedestrians
-  Fixed-object

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA





## SOUTH STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	<b>13</b>
Same Direction – Sideswipe	-
Right Angle	-
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	<b>4</b>
Left Turn / U-Turn	-
Backing	<b>1</b>
Encroachment	-
Overtaken	-
Fixed Object	<b>1</b>
Animal	-
Pedestrian	<b>1</b>
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>20</b>

Month	#
January	<b>1</b>
February	<b>3</b>
March	<b>4</b>
April	<b>1</b>
May	<b>1</b>
June	<b>2</b>
July	-
August	<b>3</b>
September	<b>3</b>
October	-
November	-
December	<b>2</b>
<b>Total</b>	<b>20</b>

Severity	#
Property Damage Only (PDO)	<b>16</b>
Pain	<b>3</b>
Moderate Injury	-
Incapacitating Injury	<b>1</b>
Fatal	-
<b>Total</b>	<b>20</b>

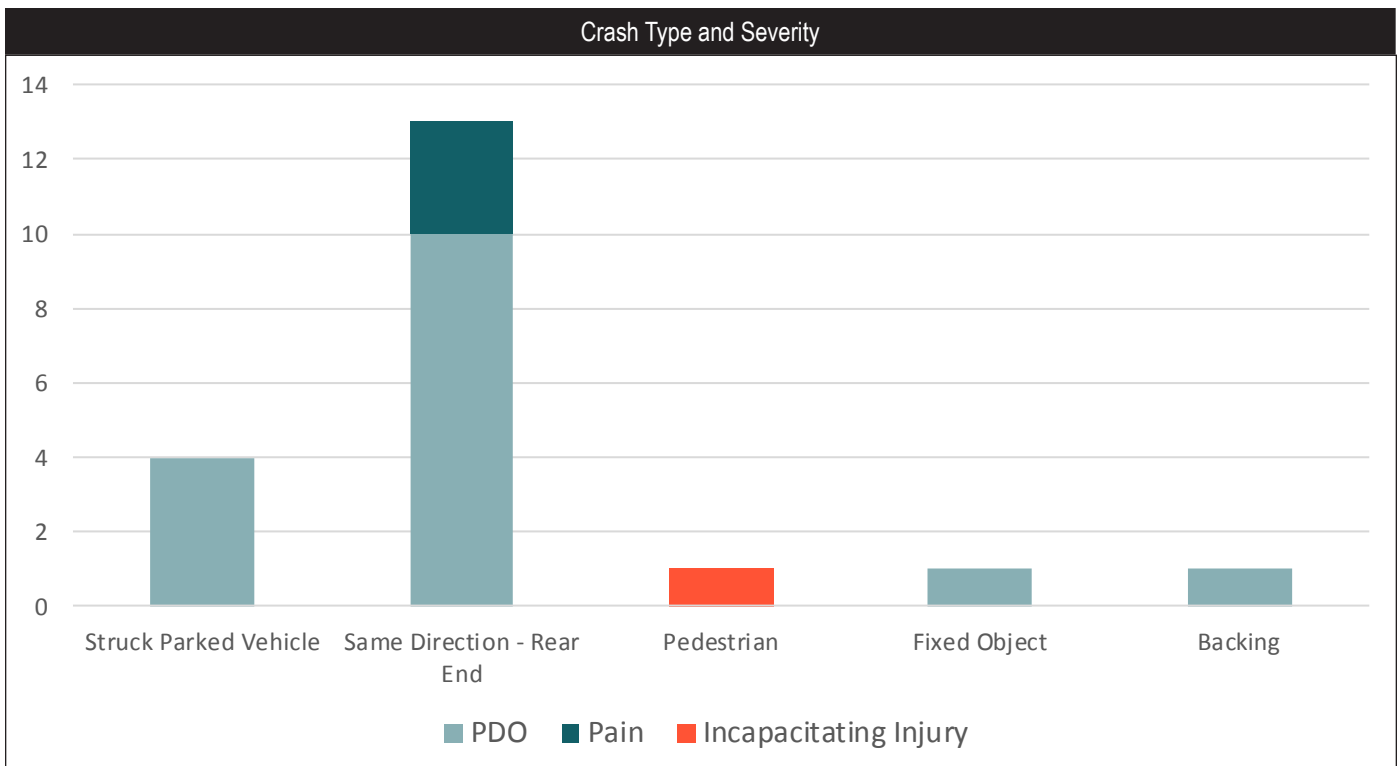
Crash Year	#
2010	3
2011	7
2012	10
<b>Total</b>	<b>20</b>

Intersection	#
At intersection	<b>3</b>
Not at intersection	<b>17</b>
At or Near Railroad	-
<b>Total</b>	<b>20</b>

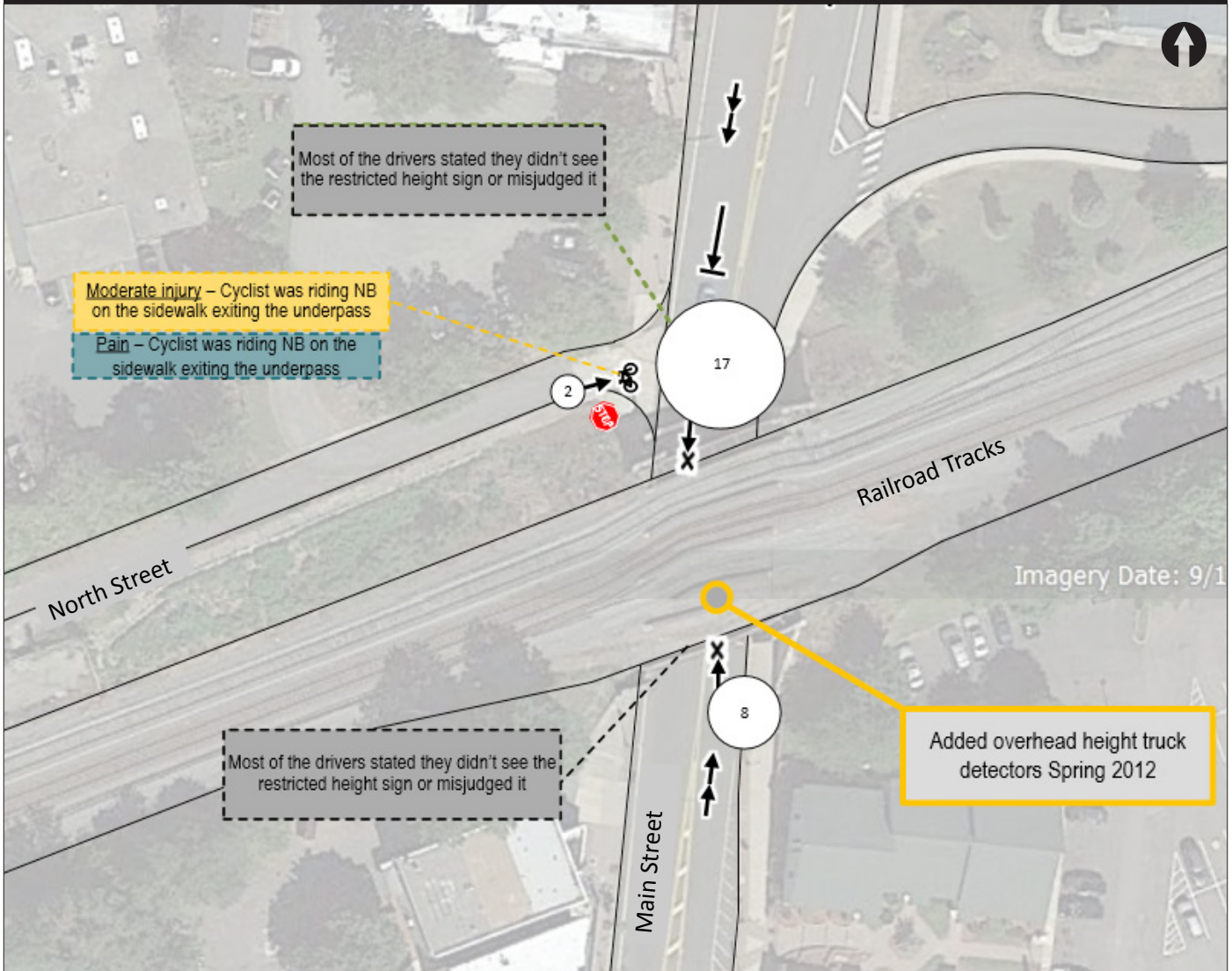
Surface Condition	#
Dry	<b>17</b>
Wet	<b>3</b>
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>20</b>

Light Condition	#
Daylight	<b>15</b>
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	<b>5</b>
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>20</b>

Day	#
Monday	<b>3</b>
Tuesday	<b>5</b>
Wednesday	<b>6</b>
Thursday	<b>3</b>
Friday	-
Saturday	<b>3</b>
Sunday	-
<b>Total</b>	<b>20</b>



# LVRR AND NORTH STREET



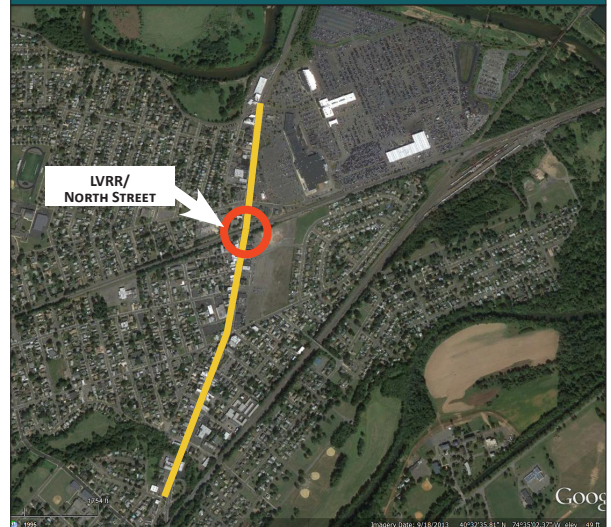
## LEGEND

- Fixed-object
- Cyclist
- Same direction - Rear End
- Encroachment

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## LVRR AND NORTH STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	2
Same Direction – Sideswipe	-
Right Angle	-
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	-
Backing	-
Encroachment	1
Overtaken	-
Fixed Object	25
Animal	-
Pedestrian	-
Pedalcyclist	2
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>30</b>

Month	#
January	5
February	3
March	2
April	5
May	4
June	2
July	-
August	3
September	3
October	1
November	1
December	1
<b>Total</b>	<b>30</b>

Severity	#
Property Damage Only (PDO)	27
Pain	2
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>30</b>

Crash Year	#
2010	13
2011	9
2012	8
<b>Total</b>	<b>30</b>

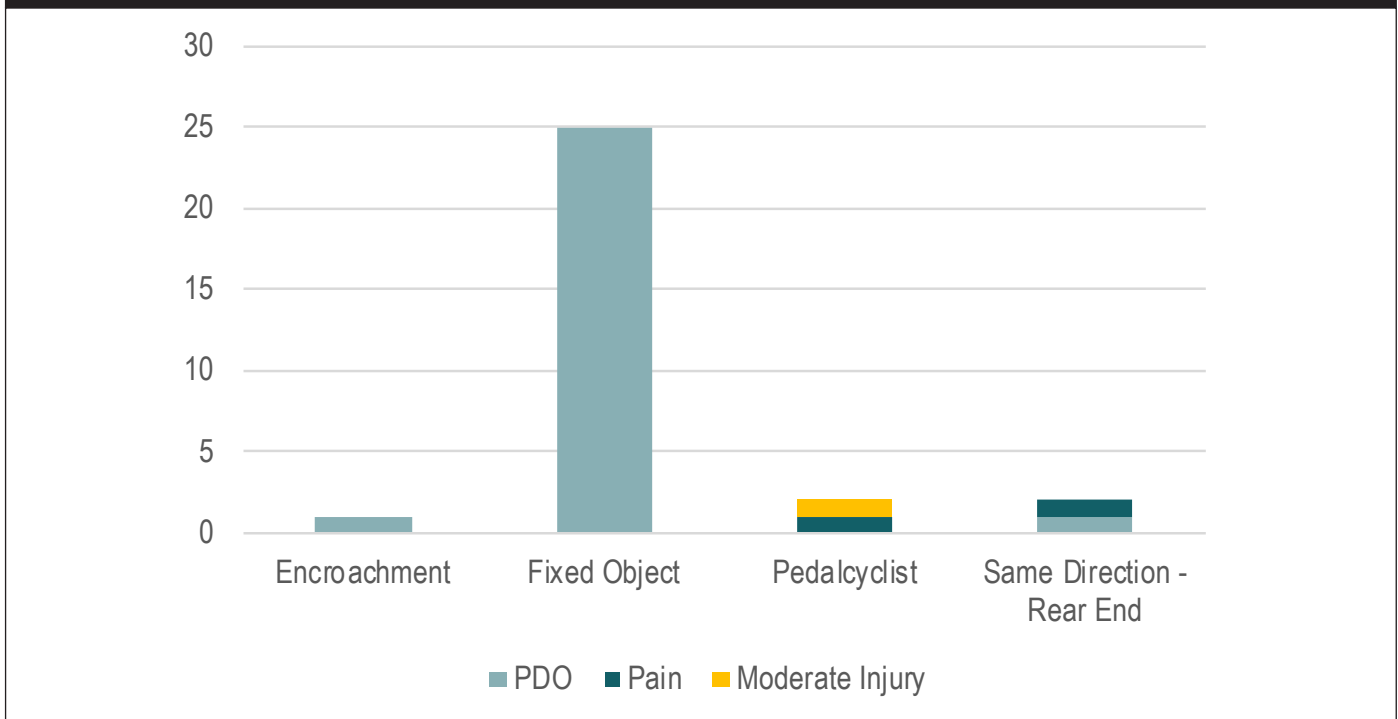
Intersection	#
At intersection	10
Not at intersection	20
At or Near Railroad	-
<b>Total</b>	<b>30</b>

Surface Condition	#
Dry	23
Wet	6
Snowy	1
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>30</b>

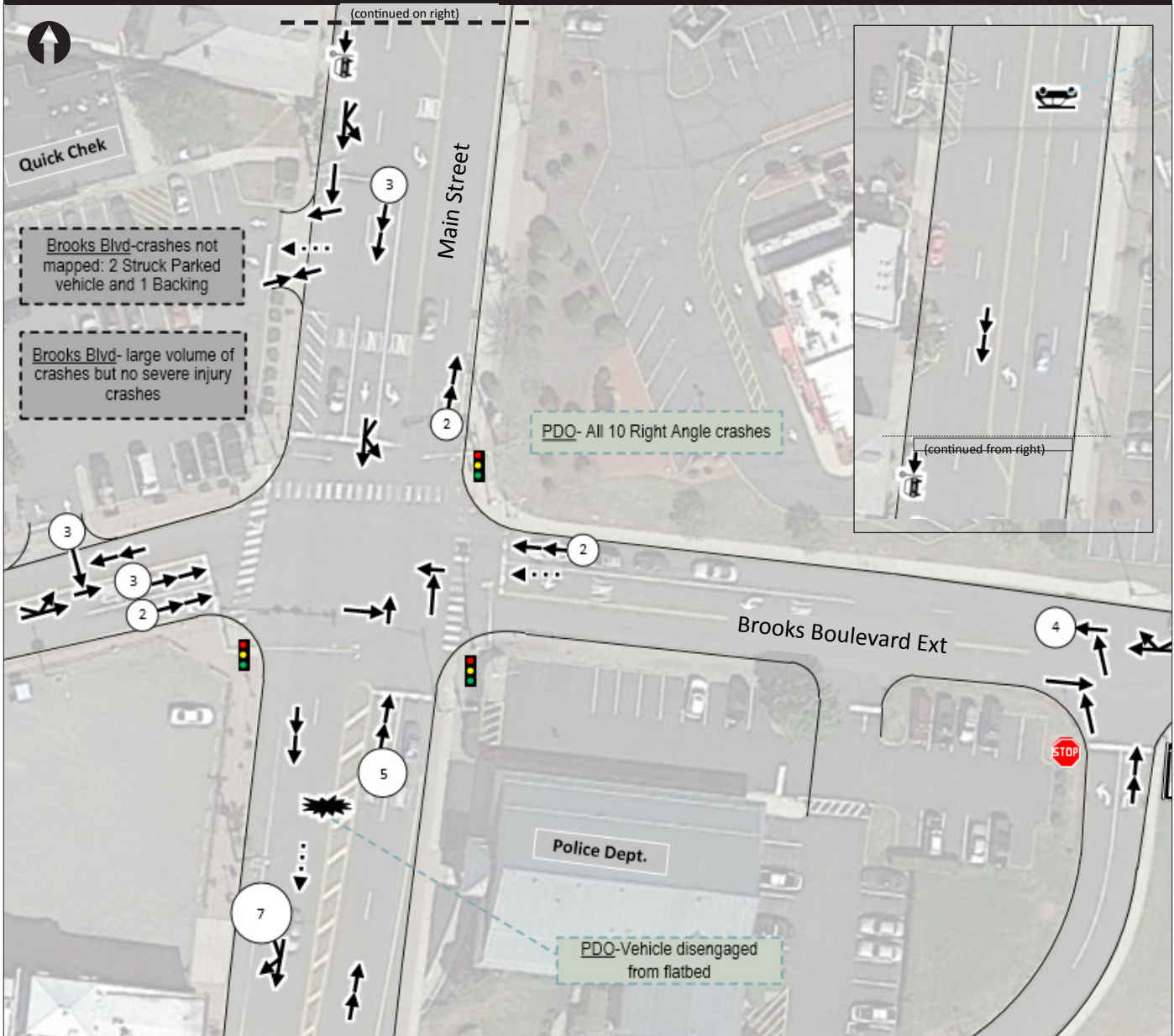
Light Condition	#
Daylight	20
Dawn	-
Dusk	2
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	8
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>30</b>

Day	#
Monday	7
Tuesday	5
Wednesday	4
Thursday	2
Friday	9
Saturday	3
Sunday	-
<b>Total</b>	<b>30</b>

Crash Type and Severity



# BROOKS BOULEVARD



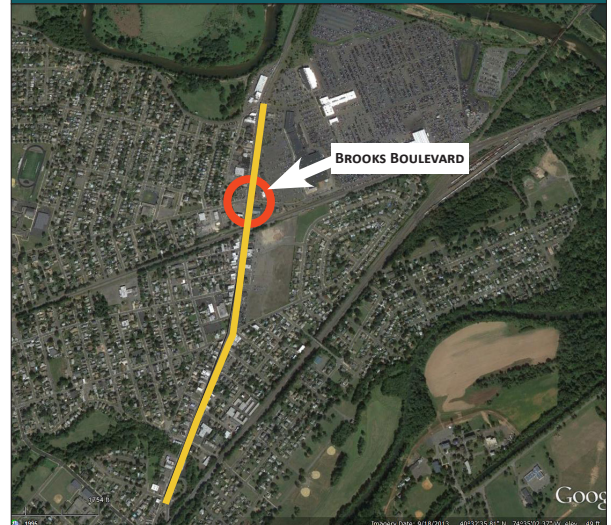
## LEGEND

- |  |                       |  |                                      |
|--|-----------------------|--|--------------------------------------|
|  | Right angle           |  | Same direction - Side swipe          |
|  | Backing               |  | Same direction - Rear End            |
|  | Other                 |  | Overturned                           |
|  | Struck parked vehicle |  | Opposite direction - Head on/angular |

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## BROOKS BOULEVARD—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	<b>23</b>
Same Direction – Sideswipe	<b>11</b>
Right Angle	<b>12</b>
Opposite Direction – Head On/ Angular	<b>1</b>
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	<b>3</b>
Left Turn / U-Turn	-
Backing	<b>4</b>
Encroachment	-
Overtaken	<b>1</b>
Fixed Object	-
Animal	-
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	<b>1</b>
<b>Total</b>	<b>56</b>

Month	#
January	<b>3</b>
February	<b>3</b>
March	<b>6</b>
April	<b>4</b>
May	<b>1</b>
June	<b>11</b>
July	<b>7</b>
August	<b>2</b>
September	<b>8</b>
October	-
November	<b>5</b>
December	<b>6</b>
<b>Total</b>	<b>56</b>

Severity	#
Property Damage Only (PDO)	<b>46</b>
Pain	<b>10</b>
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>56</b>

Crash Year	#
2010	14
2011	21
2012	21
<b>Total</b>	<b>56</b>

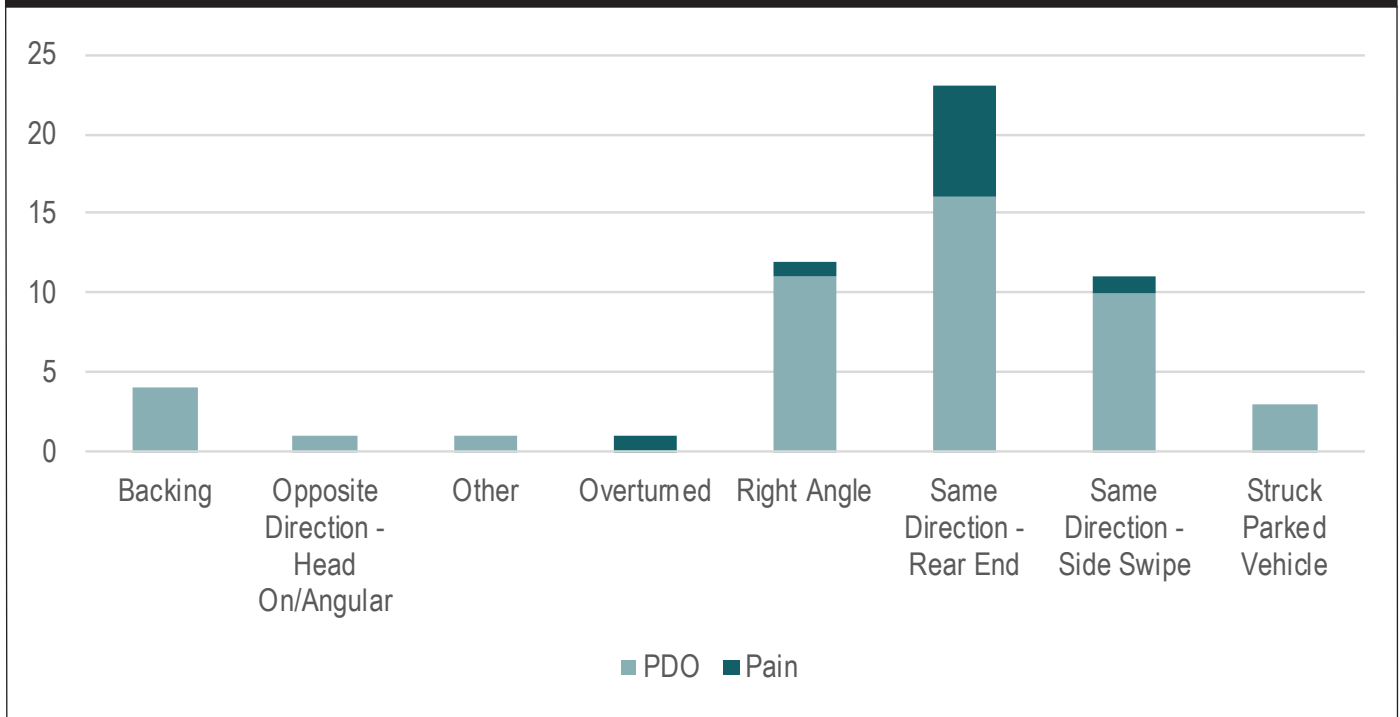
Intersection	#
At intersection	<b>8</b>
Not at intersection	<b>48</b>
At or Near Railroad	-
<b>Total</b>	<b>56</b>

Surface Condition	#
Dry	<b>51</b>
Wet	<b>4</b>
Snowy	<b>1</b>
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>56</b>

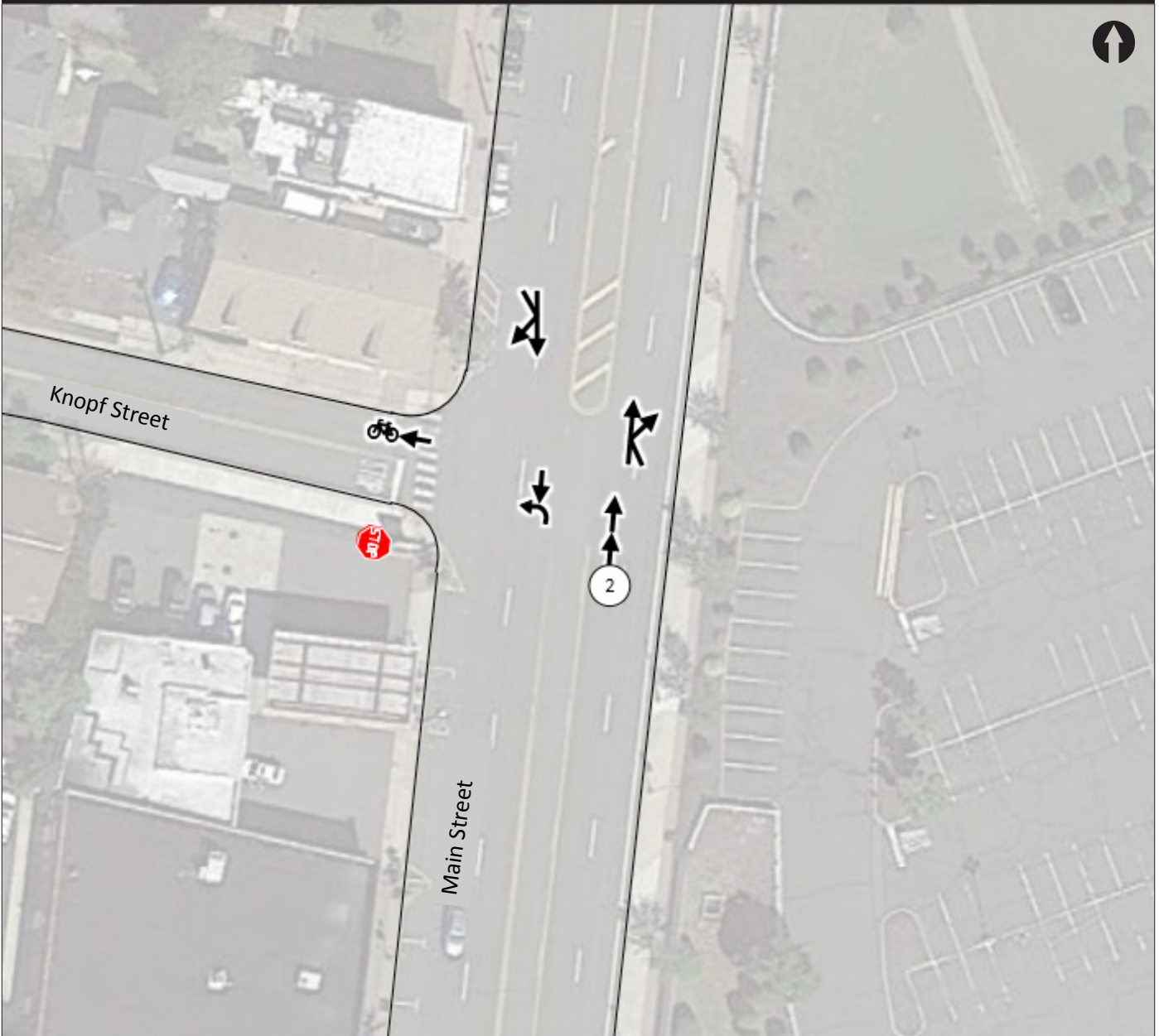
Light Condition	#
Daylight	<b>46</b>
Dawn	<b>1</b>
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	<b>8</b>
Dark – Street Lights On/ Spot	<b>1</b>
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>56</b>

Day	#
Monday	<b>6</b>
Tuesday	<b>9</b>
Wednesday	<b>8</b>
Thursday	<b>13</b>
Friday	<b>14</b>
Saturday	<b>5</b>
Sunday	<b>1</b>
<b>Total</b>	<b>56</b>

Crash Type and Severity



# KNOPF STREET



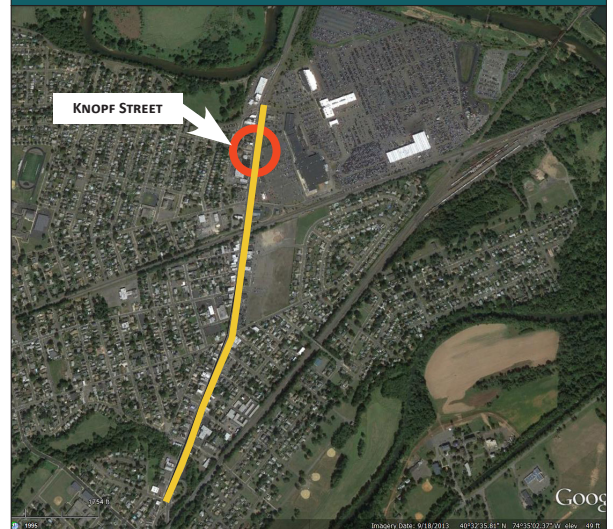
## LEGEND

-  Left-turn
-  Cyclist
-  Same direction - Side swipe
-  Same direction - Rear End

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA



## KNOPF STREET—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	2
Same Direction – Sideswipe	2
Right Angle	-
Opposite Direction – Head On/ Angular	-
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	-
Left Turn / U-Turn	1
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	-
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>6</b>

Month	#
January	-
February	-
March	2
April	-
May	-
June	-
July	1
August	1
September	-
October	1
November	1
December	-
<b>Total</b>	<b>6</b>

Severity	#
Property Damage Only (PDO)	4
Pain	1
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>6</b>

Crash Year	#
2010	2
2011	3
2012	1
<b>Total</b>	<b>6</b>

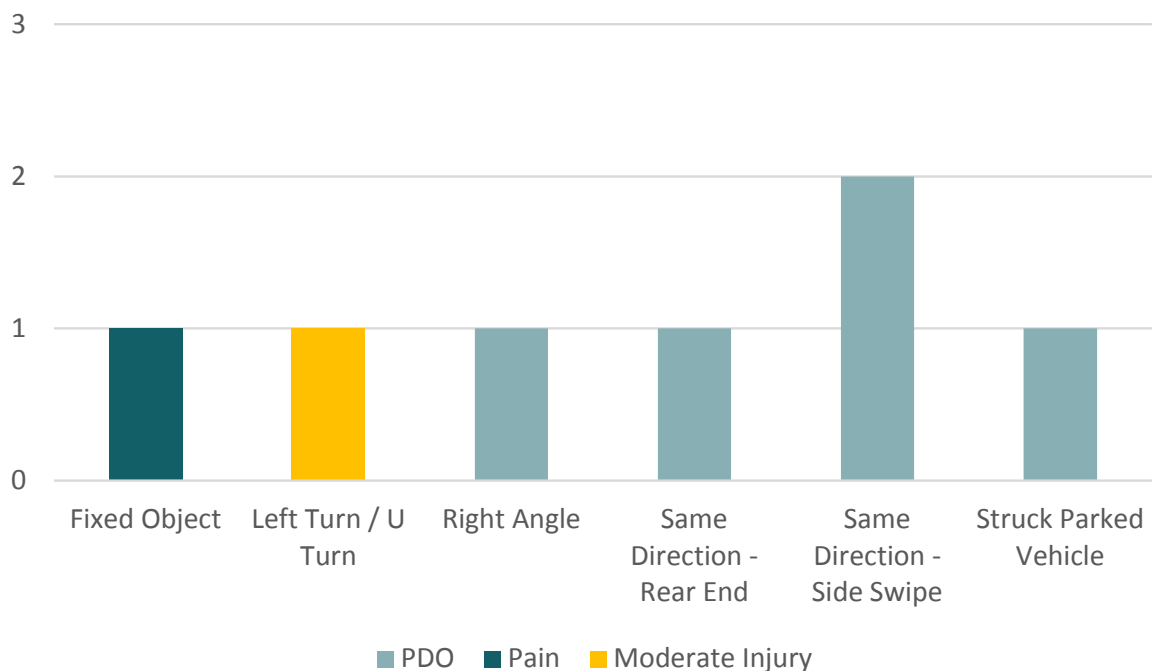
Intersection	#
At intersection	2
Not at intersection	4
At or Near Railroad	-
<b>Total</b>	<b>6</b>

Surface Condition	#
Dry	5
Wet	1
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>6</b>

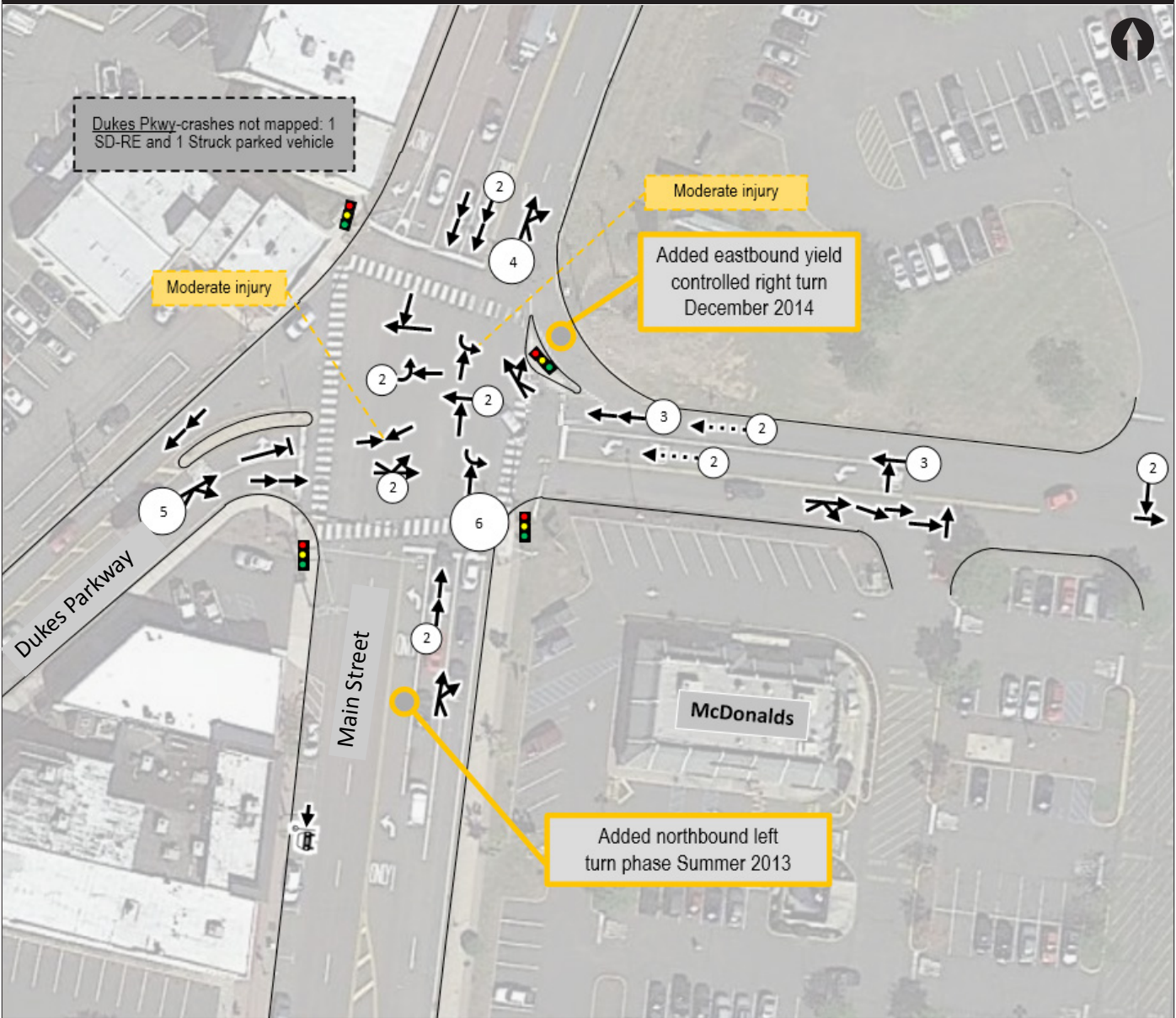
Light Condition	#
Daylight	5
Dawn	-
Dusk	1
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	-
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>6</b>

Day	#
Monday	-
Tuesday	1
Wednesday	-
Thursday	1
Friday	3
Saturday	1
Sunday	-
<b>Total</b>	<b>6</b>

Crash Type and Severity



# DUKES PARKWAY



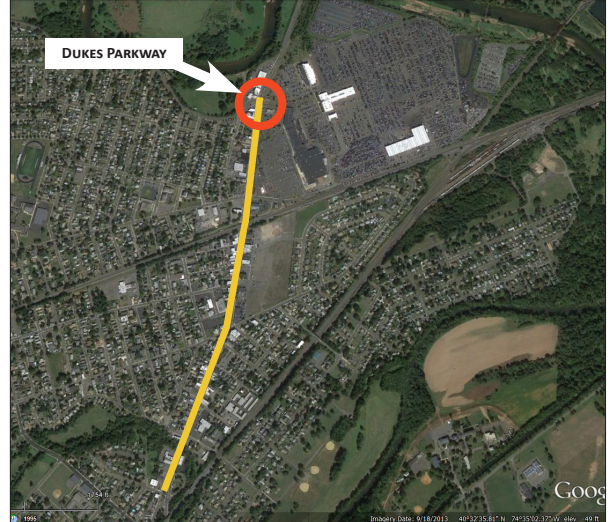
## LEGEND

- |  |              |  |                                      |
|--|--------------|--|--------------------------------------|
|  | Right angle  |  | Same direction - Side swipe          |
|  | Backing      |  | Same direction - Rear End            |
|  | Encroachment |  | Struck parked vehicle                |
|  | Left-turn    |  | Opposite direction - Head on/angular |

Google Imagery, 2014

Crash diagrams based on reports retrieved from NJDOT

## RELATION TO STUDY AREA





## DUKES PARKWAY—CRASH SUMMARY (2010-2012)

Crash Type	#
Same Direction – Rear End	11
Same Direction – Sideswipe	15
Right Angle	9
Opposite Direction – Head On/ Angular	1
Opposite Direction – Sideswipe	-
Struck Parked Vehicle	2
Left Turn / U-Turn	9
Backing	4
Encroachment	1
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
<b>Total</b>	<b>52</b>

Month	#
January	6
February	5
March	1
April	2
May	3
June	4
July	4
August	6
September	3
October	5
November	9
December	4
<b>Total</b>	<b>52</b>

Severity	#
Property Damage Only (PDO)	42
Pain	8
Moderate Injury	2
Incapacitating Injury	-
Fatal	-
<b>Total</b>	<b>52</b>

Crash Year	#
2010	18
2011	15
2012	19
<b>Total</b>	<b>52</b>

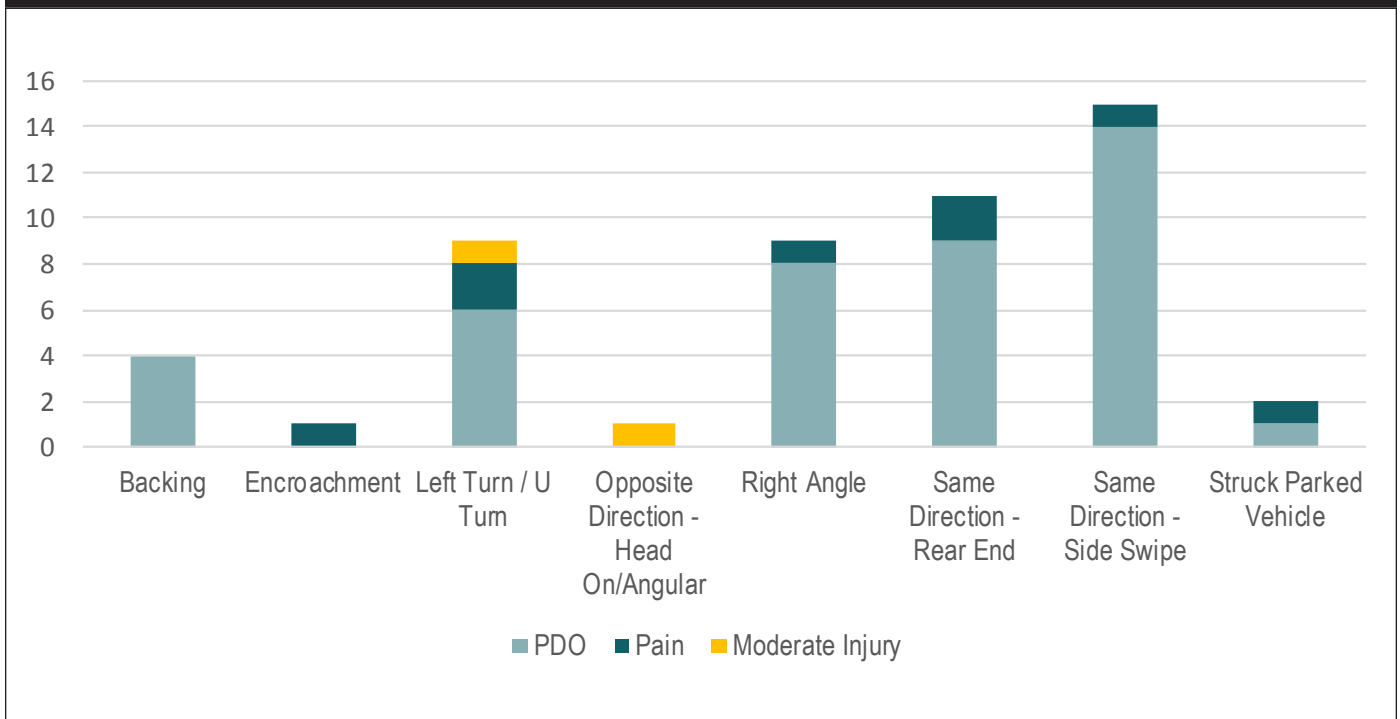
Intersection	#
At intersection	24
Not at intersection	28
At or Near Railroad	-
<b>Total</b>	<b>52</b>

Surface Condition	#
Dry	44
Wet	6
Snowy	2
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
<b>Total</b>	<b>52</b>

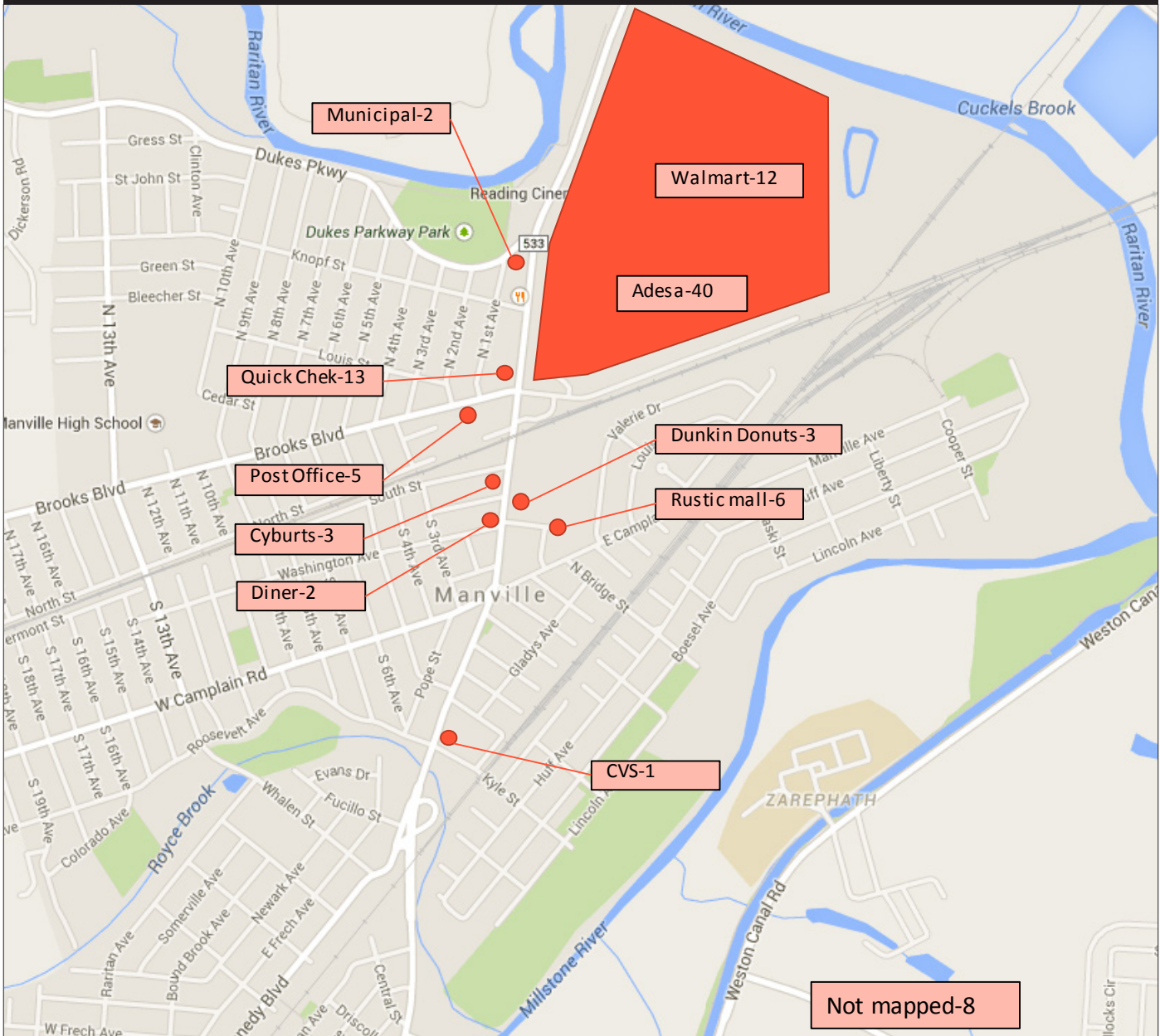
Light Condition	#
Daylight	36
Dawn	-
Dusk	1
Dark – No Street Lights	1
Dark – Street Lights On/ Continuous	14
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
<b>Total</b>	<b>52</b>

Day	#
Monday	13
Tuesday	3
Wednesday	6
Thursday	11
Friday	9
Saturday	7
Sunday	3
<b>Total</b>	<b>52</b>

Crash Type and Severity



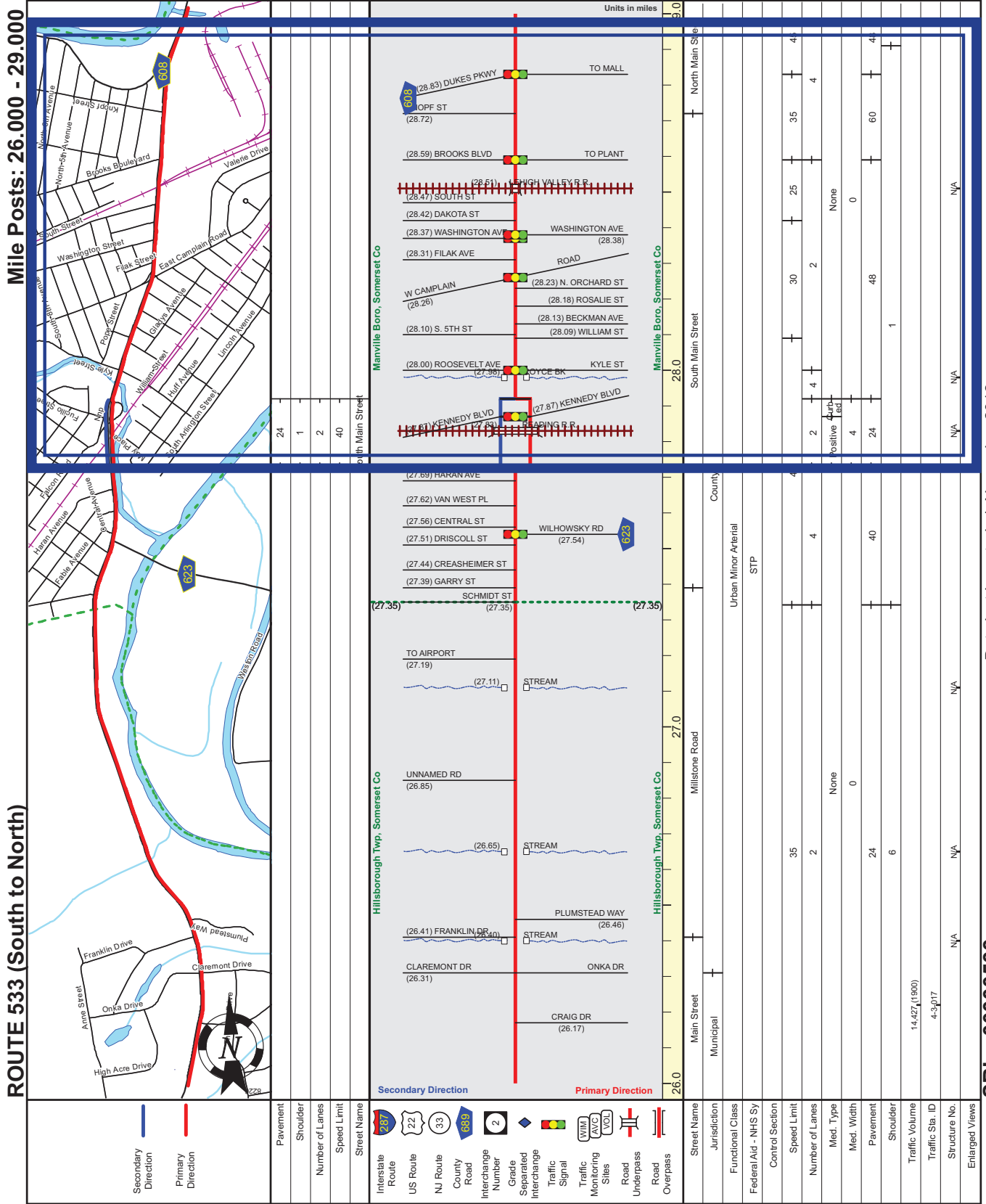
## CRASH SUMMARY—PARKING LOTS



There were 17 injury crashes in the parking lots, most of them in the ADESA lot. One of these caused a moderate injury.

Crash Type	PL-ADESA	PL-Quick Chek	PL-Rustic Mall	PL-Walmart	Parking Lot_Misc	Grand Total
Backing	5	7	-	2	10	24
Fixed Object	8	2	2	-	2	14
Opposite Direction - Side Swipe	-	-	1	-	-	1
Pedestrian	5	1	-	-	-	6
Right Angle	7	1	1	-	-	9
Same Direction - Rear End	2	-	-	-	-	2
Struck Parked Vehicle	13	2	2	10	12	39
<b>Total</b>	<b>40</b>	<b>13</b>	<b>6</b>	<b>12</b>	<b>24</b>	<b>95</b>

➤➤ APPENDIX E—STRAIGHT LINE DIAGRAM



Date last inventoried: November 2012

SRI = 00000533