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Pedestrian and Bicycle Road Safety Audit Report

City of Bridgeton, City of Millville, City of Vineland

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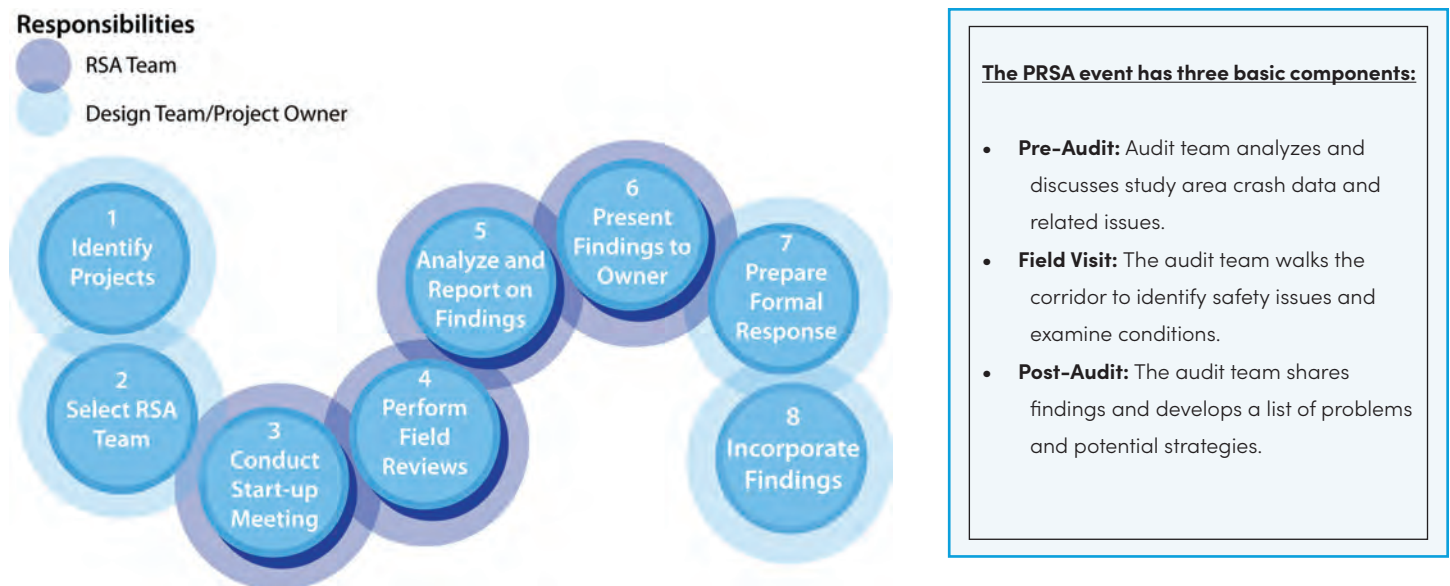
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1. Introduction

As the final report for the Cities of Bridgeton, Millville, and Vineland Pedestrian/Bicycle Road Safety Audits (PRSAs), this document represents an important step towards the implementation of the South Jersey Transportation Planning Organization's Cumberland County Bicycle and Pedestrian Safety Action Plan. This plan is intended to document a number of action-orientated tasks geared towards advancing data-driven bicycle and pedestrian projects via New Jersey's Local Safety Program and the Federal Highway Safety Improvement Program (HSIP). To that end, the task of conducting a series of Pedestrian/Bicycle Road Safety Audits was necessary to bring together a multi-disciplinary team of local, county, state and regional agencies and subject matter experts to 1) conduct a first-hand evaluation of existing conditions along the selected corridors, and 2) work together to develop improvement recommendations.

Pedestrian/Bicycle Road Safety Audit Process

Following the basic format of traditional Road Safety Audits (RSAs), the pedestrian/bicycle RSA is a focused and formal safety performance examination of an existing or future road or intersection by a multi-disciplinary audit team. PRSAs can be used on a project of any size and can be conducted on facilities with a history of crashes, or during the design phase of a new roadway or planned upgrade. PRSA audit teams 1) identify and evaluate any potential safety issues, and 2) develop pedestrian/bicycle related countermeasures for all abilities. PRSAs provide transportation agencies and team members a better understanding of the needs of pedestrians and bicyclists by following the *FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists (Publication FHWA-SA-07-007)*. Implementation of improvement strategies identified through this process in New Jersey may be eligible for Federal Highway Safety Improvement Program (HSIP) funds. These identified improvements are noted in the following sections of this report.



Eight-Step RSA Process (FHWA-SA-07-07)

Site Selection Process

A central theme in the Cumberland County Bicycle and Pedestrian Safety Action Plan is public involvement and outreach. During the project’s first round of public outreach, people informed the project team on their traveling experiences, in particular regarding bicycle and pedestrian safety in Cumberland County. Public outreach events throughout the County were conducted by transportation experts, these events included display boards highlighting high-crash locations. In addition to the events, an online website was created for the public to submit comments regarding bicycle pedestrian safety and map specific locations of concern.

The comments and feedback provided by the public during Phase 1 were combined with the technical analysis of the crash data and resulted in the decision to select six (6) high-crash corridors to become the focus of the project; top two highest crash corridors in Bridgeton, Millville, and Vineland. In order to gain a true understanding of the selected corridors’ existing conditions, a focused and formal safety performance examination of each corridor was conducted by a multi-disciplinary audit team. These examination were conducted during four PRSA events. Following the FHWA guidance, the needs of bicyclists and pedestrians were stressed during these events. The report sections for each event note the results and recommendations of the PRSAs conducted.

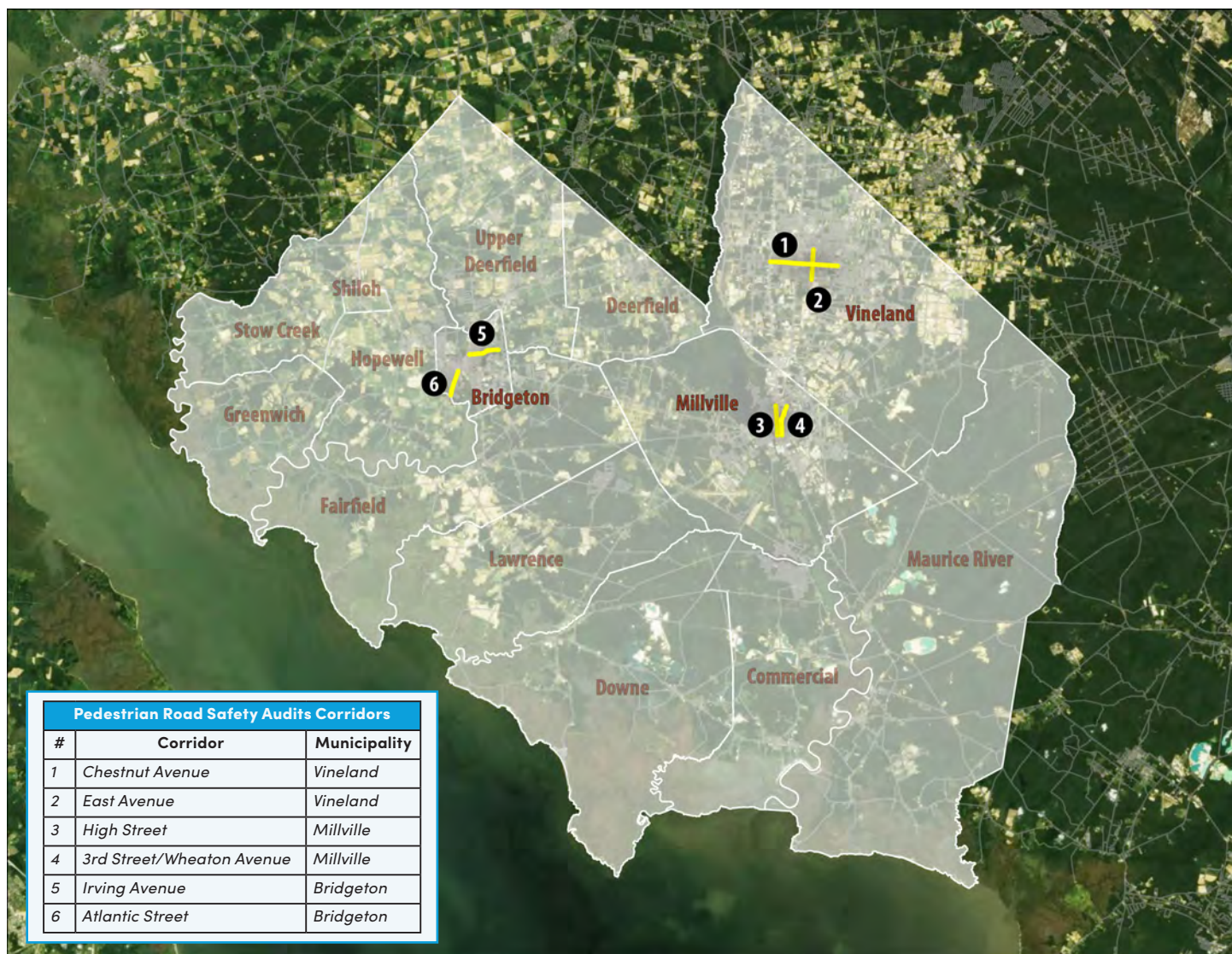


Photo Caption: Cumberland County, New Jersey – Study Locations

2. Chestnut Avenue (Vineland)

The first Pedestrian/Bicycle Road Safety Audit was conducted on Thursday, December 5, 2019 at the Vineland Municipal Building in Vineland, Cumberland County, New Jersey. Eighteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 2.3-mile section of Chestnut Avenue located in the urban area of Vineland, New Jersey. Audit limits are between NJ 47 (Delsea Drive) and CR 555 (Main Road) (MP 0.00–2.30). This corridor is a local east-west connector that bisects north-south collectors CR 615 (South West/South East Boulevard), West Avenue, and East Avenue. The corridor is surrounded by a mix of commercial and low to medium-density residential development. It is important to note that the corridor includes a park, nursing home, EMS station, two schools, and public housing.



Figure 1: Chestnut Avenue Study Area

Roadway Characteristics

Chestnut Avenue is classified as an urban major collector with a posted speed limit from (MP 0.00–0.24) of 25 mph and from (MP 0.24–2.30) of 40 mph. The corridor study area is 4-lanes, undivided, with no shoulder or on-street parking. The roadway's horizontal alignment is straight with 11 signalized and 16 unsignalized intersections.

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of Chestnut Avenue and are typically 4'–5' in width. Sidewalk conditions vary from satisfactory to needing maintenance. Basic parallel style crosswalks are provided at signalized intersections although not always at every leg. Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017–2018 ADT along Chestnut Avenue is approximately 13,500 vehicles per day within the study area. A copy of available data can be found in *Appendix B*. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to *Appendix B* and will be used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Transit

The study corridor is serviced by NJ Transit routes #313 and #553 with stops at NJ 47 (Delsea Drive) and route #408 with stops at CR 555 (Main Road). All NJ Transit routes mentioned only service stops at the termini of the Chestnut Avenue Study Corridor.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed below.

Characteristics	Chestnut Avenue (0.25 mile buffer)	Cumberland County
Population	5,849	154,952
<i>Black or African American</i>	18%	19%
<i>Hispanic/Latino*</i>	61%	30%
<i>White</i>	62%	66%
<i>Asian</i>	<1%	1%
<i>American Indian/Alaskan</i>	<1%	1%
<i>Two or More Races</i>	3%	5%
<i>Other</i>	16%	8%
Population by Age		
<i>Age 0-4</i>	8%	7%
<i>Age 0-17</i>	26%	24%
<i>Age 18+</i>	74%	76%
<i>Age 65+</i>	11%	14%
Households	2,193	50,596
<i>Linguistically Isolated Households**</i>	22%	8%
<i>Speak Spanish***</i>	93%	91%
Income		
<i><\$15,000</i>	22%	14%
<i>\$15,000 - \$25,000</i>	16%	12%
<i>\$25,000 - \$50,000</i>	23%	24%
<i>\$50,000 - \$75,000</i>	16%	17%
<i>\$75,000+</i>	23%	33%



Table 1: Community Profile of Chestnut Avenue Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well",

***Percentage of Linguistically Isolated Households that speak spanish as their primary language

In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Vineland study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown below in *Figure 2*.

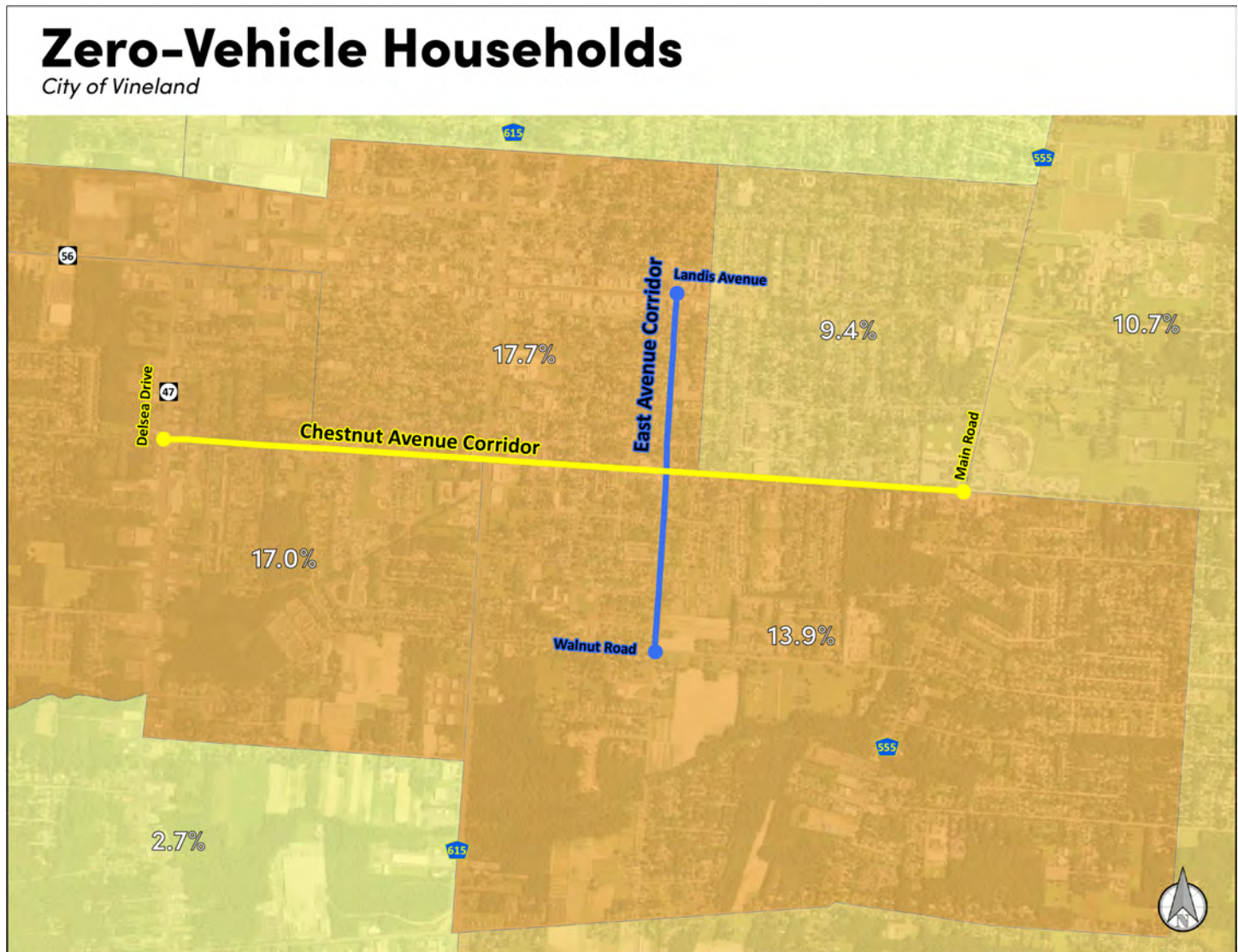


Figure 2: Percentage of Zero-Vehicle Households in Vineland, NJ

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 13> are provided in *Appendix C*.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally ($K=A$), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. Of note, it is important to mention that of the 8 crashes that occurred during Dark (Unlit) conditions, 3 were pedestrians. In New Jersey, 75% of all fatal

pedestrian crashes occur during dawn, dusk, or dark conditions. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	148	54	4
2013	112	40	1
2014	126	47	1
2015	155	51	0
2016	122	32	0
Total	663	224	6

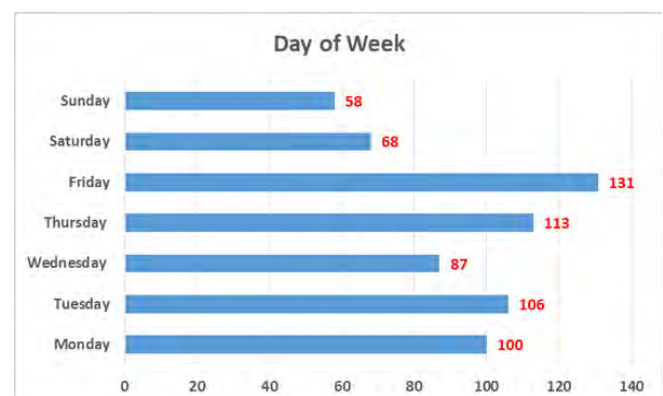
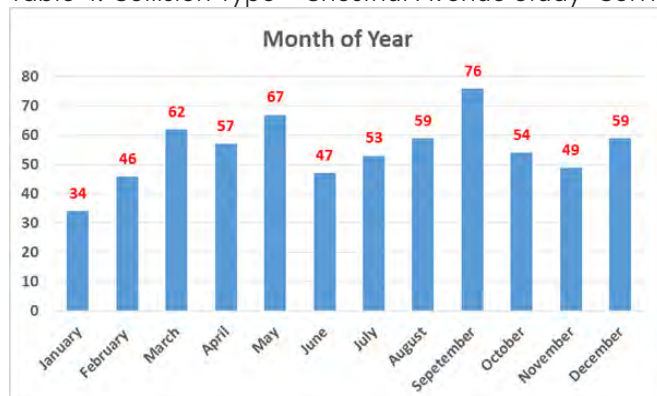
Table 2: Total Crashes by Year - Chestnut Avenue Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	538	81.1%
	Wet	124	18.7%
Illumination	Daylight	515	77.7%
	Dusk	16	2.4%
	Dark (Lit)	122	18.4%
	Dark (Unlit)	8	1.2%

Table 3: Environmental Conditions - Chestnut Avenue Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	21	3.2%
Fixed Object	38	5.7%
Animal	1	0.2%
Encroachment	3	0.5%
Backing	24	3.6%
Overturned	1	0.2%
Opposite Direction (Sideswipe)	6	0.9%
Opposite Direction (Head-on)	10	1.5%
Left-Turn/U-Turn	51	7.7%
Right Angle	171	25.8%
Same Direction (Sideswipe)	92	13.9%
Same Direction (Read End)	218	32.9%
Pedalcyclist	7	1.1%
Pedestrian	20	3.0%

Table 4: Collision Type - Chestnut Avenue Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 20 pedestrian and 7 bicyclist crashes, representing 4.1% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in serious injury or fatality (KA), representing 20% of all KA crashes. Moreover, three of the 8 crashes that occurred under dark un-lit conditions involved pedestrians.

Crash Type	Total Crashes	Percentage
<i>Collision with Pedestrian</i>	20	74.1%
<i>Collision with Cyclist</i>	7	25.9%
Crash Severity		
<i>Fatality</i>	0	0.0%
<i>Incapacitating Injury</i>	2	7.4%
<i>Moderate Injury</i>	4	14.8%
<i>Pain</i>	13	48.1%
<i>Property Damage Only</i>	8	29.6%

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
<i>Crashes often occur at or near intersections</i>
<i>Many crash victims have Limited English Proficiency (LEP)</i>
<i>Motorist speeds are too high</i>
<i>Crashes in crosswalks are often due to Left-Hand turn movements</i>

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the Chestnut Avenue PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✓	Limited safety benefit potential	
✓✓	Limited to moderate safety benefit potential	
✓✓✓	Moderate safety benefit potential	
✓✓✓✓	High safety benefit potential	
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition and new funding
🕒	Short term	Could be accomplished within 1 year
🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
🕒	Long term	Could be accomplished in 3 years or more; may require full engineering

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)	✓	\$	🕒	Vineland
2	Narrow driveways where possible	✓	\$\$	🕒	Vineland/ Property Owners
3	Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)	✓	\$	🕒	Vineland
4	Conduct a bi-lingual road/bicycle-pedestrian safety campaign (i.e. StreetSmart)	✓	\$	🕒	Vineland
5	Inspect, repave and restripe the roadway as needed	✓	\$\$	🕒	Vineland
6	Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed	✓	\$\$	🕒	Vineland/NJDOT
7	Carry sidewalks through driveways per ADA design standards	✓	\$\$	🕒	Vineland

8	Develop an access management plan within the study area for vehicles and pedestrians (i.e. driveway consolidation, barriers to prevent jaywalking)	✓✓	\$	●	Vineland
9	Update complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide	✓✓	\$	●	Vineland
10	Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)	✓✓	\$\$\$	●	Vineland/NJDOT
11	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	●	Vineland/NJDOT
12	Remove sidewalk on southside of study corridor and install a shared-use path per NJ Complete Streets Design Guide	✓✓	\$\$	●	Vineland/NJDOT
13	Convert Chestnut Avenue to a 3-lane section (2 travel lanes, TWLTL and shoulders; i.e. road diet)	✓✓✓	\$\$	●	Vineland
14	Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results	✓✓✓	\$\$\$	●	Vineland/NJDOT
15	Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location	✓✓✓	\$	●	Vineland
Site-Specific					
Segment: 2nd Street-Earl Drive					
16	Install midblock pedestrian crossing improvements (i.e. Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style crosswalk and crossing island)	✓✓✓	\$\$\$	●	Vineland
Segment: Tarkiln Drive-3rd Street					
17	Conduct circulation study of 3rd Street	✓	\$\$	●	Vineland
18	Close Normandie Lane access to Chestnut Avenue	✓	\$\$	●	Vineland
19	Install barriers to prevent jaywalking (i.e. greenery, 2'-3' wall, fence, benches etc.)	✓✓	\$\$	●	Vineland

20	Install midblock pedestrian crossing improvements (i.e. Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style crosswalk and crossing island)	✓✓✓	\$\$\$	●	Vineland
Intersection: "The Boulevards"					
21	Install railroad crossing gates	✓	\$\$	●	Vineland/ County/Conrail
22	Study and evaluate intersection (i.e. address non-compliant crossings, traffic and pedestrian safety, signal placement, and signal timing concerns)	✓✓✓	\$\$\$	●	Vineland/ County/Conrail
Vineland Fire Station No. 1					
23	Install advance warning signal and stripe roadway appropriately in front of Fire/EMS Station (i.e. "Do Not Block The Box")	✓	\$\$	●	Vineland
Intersection: East Avenue					
24	Study intersection to reduce and realign lanes	✓✓✓	\$\$	●	Vineland
25	Upgrade signals to current standards	✓✓✓	\$\$	●	Vineland
26	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	●	Vineland
Intersection: 7th Street					
27	Complete signal upgrade to current standards	✓✓	\$\$\$	●	Vineland
Intersection: State Street					
28	Perform a MUTCD signal warrant analysis for removal	✓	\$\$	●	Vineland
Intersection: Valley Avenue					
29	Consider replacement of signalized offset intersection with a modern roundabout; must be accompanied by a 3-lane section (2 travel lanes, TWLTL and shoulders; i.e. road diet)	✓✓✓✓	\$\$\$	●	Vineland
Intersection: Main Road					
30	Address lane confusions (i.e. delineate lane configuration at the intersection approaches)	✓	\$	●	Vineland/County
31	Install bumpouts or reduce turning radii	✓✓	\$\$	●	Vineland/County
32	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	●	Vineland/County

Table 7: Chestnut Avenue PRSA Recommendations

Recommendation Visualizations

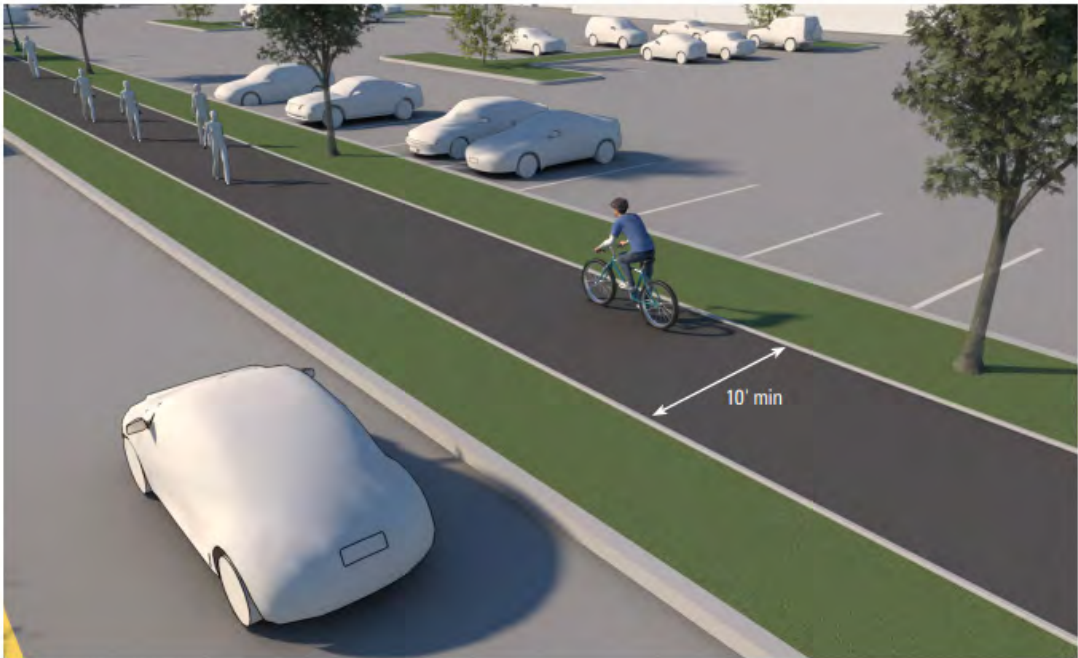
Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the 2017 *NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Midblock Pedestrian Crossing Improvements (i.e. RRFB or PHB with crosswalk and crossing island)



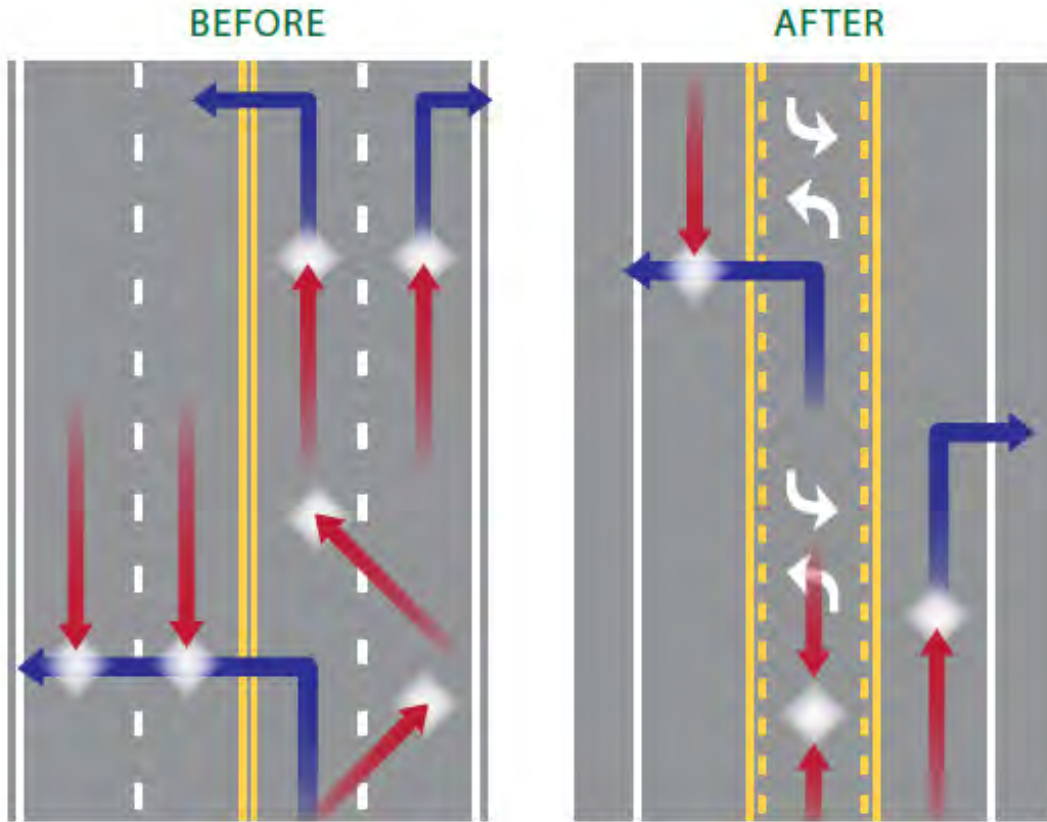
Source: (FHWA-SA-18-018)

Shared-use path



Source: (CSDG)

Road Diet Configuration (i.e. 3-lane section, 2 travel lanes with TWLTL)



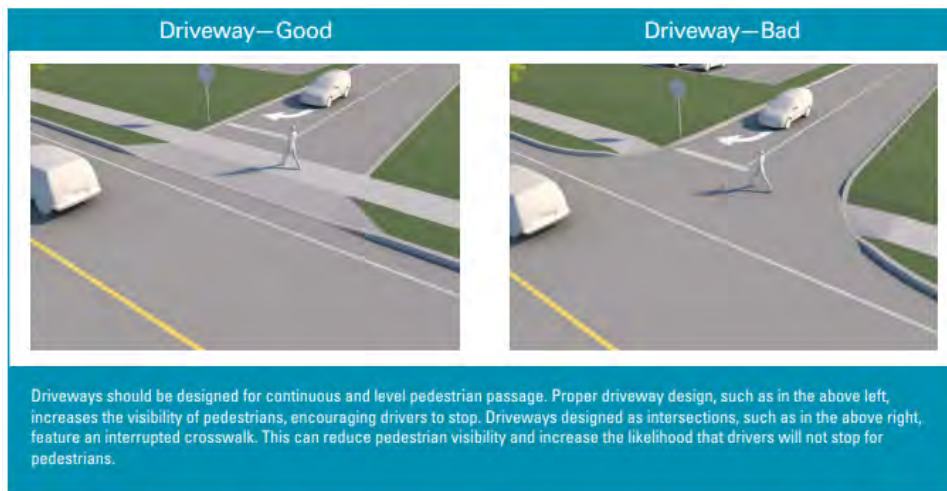
Source: (FHWA-SA-14-028)

Modern Roundabout



Source: (CSDG)

Driveway Design (i.e. Carrying sidewalk through driveway)



Source: (CSDG)

Pedestrian Access Management (i.e. barriers, fences etc.)



Photo Caption: (Google Earth) Newark, DE

Road Owner Response

As the roadway owner, City of Vineland is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Vineland should use its experience in planning and engineering to determine which recommendations in **Table 7** can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Vineland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in **Appendix D**.

3. East Avenue (Vineland)

The East Avenue Pedestrian/Bicycle Road Safety Audit was conducted on Friday, December 20, 2019 at the Vineland Municipal Building in Vineland, Cumberland County, New Jersey. Six stakeholders representing regional, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of East Avenue located in the urban area of Vineland, New Jersey. Audit limits are between NJ 56 (Landis Avenue) and Walnut Road (MP 1.77-0.76). This corridor is a local north-south connector and rural gateway into Vineland that bisects a major east-west collector Chestnut Avenue. The corridor is surrounded by low to medium-density residential development. It is important to note that the corridor includes a school.

Roadway Characteristics

East Avenue is classified as an urban major collector with a posted speed limit from Walnut Road to Chestnut Avenue (MP 0.76-1.27) of 30 mph. This segment of the corridor study area is 2-lanes, undivided, with varying segments of 4-8 foot shoulder widths. Along the corridor there are posted signs for “No Stopping Or Standing” and “No Parking Anytime” however there is no ordinance restricting parking in 8 foot shoulders. North of Chestnut Avenue to Landis Avenue (MP 1.27-1.77) has a posted speed limit of 35 mph, with exception to the school zone between Almond Street and Grape Street (MP 1.49-1.62) with a mandatory posted speed limit of 25 mph when children are present. This corridor study area segment is narrower with 2-lanes, undivided, with no shoulder or on-street parking. Altogether, the roadway’s horizontal alignment is straight with 2 signalized and 12 unsignalized intersections.

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of East Avenue between Chestnut Avenue and Landis Avenue (MP 1.27-1.77) and are typically 4’-5’ in width, with exception to a much wider sidewalk segment fronting Cunningham Academy. Sidewalks are provided along both sides of East Avenue from Chestnut Avenue to a point approximately 500 feet south thereof. From this point only one sidewalk is available along the west curbline until Florence Avenue (MP 0.98) where a sidewalk is available along both sides until a point approximately 50 feet north of Humbert Street (MP 0.92). A brief section of sidewalk then reappears south of Humbert Street along the east curbline for approximately 400 feet.

Sidewalk conditions vary from satisfactory to needing maintenance. Basic parallel style crosswalks are provided at signalized intersections. Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose East Avenue as a potential bikeway.



Figure 1: East Avenue Study Area

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017-2018 ADT along East Avenue is approximately 6,500 vehicles per day within the study area. A copy of available data can be found in **Appendix B**. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to **Appendix B** and will be used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed below.

Characteristics	East Avenue (0.25 mile buffer)	Cumberland County
Population	3,394	154,952
Black or African American	23%	19%
Hispanic/Latino*	59%	30%
White	54%	66%
Asian	<1%	1%
American Indian/Alaskan	2%	1%
Two or More Races Alone	3%	5%
Other	18%	8%
Population by Age		
Age 0-4	8%	7%
Age 0-17	26%	24%
Age 18+	74%	76%
Age 65+	8%	14%
Households	1,271	50,596
Linguistically Isolated Households**	18%	8%
Speak Spanish***	91%	91%
Income		
<\$15,000	24%	14%
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\$75,000+	19%	33%



Table 1: Community Profile of East Avenue Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English “very well”,
 ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau’s 2014–2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Vineland study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in *Figure 2*.

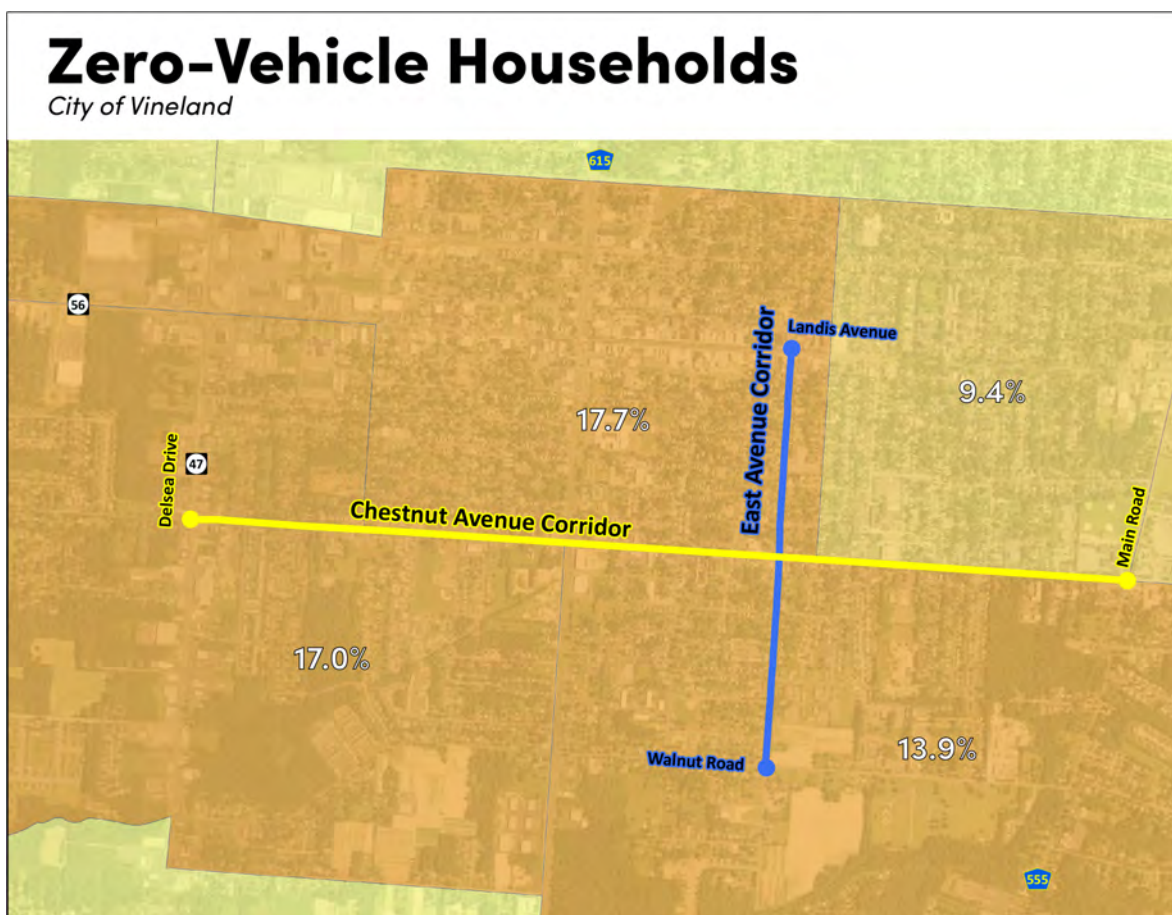


Figure 2: Percentage of Zero-Vehicle Households in Vineland, NJ

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed. Crash data between the years of 2012–2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 13> are provided in *Appendix C*.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	44	19	1
2013	37	12	0
2014	28	8	0
2015	37	8	0
2016	38	10	0
Total	184	57	1

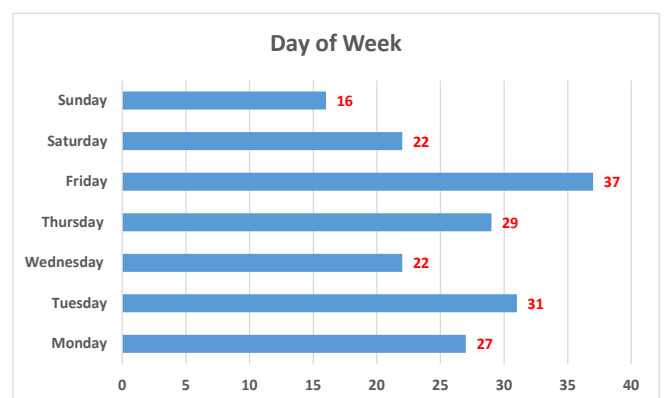
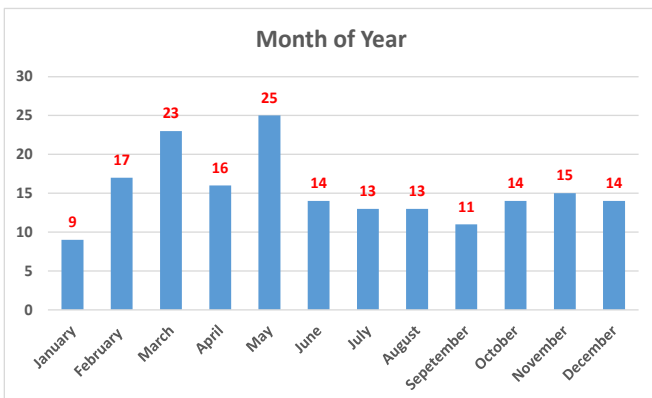
Table 2: Total Crashes by Year – East Avenue Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	145	78.8%
	Wet	38	20.7%
Illumination	Daylight	151	82.1%
	Dusk	4	2.2%
	Dark (Lit)	23	12.5%
	Dark (Unlit)	1	0.5%

Table 3: Environmental Conditions – East Avenue Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	7	3.8%
Fixed Object	18	9.8%
Animal	0	0.0%
Encroachment	0	0.0%
Backing	4	2.2%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	1	0.9%
Opposite Direction (Head-on)	2	1.5%
Left-Turn/U-Turn	8	7.7%
Right Angle	53	28.8%
Same Direction (Sideswipe)	21	11.4%
Same Direction (Read End)	62	33.7%
Pedalcyclist	2	1.1%
Pedestrian	6	3.3%

Table 4: Collision Type – East Avenue Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 6 pedestrian and 2 bicyclist crashes, representing 4.4% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 13.2% of all injury crashes.

Crash Type	Total Crashes	Percentage
<i>Collision with Pedestrian</i>	6	75.0%
<i>Collision with Cyclist</i>	2	25.0%
Crash Severity		
<i>Fatality</i>	0	0.0%
<i>Incapacitating Injury</i>	1	12.5%
<i>Moderate Injury</i>	3	37.5%
<i>Pain</i>	4	50.0%
<i>Property Damage Only</i>	0	0.0%

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
<i>Crashes often occur at or near intersections</i>
<i>No bicycle facilities</i>
<i>Lack of sidewalk connectivity & continuity</i>
<i>Crashes in crosswalks are often due to Left-Hand turn movements</i>

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the East Avenue PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✓	Limited safety benefit potential	
✓✓	Limited to moderate safety benefit potential	
✓✓✓	Moderate safety benefit potential	
✓✓✓✓	High safety benefit potential	
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition and new funding
🕒	Short term	Could be accomplished within 1 year
🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
🕒	Long term	Could be accomplished in 3 years or more; may require full engineering

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)	✓	\$	🕒	Vineland
2	Inspect, repave and restripe the roadway as needed	✓	\$\$	🕒	Vineland
3	Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed	✓	\$\$	🕒	Vineland
4	Remove sidewalk obstructions per ADA requirements	✓	\$	🕒	Vineland
5	Update complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide	✓✓	\$	🕒	Vineland
6	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	🕒	Vineland
7	Consider installing sharrows or bicycle lanes in a shoulder, when possible, to improve multimodal accommodations	✓✓	\$	🕒	Vineland

8	After improvements are made conduct speed study to investigate reducing speed limit (i.e. Consider reducing Speed Limit to 30 mph)	✓✓	\$	⦿	Vineland
9	Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results	✓✓✓	\$\$\$	⦿	Vineland
10	Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location	✓✓✓	\$	⦿	Vineland
11	Extend and connect existing sidewalks to provide continuous sidewalks along both sides of roadway from Landis Avenue to Humbert Street	✓✓✓	\$\$\$	●	Vineland
Site-Specific					
Intersection: Florence Avenue					
12	Install midblock pedestrian crossing improvements (i.e. Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style crosswalk and crossing island)	✓✓✓	\$\$\$	●	Vineland
Intersection: Chestnut Avenue					
13	Study intersection to reduce and realign lanes	✓✓	\$\$	⦿	Vineland
14	Upgrade signals to current standards	✓✓	\$\$	⦿	Vineland
15	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	⦿	Vineland
Segment: Almond Street-Grape Street					
16	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	⦿	Vineland
17	Install in-street pedestrian crossing signage at crosswalks in school zone	✓✓	\$	⦿	Vineland
18	Install a pull-in loading zone in front of Cunningham Academy for bus and vehicle loading and unloading	✓✓	\$\$	⦿	Vineland
Segment: Chestnut Avenue-Walnut Road					
19	Widen existing sidewalks per NJ Complete Streets Design Guide (i.e. 5' minimum)	✓	\$\$\$	●	Vineland
20	Install gateway treatments to calm traffic and communicate transition from rural Vineland to urbanized Vineland (i.e. signage in median island, neckdowns with plantings)	✓✓	\$\$\$	⦿	Vineland

21	Narrow roadway segment width (i.e. moving curblines closer to each other, installing median islands with planting strips, install buffered bicycle lanes to reduce travel lane widths)	✓✓✓	\$\$\$	●	Vineland
Intersection: Walnut Road					
22	Install double 36" stop signs at all approaches	✓	\$	●	Vineland
23	Install LED strip around perimeter of stop signs with solar power supply to increase visibility	✓	\$	●	Vineland
24	Install advance warning treatments at the southern approach	✓✓	\$	●	Vineland

Table 7: East Avenue PRSA Recommendations

Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the 2017 *NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Reduce Road Segment Width (i.e. Buffered bike lane typical)

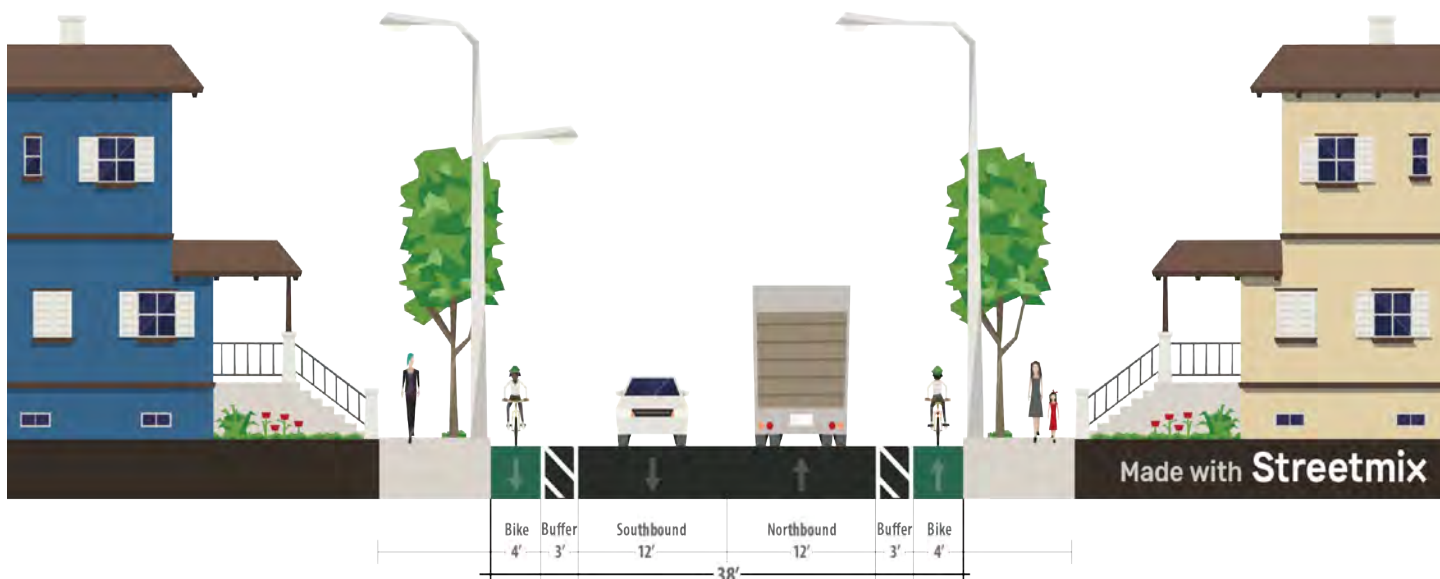


Photo Caption: East Avenue Concept

Reduce Road Segment Width (i.e. Median Island, Boulevard)



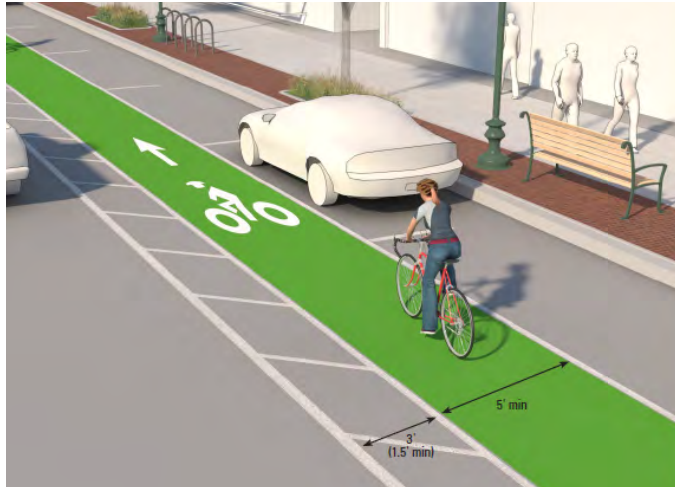
Source: (Google Earth) Haven Avenue, Ocean City, NJ

Midblock Pedestrian Crossing Improvements (i.e. RRFB or PHB with crosswalk and crossing island)



Source: (FHWA-SA-18-018)

Reduce Road Segment Width (i.e. Buffered bike lane)



Source: (CSDG)

Road Owner Response

As the roadway owner, City of Vineland is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Vineland should use its experience in planning and engineering to determine which recommendations in **Table 7** can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Vineland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in **Appendix D**.

4. Irving Avenue (Bridgeton)

The Irving Avenue Pedestrian/Bicycle Road Safety Audit was conducted on Wednesday, December 11, 2019 at the Cumberland County Administration Building in Bridgeton, Cumberland County, New Jersey. Fourteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of Irving Avenue located in the urban area of Bridgeton, New Jersey. Audit limits are between CR 606 (Laurel Street) and Rogers Street (MP 0.00-1.02). This corridor runs east to west and is a rural gateway into Bridgeton that bisects notable north-south roadways NJ 77 (Pearl Street) and CR 669 (Manheim Avenue). The corridor is surrounded by low-density residential and commercial development. It is important to note that the corridor includes a hospital and a children's medical clinic.



Figure 1: Irving Avenue Study Area

Roadway Characteristics

CR 552 (Irving Avenue) is classified as an urban minor arterial with a posted speed limit of 25 mph from CR 606 (Laurel Street) to CR 669 (Manheim Avenue) (MP 0.00-0.71), and a posted speed limit of 35 from CR 669 (Manheim Avenue) to Rogers Street (MP 0.71-1.02). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking where permitted. The roadway's horizontal alignment is mostly straight with curvilinear bends between Lakeview Avenue and Nixon Avenue, and at the Magnolia Avenue intersection, with 3 signalized intersections and 15 unsignalized. The roadway also includes a freight railroad crossing (MP 0.57).

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of Irving Avenue between CR 606 (Laurel Street and CR 669 (Manheim Avenue) (MP 0.00-0.71) and are typically 4'-5' in width, with exception to a much wider sidewalk segment fronting the shopping plaza. From CR 669 (Manheim Avenue) to Rogers Street (MP 0.71-1.02) a sidewalk is provided only along the northern curblin. Sidewalk conditions vary from satisfactory to very poor. Sidewalk segments in very poor condition are typically of slate and brick materials and are notably hazardous to pedestrians.

Basic parallel style crosswalks are provided across Irving Avenue at the signalized intersections of NJ 77 (Pearl Street) and CR 669 (Manheim Avenue). Basic parallel style crosswalks are also provided across Irving Avenue at high volume unsignalized intersections Bank Street, Walnut Street, and York Street. However, two of the three (2/3) signalized intersections in the study corridor do not provide marked crosswalks at each leg. Marked crosswalks at Magnolia Avenue, and two of the four (2/4) marked crosswalks at CR 669 (Manheim Avenue) are high-visibility continental style.

Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose Irving Avenue as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017 ADT along Irving Avenue is approximately 6,500 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will be used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Transit

The study corridor is serviced by the Cumberland Area Transit System's (CATS) Greater Bridgeton Area Transit Shuttle (Shuttle). The Shuttle provided fixed route service in the Bridgeton area with stops in the study area at Laurel Street and Manheim Avenue intersections. NJ Transit Route #410 and #553 service is also provided at the Irving Avenue/Pearl Street intersection.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Bridgeton study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in *Figure 2*.

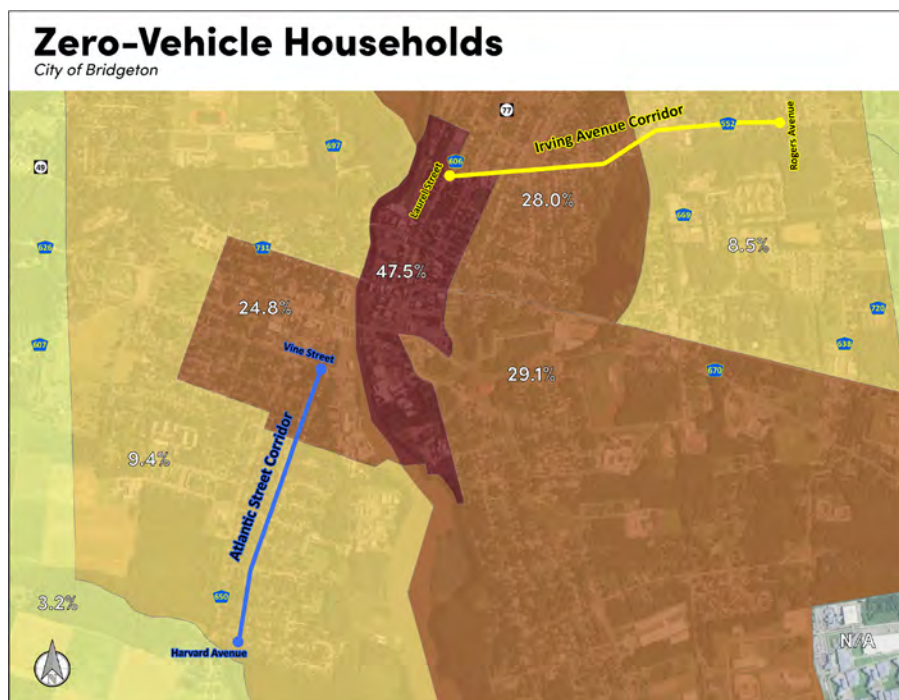


Figure 2: Percentage of Zero-Vehicle Households in Bridgeton, NJ

Characteristics	Irving Avenue (0.25 mile buffer)	Cumberland County
Population	4,799	154,952
<i>Black or African American</i>	18%	19%
<i>Hispanic/Latino*</i>	69%	30%
<i>White</i>	59%	66%
<i>Asian</i>	<1%	1%
<i>American Indian/Alaskan</i>	2%	1%
<i>Two or More Races Alone</i>	2%	5%
<i>Other</i>	19%	8%
Population by Age		
<i>Age 0-4</i>	11%	7%
<i>Age 0-17</i>	35%	24%
<i>Age 18+</i>	65%	76%
<i>Age 65+</i>	5%	14%
Households	1,168	50,596
<i>Linguistically Isolated Households**</i>	35%	8%
<i>Speak Spanish***</i>	99%	91%
Income		
<i><\$15,000</i>	14%	14%
<i>\$15,000 - \$25,000</i>	19%	12%
<i>\$25,000 - \$50,000</i>	33%	24%
<i>\$50,000 - \$75,000</i>	16%	17%
<i>\$75,000+</i>	18%	33%



Table 1: Community Profile of Irving Avenue Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English “very well”,

***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 7+ are provided in **Appendix C**.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	36	6	0
2013	40	6	0
2014	40	7	0
2015	34	7	0
2016	30	9	0
Total	180	35	0

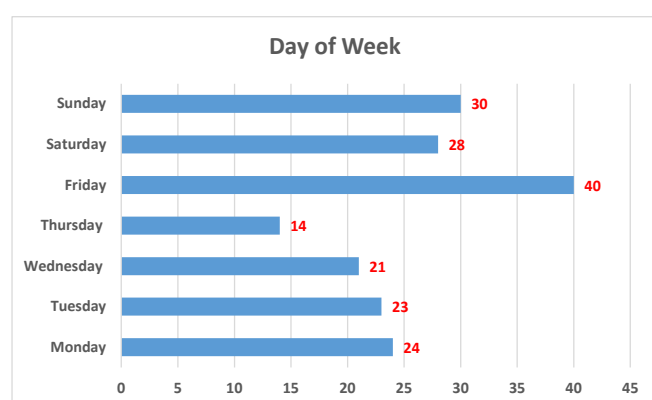
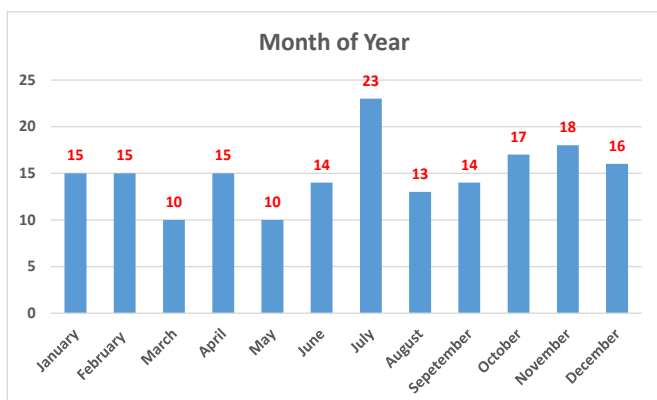
Table 2: Total Crashes by Year - Irving Avenue Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	143	77.7%
	Wet	37	20.1%
Illumination	Daylight	93	50.5%
	Dusk	6	3.3%
	Dark (Lit)	72	39.1%
	Dark (Unlit)	7	3.8%

Table 3: Environmental Conditions - Irving Avenue Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	50	27.8%
Fixed Object	19	10.6%
Animal	3	1.7%
Encroachment	0	0.0%
Backing	8	4.4%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	4	2.2%
Opposite Direction (Head-on)	8	4.4%
Left-Turn/U-Turn	5	2.8%
Right Angle	37	20.6%
Same Direction (Sideswipe)	18	10.0%
Same Direction (Read End)	21	11.7%
Pedalcyclist	1	0.6%
Pedestrian	6	3.3%

Table 4: Collision Type - Irving Avenue Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 6 pedestrian and 1 bicyclist crashes, representing 3.9% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 17.1% of all injury crashes.

Crash Type	Total Crashes	Percentage
<i>Collision with Pedestrian</i>	6	85.7%
<i>Collision with Cyclist</i>	1	14.3%
Crash Severity		
<i>Fatality</i>	0	0.0%
<i>Incapacitating Injury</i>	0	0.0%
<i>Moderate Injury</i>	2	28.6%
<i>Pain</i>	4	57.1%
<i>Property Damage Only</i>	1	14.3%

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
<i>Crashes often occur at or near intersections</i>
<i>Speeding</i>
<i>Many crash victims have Limited English Proficiency (LEP)</i>
<i>Crashes in crosswalks are often due to Left-Hand turn movements</i>

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the Irving Avenue PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✓	Limited safety benefit potential	
✓✓	Limited to moderate safety benefit potential	
✓✓✓	Moderate safety benefit potential	
✓✓✓✓	High safety benefit potential	
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition and new funding
🕒	Short term	Could be accomplished within 1 year
🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
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The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)	✓	\$	🕒	County
2	Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)	✓	\$	🕒	Bridgeton
3	Conduct a bi-lingual road/bicycle-pedestrian safety campaign (i.e. StreetSmart)	✓	\$	🕒	Bridgeton
4	Inspect, repave and restripe the roadway as needed	✓	\$\$	🕒	County
5	Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed	✓	\$\$	🕒	County/NJDOT
6	Perform parking study and develop parking management plan	✓	\$\$	🕒	Bridgeton/County
7	Remove sidewalk obstructions per ADA requirements	✓	\$	🕒	County
8	Enact a complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide	✓✓	\$	🕒	Bridgeton/County

9	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	☉	County
10	Consider installing sharrows or bicycle lanes in a shoulder, when possible, to improve multimodal accommodations	✓✓	\$	☉	County
11	Install high-visibility marked crosswalks at all legs of signalized intersections	✓✓	\$	☉	County/NJDOT
12	Daylight intersections per NJ Title 39 (i.e. education/enforcement campaigns, stripings, bollards, bicycle parking, planters etc.)	✓✓	\$	☉	County
13	Remove sight line obstacles (i.e. trees, utility poles, signage)	✓✓	\$\$	☉	County/NJDOT
14	Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results	✓✓✓	\$\$\$	☉	Bridgeton/ County
15	Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location	✓✓✓	\$	☉	Bridgeton
16	Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)	✓✓✓	\$\$\$	☉	County/NJDOT
Site-Specific					
Segment: Walnut Street-Church Street					
17	Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings)	✓	\$	☉	County
18	Install midblock pedestrian crossing improvements (i.e. Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style raised crosswalk)	✓✓✓	\$\$\$	☉	County
Intersection: Manheim Avenue					
19	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	☉	County
Intersection: Laurel Street					
20	Consider installing "No Turn on Red"	✓	\$	☉	County
21	Install channelization island at eastern approach	✓	\$\$	☉	County
Intersection: Pearl Street					
22	Consider installing "No Turn on Red"	✓	\$	☉	NJDOT

23	Install bus box stripings for bus stops in coordination with NJ Transit per NACTO Transit Street Design Guide	✓	\$\$	①	NJDOT/NJ Transit
24	Reevaluate signal timing (i.e. shorter cycle lengths)	✓✓	\$\$	②	NJDOT
Segment: Pearl Street-Bank Street					
25	Fix drainage spouts on south side of Irving Avenue (i.e. 172 Bank Street)	✓	\$\$	②	County
Segment: East Avenue-Lakeview Avenue					
26	Investigate parking supply	✓	\$	②	Bridgeton/ County
27	Remove parking on north side of Irving Avenue, stripe shoulder edgeline and push centerline north	✓✓	\$	②	County
28	Install bumpouts and neckdowns	✓✓✓	\$\$\$	①	County
Intersection: York Street					
29	Install curb ramp and extend sidewalk to align with existing crosswalk	✓	\$\$	①	County
30	Install bumpouts and neckdowns	✓✓✓	\$\$\$	①	County
Intersection: Magnolia Avenue					
31	Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings, advance warning signal)	✓	\$	②	County
32	Install a Rectangular Rapid Flash Beacon (RRFB)	✓✓	\$\$	②	County
33	Install a raised continental or ladder style crosswalk and/or provide a median refuge island	✓✓	\$\$	①	County
Segment: Magnolia Avenue-Manheim Avenue					
34	Investigate closing access from parking lot to Magnolia Avenue marked crosswalk	✓	\$	②	County/Owner
35	Install wayfinding signage encouraging pedestrians to use Manheim Avenue crosswalks	✓	\$	②	County/Owner

Table 7: Irving Avenue PRSA Recommendations

Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the 2017 *NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Bicycle Sharrows

Design Guidance

Shared Lane Markings

Required Features

1 The Shared Lane Marking in use within the United States is the bike-and-chacon "sharrow," outlined in MUTCD figure 9C-9.

2 Shared Lane Markings shall not be used on streets, in designated bicycle lanes, or to designate bicycle facilities at signalized intersections. (MUTCD 9C-9.1.1)

Recommended Features

3 Frequent, uniform placement of markings is essential. The number of markings along a street should correspond to the difficulty for motorists to maneuver and/or the need to better share the road with bicyclists. (MUTCD 9C-9.1.2)

4 Lateral placement is critical to encourage riders to avoid the "door zone." (MUTCD 9C-9.1.3)

when a parking lane is present at 10 feet from the curb face.¹⁰

5 On streets with posted 25 mph speeds or slower, preferred placement is in the center of the travel lane to encourage motorist to occupy the full travel lane.

6 On streets with posted 35 mph speeds or faster and motor vehicle volumes higher than 1,000 vph, preferred placement is in the center of the travel lane to encourage motorist to occupy the full travel lane.

7 If on-street vehicle parking is not present, SLMs should be placed far enough from the curb to direct bicyclists away from gutters, islands, and other obstacles. On streets with posted 25 mph speeds or slower, preferred placement is in the center of the travel lane to encourage motorist to occupy the full travel lane. (MUTCD 9C-9.1.4)

Optional Features

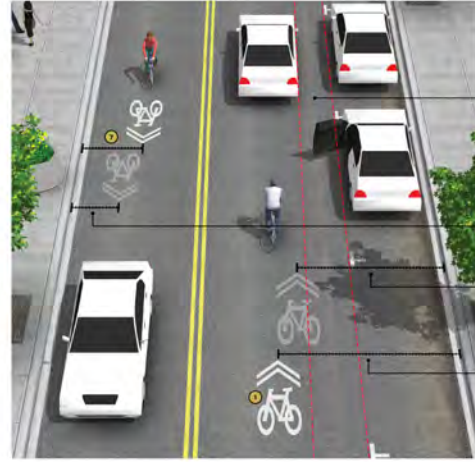
8 An overlapping pattern of the orientation of the sharrow marking may be adjusted to direct bicyclists along discontinuous routes.

9 Color may be used to enhance the visibility of the shared lane marking and to further encourage desired lane positioning.¹¹

10 Dotted line markings may accompany the shared lane marking to further encourage desired lane positioning.¹²



Optional Shared Lane Marking Applications



Source: (NACTO-US)

Daylighting Intersection (i.e. Bicycle parking, plastic bollards, stripings)



Photo Caption: (NJBPRC) New Brunswick, NJ

Curb extensions/bumpouts



Source: (NACTO-US)

Pedestrian Crossing Improvements (i.e. RRFB with raised high-visibility crosswalk)



Source: (FHWA PEDSAFE)

Road Owner Response

As the roadway owner, County of Cumberland is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, County of Cumberland should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, City of Bridgeton).

County of Cumberland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D*.

5. Atlantic Street (Bridgeton)

The Atlantic Street Pedestrian/Bicycle Road Safety Audit was conducted on Wednesday, December 11, 2019 at the Cumberland County Administration Building in Bridgeton, Cumberland County, New Jersey. Fourteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of Atlantic Street located in the urban area of Bridgeton, New Jersey. Audit limits are between CR 697 (Vine Street) and Harvard Avenue (MP 0.90–0.06). This corridor runs north-south and is a local thoroughfare into Bridgeton that bisects quiet residential streets. The corridor is surrounded by low-density residential. It is important to note that the corridor is adjacent to the Cumberland County Jail and Courthouse, which contribute to traffic and circulation patterns on Atlantic Street and its bisecting roadways, primarily CR 697 (Vine Street).

Roadway Characteristics

Atlantic Street is classified as an urban major collector with a posted speed limit of 25 mph (MP 0.06–0.90). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking where permitted. The roadway's horizontal alignment is straight with 12 unsignalized intersection. The vertical alignment generally is flat with an incline at the northern terminus of the study corridor.

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of Irving Avenue between CR 606 (Laurel Street and CR 669 (Manheim Avenue) (MP 0.00–0.71) and are typically 4'–5' in width. Sidewalk conditions are generally satisfactory with few heaved segments due to tree roots. There are also small segments of the sidewalk that are brick material between Hampton Street and Vine Street (MP 0.80–0.90).

Basic parallel style crosswalks are provided across Atlantic Street at only Lincoln Avenue (MP 0.67). There is also a parallel style crosswalk along the east side of Atlantic Street at Woodland Drive (MP 0.63). There are no bicycle lanes or other bicycle infrastructure identified along the corridor.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017 ADT along Atlantic Street is approximately 1,800 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will be used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.



Figure 1: Atlantic Street Study Area

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Bridgeton study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in *Figure 2*.

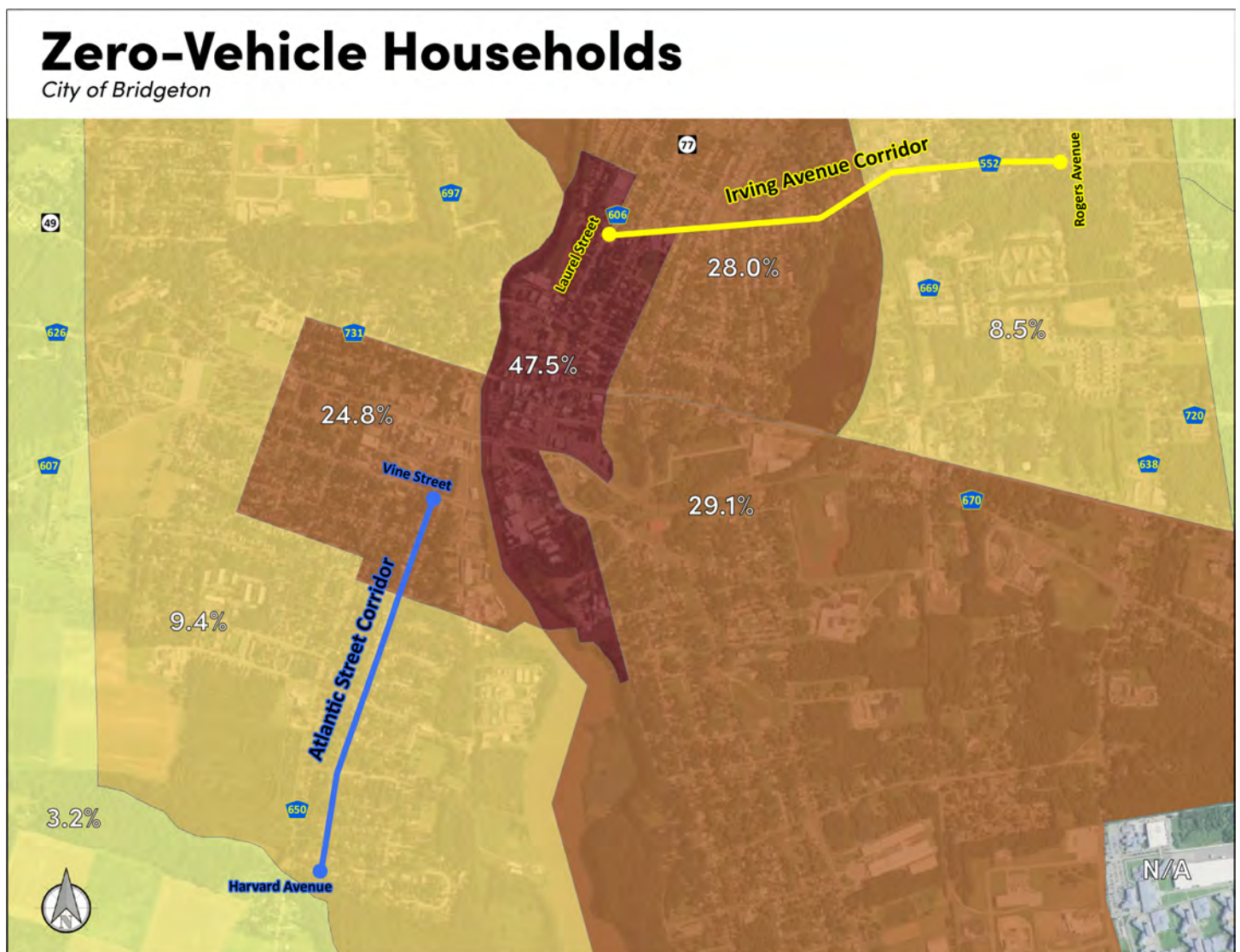


Figure 2: Percentage of Zero-Vehicle Households in Bridgeton, NJ

Characteristics	Atlantic Street (0.25 mile buffer)	Cumberland County
Population	3,579	154,952
Black or African American	23%	19%
Hispanic/Latino*	61%	30%
White	51%	66%
Asian	1%	1%
American Indian/Alaskan	1%	1%
Two or More Races Alone	2%	5%
Other	22%	8%
Population by Age		
Age 0-4	10%	7%
Age 0-17	37%	24%
Age 18+	63%	76%
Age 65+	6%	14%
Households	934	50,596
Linguistically Isolated Households**	21%	8%
Speak Spanish***	99%	91%
Income		
<\$15,000	16%	14%
\$15,000 - \$25,000	20%	12%
\$25,000 - \$50,000	24%	24%
\$50,000 - \$75,000	13%	17%
\$75,000+	27%	33%



Table 1: Community Profile of Atlantic Street Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English “very well”,

***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 6+ are provided in **Appendix C**.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	14	2	0
2013	8	2	0
2014	11	0	0
2015	15	4	0
2016	6	2	0
Total	54	10	0

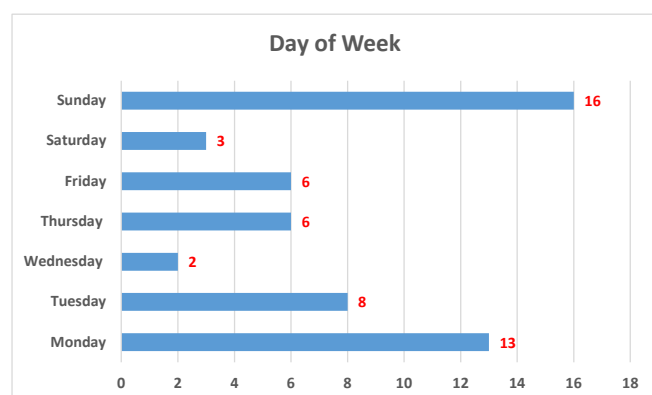
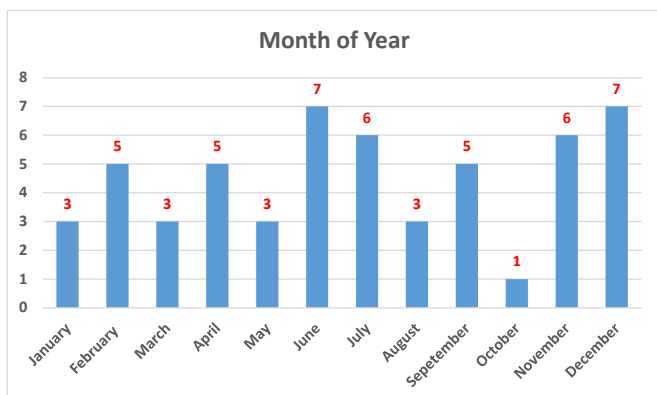
Table 2: Total Crashes by Year - Atlantic Street Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	46	25.0%
	Wet	6	3.3%
Illumination	Daylight	26	14.1%
	Dusk	2	1.1%
	Dark (Lit)	17	9.2%
	Dark (Unlit)	3	1.6%

Table 3: Environmental Conditions - Atlantic Street Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	33	61.1%
Fixed Object	3	5.6%
Animal	0	0.0%
Encroachment	0	0.0%
Backing	2	3.7%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	1	1.9%
Opposite Direction (Head-on)	0	0.0%
Left-Turn/U-Turn	0	0.0%
Right Angle	7	13.0%
Same Direction (Sideswipe)	1	1.9%
Same Direction (Rear End)	2	3.7%
Pedalcyclist	0	0.0%
Pedestrian	5	9.3%

Table 4: Collision Type - Atlantic Street Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 5 pedestrian and 0 bicyclist crashes, representing 9.3% of all crashes within the study area, well above the county and state averages. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 50% of all injury crashes.

Crash Type	Total Crashes	Percentage
<i>Collision with Pedestrian</i>	5	100.0%
<i>Collision with Cyclist</i>	0	0.0%
Crash Severity		
<i>Fatality</i>	0	0.0%
<i>Incapacitating Injury</i>	0	0.0%
<i>Moderate Injury</i>	2	40.0%
<i>Pain</i>	2	40.0%
<i>Property Damage Only</i>	1	20.0%

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
<i>Crashes often occur at or near intersections</i>
<i>Speeding</i>
<i>Inadequate lighting</i>

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the Atlantic Street PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✓	Limited safety benefit potential	
✓✓	Limited to moderate safety benefit potential	
✓✓✓	Moderate safety benefit potential	
✓✓✓✓	High safety benefit potential	
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition and new funding
🕒	Short term	Could be accomplished within 1 year
🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
🕒	Long term	Could be accomplished in 3 years or more; may require full engineering

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)	✓	\$	🕒	Bridgeton
2	Inspect, repave and restripe the roadway as needed	✓	\$\$	🕒	Bridgeton
3	Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed	✓	\$\$	🕒	Bridgeton
4	Install wayfinding signage (i.e. Street signs)	✓	\$	🕒	Bridgeton
5	Enact a complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide	✓✓	\$	🕒	Bridgeton/ County
6	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	🕒	Bridgeton/ County
7	Consider installing sharrows or bicycle lanes in a shoulder, when possible, to improve multimodal accommodations	✓✓	\$	🕒	Bridgeton

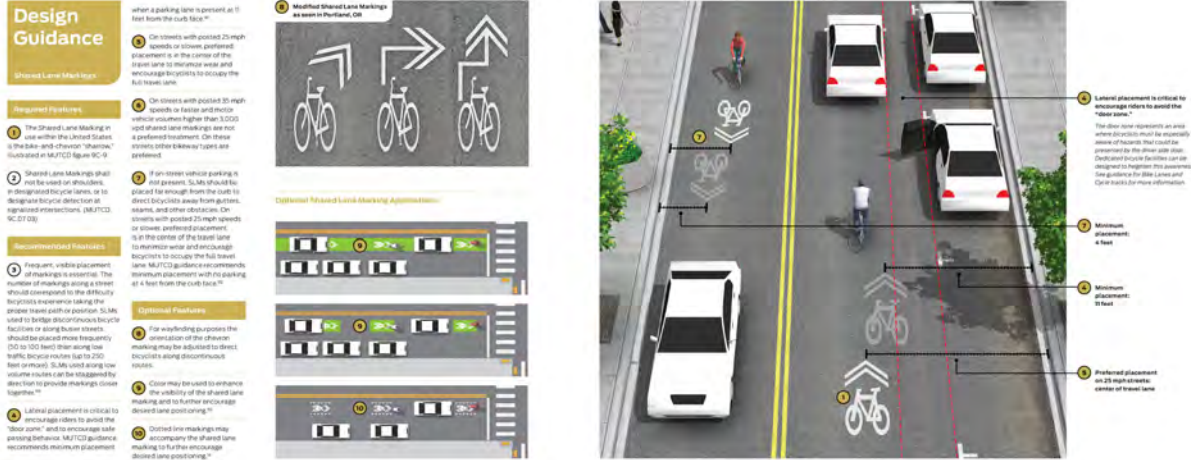
8	Install high-visibility marked crosswalks at all legs of Vine Street and Hampton Street intersections	✓✓	\$	●	Bridgeton/ County
9	Daylight intersections per NJ Title 39 (i.e. education/enforcement campaigns, stripings, bollards, bicycle parking, planters etc.)	✓✓	\$	●	Bridgeton/ County
10	Remove sight line obstacles (i.e. trees, utility poles, signage)	✓✓	\$\$	●	Bridgeton/ County
11	Delineate pavement with centerline and edgeline stripings	✓✓	\$	●	Bridgeton
12	Install speed management treatments (i.e. speed cushions, speed tables, neckdowns etc.)	✓✓✓	\$\$	●	Bridgeton
13	Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results	✓✓✓	\$\$\$	●	Bridgeton
14	Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location	✓✓✓	\$	●	Bridgeton
Site-Specific					
Intersection: Vine Street					
16	Install all-way stop	✓✓	\$	●	Bridgeton/ County
17	Install curb extensions/bumpouts to reduce turning radii and daylight intersection	✓✓✓	\$\$\$	●	Bridgeton/ County
Intersection: Woodland Drive					
18	Reduce roadway width (i.e. install median crossing island, curb extensions etc.)	✓✓	\$\$\$	●	Bridgeton

Table 7: Atlantic Street PRSA Recommendations

Recommendation Visualizations

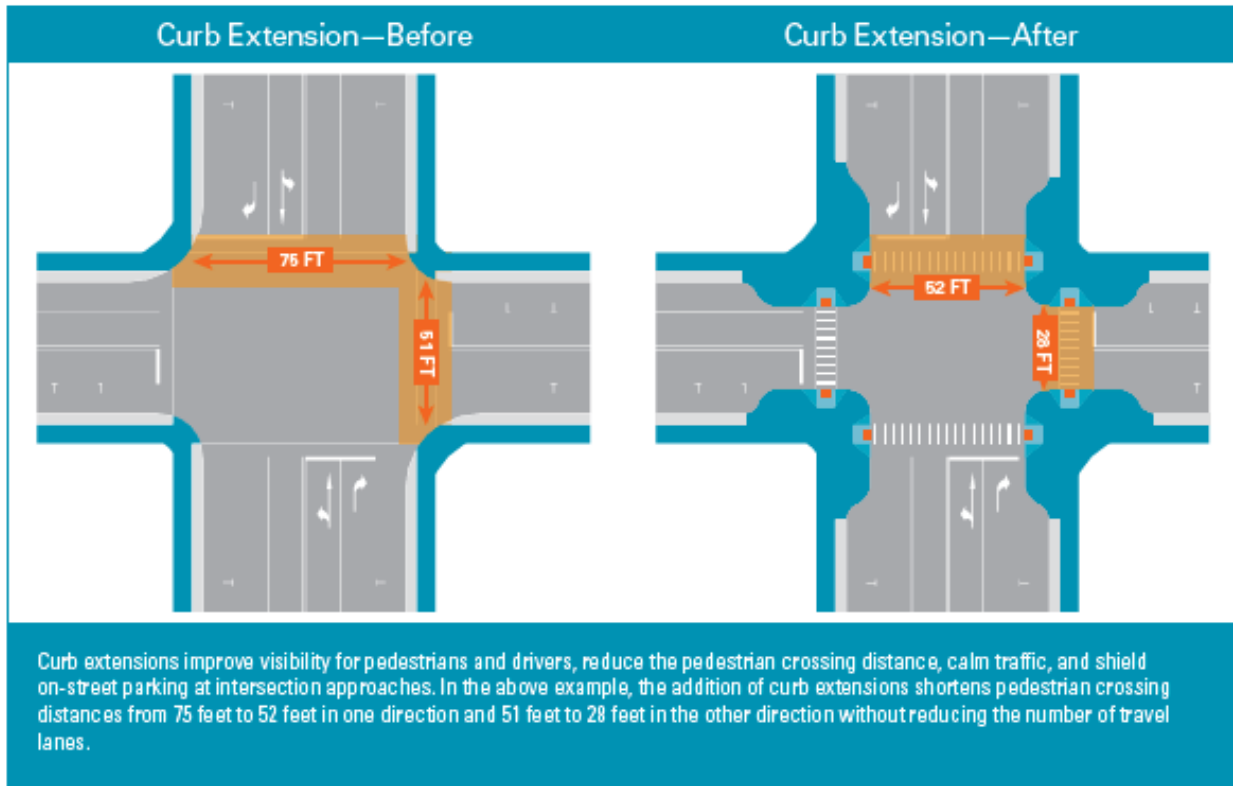
Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Bicycle Sharrows



Source: (NACTO-US)

Daylighting Intersection/Traffic Calming/Pedestrian Safety (i.e. Curb extension/bumpout)



Source: (CSDG)

Curb extensions/bumpouts



Source: (NACTO-US)

Traffic Calming/Speed Management Treatments (i.e. speed cushions, neckdowns, speed tables)



Speed Cushions

Speed cushions are speed humps or speed tables that include wheel cutouts that allow larger vehicles to pass unaffected but reduce passenger vehicle speeds. They are often used on key emergency response routes to allow emergency vehicles to pass unimpeded while causing the typical passenger vehicle to slow down. Speed cushions should be used with caution, however, as drivers will often seek out the space in between the humps.



Neckdowns

Neckdowns create pinch points by extending the curbline to narrow the roadway, which deters motorists from operating at high speeds on local streets and significantly expands the sidewalk realm for pedestrians.

Source: (CSDG)

Road Owner Response

As the roadway owner, City of Bridgeton is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Bridgeton should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Bridgeton delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D*.

6. High Street (Millville)

The High Street Pedestrian/Bicycle Road Safety Audit was conducted on Friday, January 6, 2020 at the Millville Municipal Building in Millville, Cumberland County, New Jersey. Sixteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of High Street located in the urban area of Millville, New Jersey. Audit limits are between NJ 49 (Main Street) and Harrison Avenue (MP 0.00–0.99). This corridor runs north-south along the central business district of Millville. The corridor is surrounded by mixed-use commercial and residential. It is important to note that the corridor is located within the Glasstown Arts District (Arts District) which includes the historic Levoy Theatre and the Rowan College of South Jersey – Cumberland County Arts & Innovation Center.



Figure 1: High Street Study Area

Roadway Characteristics

High Street is classified as an urban major collector with a posted speed limit of 25 mph (MP 0.00–0.99). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking where permitted from NJ 49 (Main Street) to Foundry Street (MP 0.00–0.77). Between Foundry Street and Harrison Avenue (MP 0.77–0.99) the roadway substantially widens creating a 24' shoulder along the west curblane and an 8' shoulder on the east. The roadway's horizontal alignment is straight with 4 signalized intersections and 9 unsignalized.

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of High Street between NJ 49 (Main Street) and Harrison Avenue (MP 0.00–0.99). Sidewalks north of McNeal Street (MP 0.69) are typically 4'–5' in width while sidewalks south of this point thereof are typically 6'–14'. The widest segments of sidewalk are brick material and located within the streetscaped Glasstown Arts District from NJ 49 (Main Street) to Broad Street (MP 0.00–0.45). Sidewalk conditions are generally satisfactory with a few heaved segments due to tree roots. Within the Arts District there are also ample pedestrian and vehicular scale lighting and benches.

Basic parallel style crosswalks are provided at every four-way intersection within the study area, with exception to the crosswalk art at the Pine Street intersection. Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose High Street as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017-2018 ADT along High Street is approximately 8,500 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will be used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Millville study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in *Figure 2*.

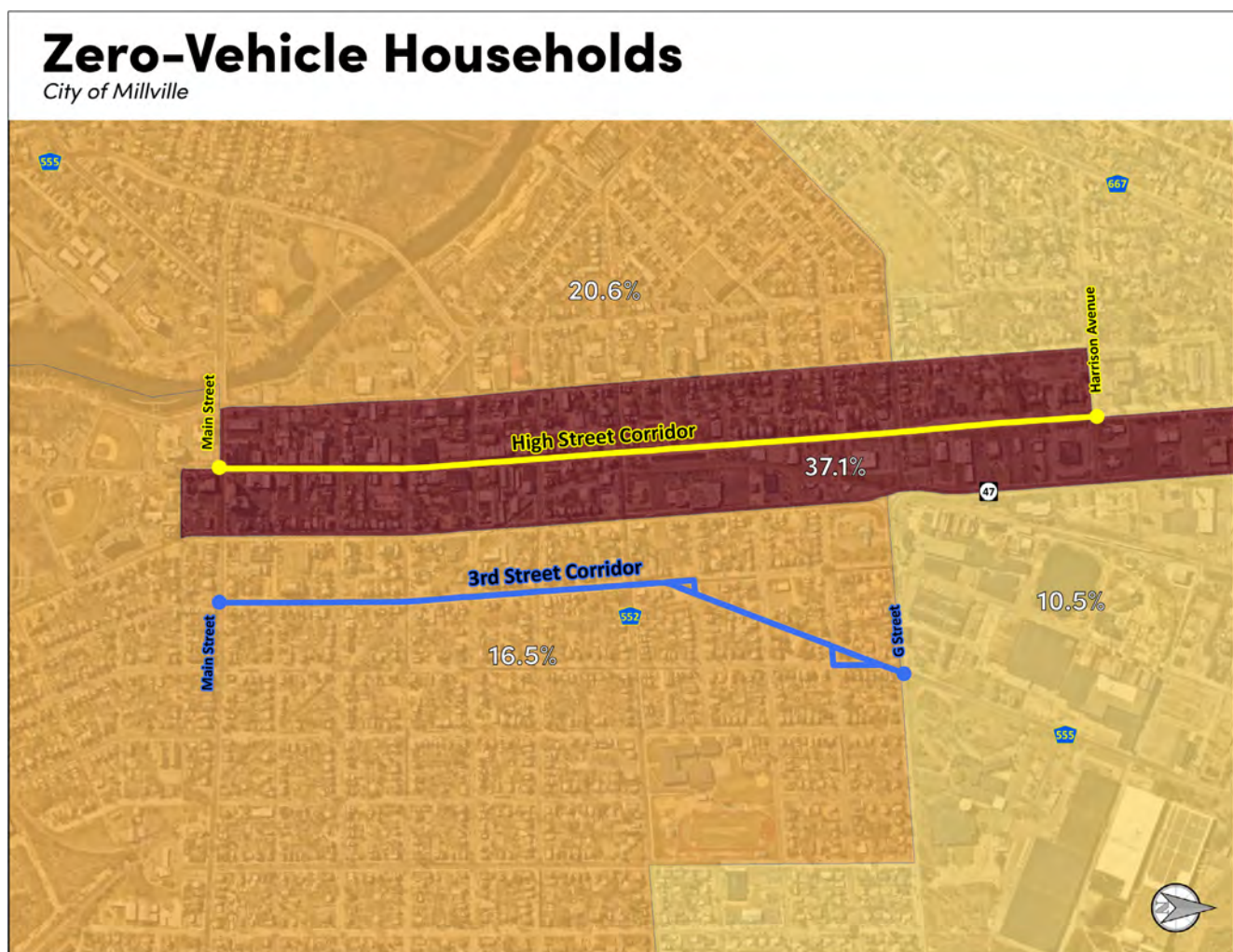


Figure 2: Percentage of Zero-Vehicle Households in Millville, NJ

Characteristics	High Street (0.25 mile buffer)	Cumberland County
Population	4,059	154,952
<i>Black or African American</i>	31%	19%
<i>Hispanic/Latino*</i>	22%	30%
<i>White</i>	60%	66%
<i>Asian</i>	<1%	1%
<i>American Indian/Alaskan</i>	<1%	1%
<i>Two or More Races Alone</i>	7%	5%
<i>Other</i>	2%	8%
Population by Age		
<i>Age 0-4</i>	5%	7%
<i>Age 0-17</i>	28%	24%
<i>Age 18+</i>	72%	76%
<i>Age 65+</i>	13%	14%
Households	1,690	50,596
<i>Linguistically Isolated Households**</i>	4%	8%
<i>Speak Spanish***</i>	96%	91%
Income		
<i><\$15,000</i>	27%	14%
<i>\$15,000 - \$25,000</i>	16%	12%
<i>\$25,000 - \$50,000</i>	28%	24%
<i>\$50,000 - \$75,000</i>	17%	17%
<i>\$75,000+</i>	12%	33%



Table 1: Community Profile of High Street Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English “very well”,

***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 4> are provided in **Appendix C**.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	56	14	0
2013	48	10	0
2014	40	7	0
2015	36	14	0
2016	28	12	0
Total	208	56	0

Table 2: Total Crashes by Year - High Street Study Corridor

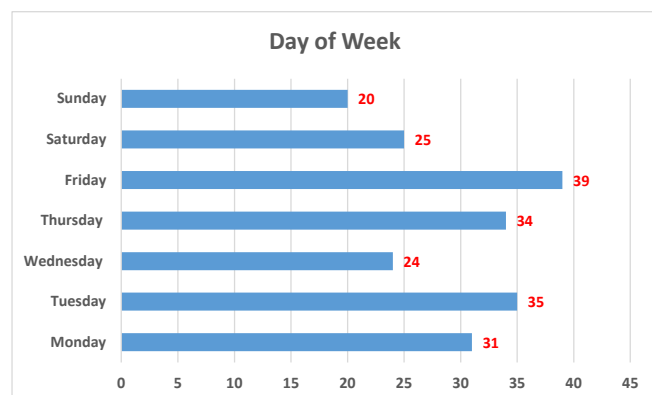
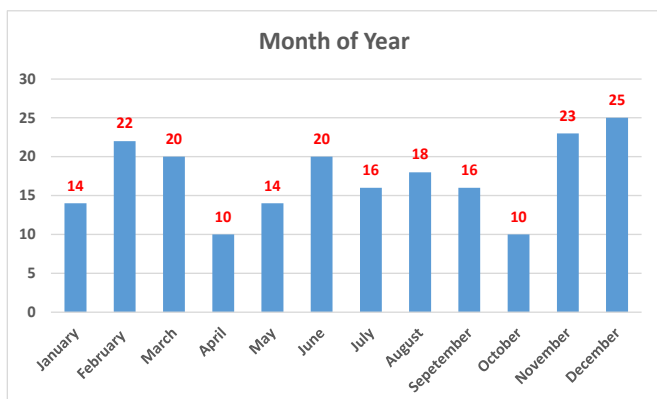
		Total Crashes	Percentages
Road Surfaces	Dry	143	77.7%
	Wet	37	20.1%
Illumination	Daylight	93	50.5%
	Dusk	6	3.3%
	Dark (Lit)	72	39.1%
	Dark (Unlit)	7	3.8%

Table 3: Environmental Conditions - High Street Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	18	8.7%
Fixed Object	8	3.8%
Animal	0	0.0%
Encroachment	0	0.0%
Backing*	29	13.9%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	2	1.0%
Opposite Direction (Head-on)	4	1.9%
Left-Turn/U-Turn	11	5.3%
Right Angle	50	24.0%
Same Direction (Sideswipe)	26	12.5%
Same Direction (Read End)	45	11.7%
Pedalcyclist	4	0.6%
Pedestrian	11	3.3%

Table 4: Collision Type - High Street Study Corridor

*Crashes may be attributed to adjacent parking lots



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 11 pedestrian and 4 bicyclist crashes, representing 3.9% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 21% of all injury crashes.

Crash Type	Total Crashes	Percentage
<i>Collision with Pedestrian</i>	11	73.3%
<i>Collision with Cyclist</i>	4	26.7%
Crash Severity		
<i>Fatality</i>	0	0.0%
<i>Incapacitating Injury</i>	0	0.0%
<i>Moderate Injury</i>	4	26.7%
<i>Pain</i>	8	53.3%
<i>Property Damage Only</i>	3	20.0%

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
<i>Crashes often occur at or near intersections</i>
<i>Speeding</i>
<i>Mid-block crossings</i>
<i>Crashes in crosswalks are often due to Left-Hand turn movements</i>

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the High Street PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✓	Limited safety benefit potential	
✓✓	Limited to moderate safety benefit potential	
✓✓✓	Moderate safety benefit potential	
✓✓✓✓	High safety benefit potential	
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition and new funding
🕒	Short term	Could be accomplished within 1 year
🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
🕒	Long term	Could be accomplished in 3 years or more; may require full engineering

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)	✓	\$	🕒	Millville/NJDOT
2	Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)	✓	\$	🕒	Millville
3	Inspect, repave and restripe the roadway as needed	✓	\$\$	🕒	Millville
4	Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed	✓	\$\$	🕒	Millville/NJDOT
5	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	🕒	Millville/NJDOT
6	Daylight intersections per NJ Title 39 (i.e. education/enforcement campaigns, stripings, bollards, bicycle parking, planters etc.)	✓✓	\$	🕒	Millville
7	Develop an access management plan (i.e. consolidate redundant driveways, shared parking agreements etc.)	✓✓	\$	🕒	Millville/Owners

9	Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results	✓✓✓	\$\$\$	●	Millville
10	Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location	✓✓✓	\$	●	Millville
11	Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)	✓✓✓	\$\$\$	●	Millville/NJDOT
Site-Specific					
Segment: Main Street-Foundry Street					
12	Install curb extensions/bumpouts at every intersection	✓✓✓	\$\$\$	●	Millville/NJDOT
Segment: Main Street-Foundry Street					
13	Consider installing bicycle sharrows to improve multimodal accommodations	✓✓	\$	●	Millville
Intersection: Main Street					
14	Extend queue lane	✓✓	\$\$	●	NJDOT
15	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	●	NJDOT
Intersection: Mulberry Street					
16	Perform a MUTCD signal warrant analysis for removal	✓	\$\$	●	Millville
Intersection: Broad Street					
17	Consider a raised intersection with artwork and gateway treatments (i.e. Arts District branding)	✓✓	\$\$\$	●	Millville
Intersection: Foundry Street					
18	Install gateway median crossing island at north leg of intersection	✓✓	\$\$	●	Millville
Segment: Foundry Street-Harrison Avenue					
19	Make connections to existing bicycle network on 2nd Street (i.e. buffered bike lanes, shared-use path etc.)	✓✓	\$	●	Millville
20	Install a shared-use path along the frontage road	✓✓	\$\$	●	Millville
21	Install a frontage road in the west shoulder	✓✓✓	\$\$\$	●	Millville
22	Convert section to a 3-lane section (2 travel lanes, TWLTL and shoulders; i.e. road diet)	✓✓✓	\$	●	Millville
23	Install bumpouts and neckdowns	✓✓✓	\$\$\$	●	Millville

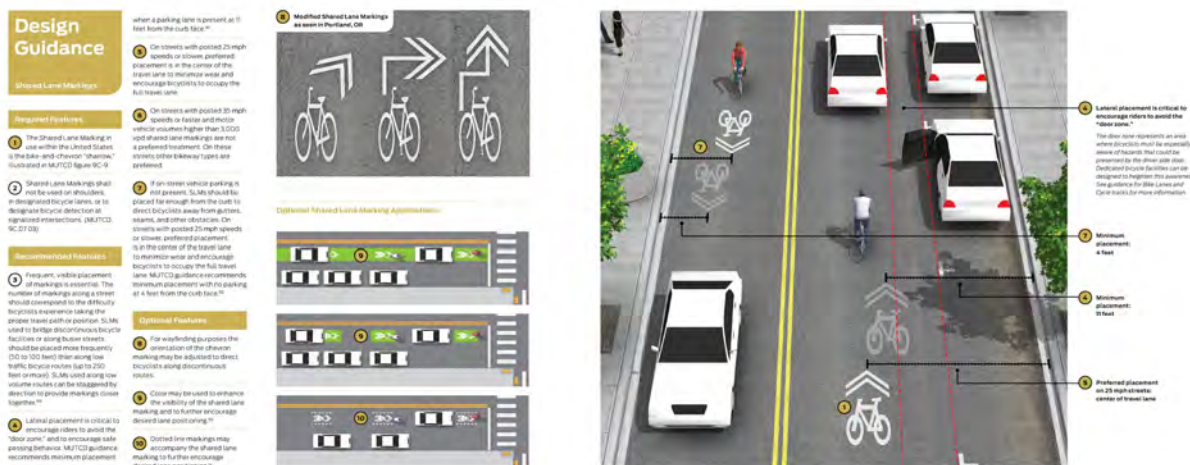
Intersection: Powell Street					
24	Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings)	✓	\$	🕒	Millville
25	Install midblock pedestrian crossing improvements (i.e. Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style raised crosswalk)	✓✓✓	\$\$	🕒	Millville
26	Install bumpouts and neckdowns	✓✓✓	\$\$\$	🕒	Millville
Segment: Broad Street-McNeal Street					
27	Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings)	✓	\$	🕒	Millville
28	Delineate pavement (i.e. add edgeline/parking lane striping)	✓	\$	🕒	Millville
29	Remove parking on east curbline	✓	\$	🕒	Millville
30	Install midblock pedestrian crossing improvements (i.e. Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style raised crosswalk)	✓✓✓	\$\$	🕒	Millville

Table 7: High Street PRSA Recommendations

Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Bicycle Sharrows



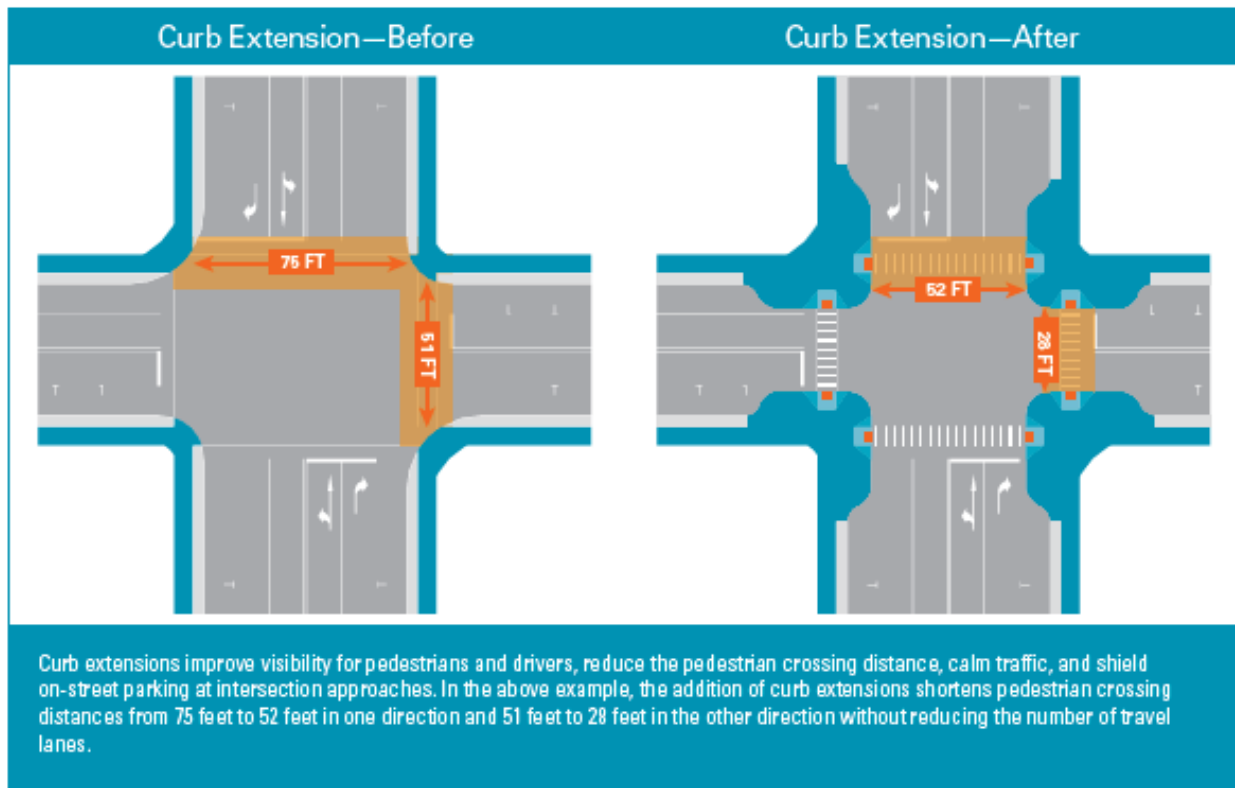
Source: (NACTO-US)

Raised Intersection



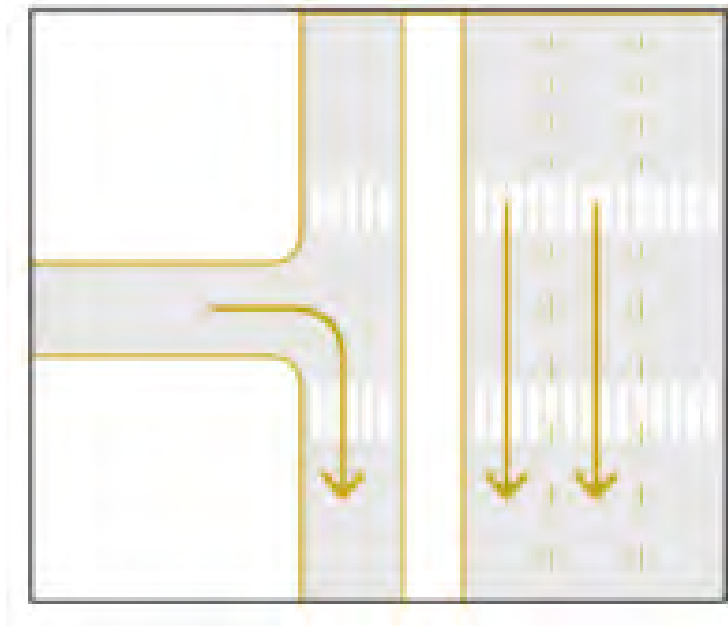
Source: (NACTO-US)

Daylighting Intersection/Traffic Calming/Pedestrian Safety (i.e. Curb extension/bumpout)



Source: (CSDG)

Frontage Road



Source: (NACTO-US)

Pedestrian Crossing Improvements (i.e. RRFB with raised high-visibility crosswalk)



Source: (FHWA PEDSAFE)

Road Owner Response

As the roadway owner, City of Millville is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Millville should use its experience in planning and engineering to determine which recommendations in **Table 7** can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Millville delivered their response following the finalization of the findings and recommendations, a copy of which can be found in **Appendix D**.

7. 3rd Street {Millville}

The 3rd Street Pedestrian/Bicycle Road Safety Audit was conducted on Friday, January 6, 2020 at the Millville Municipal Building in Millville, Cumberland County, New Jersey. Sixteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of CR 555 (3rd Street/Wheaton Avenue). At a point approximately 100 feet south of D Street (MP 10.58) the study area changes from 3rd Street to Wheaton Avenue. For the sake of clarity the study corridor will be referred to as 3rd Street. Located in the urban area of Millville, New Jersey. Audit limits are between NJ 49 (Main Street) and G Street (MP 10.05-10.83). This corridor runs north-south. The corridor is surrounded by low-density residential and some commercial development.

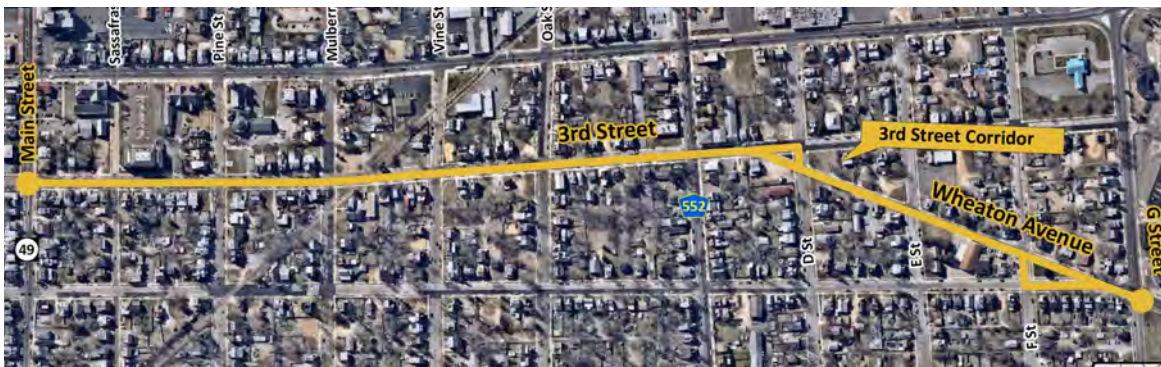


Figure 1: 3rd Street Study Area

Roadway Characteristics

3rd Street is classified as an urban local from NJ 49 (Main Street) to Broad Street (MP 10.05-10.50) and an urban minor arterial from Broad Street to G Street (MP 10.50-10.83). Both functional classification segments have a posted speed limit of 25 mph (MP 10.05-10.83). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking from NJ 49 (Main Street) to the beginning of Wheaton Avenue.

Pavement widths change dramatically as the study corridor transitions between Wheaton Avenue and 3rd Street. 3rd Street has a pavement width of approximately 40' feet while Wheaton Avenue is approximately 22' feet. Due to the narrowness of Wheaton Avenue vehicles ride, when possible, along the centerline of the corridor. The study area roadways' horizontal alignments are straight with 3 signalized intersections and 10 unsignalized. The roadway also includes a freight railroad crossing (MP 10.27).

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of 3rd Street between NJ 49 (Main Street) to G Street (MP 10.05-10.83). Sidewalks from NJ 49 (Main Street) to Broad Street (MP 10.05-10.50) are typically 6' wide and in excellent condition. Sidewalks from Broad Street to G Street (MP 10.50-10.83) are typically 4'-6' wide and in very good condition with exception to sever obstacles located in the sidewalk along the west curbline (i.e. utility poles, signs).

Basic parallel style crosswalks are provided at every signalized intersection within the study area. Crosswalk conditions vary from newly stripped to very-poor and in-need of restriping. There are no bicycle lanes or other bicycle infrastructure

identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose 3rd Street as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2018 ADT along CR 555 (3rd Street/Wheaton Avenue) is approximately 3,500 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will be used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Transit

NJ Transit bus service does not run along 3rd Street but does service the study area with bisecting routes #408 and #553 providing service with stops at the intersection of Broad Street. Service is also provided by route #408 at the intersection of G Street.

Cumberland County Area Transit System (CATS) runs fixed route service within the study area with a Millville Area Connector shuttle stop at 3rd Street & Sassafra Street.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Millville study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in *Figure 2*.

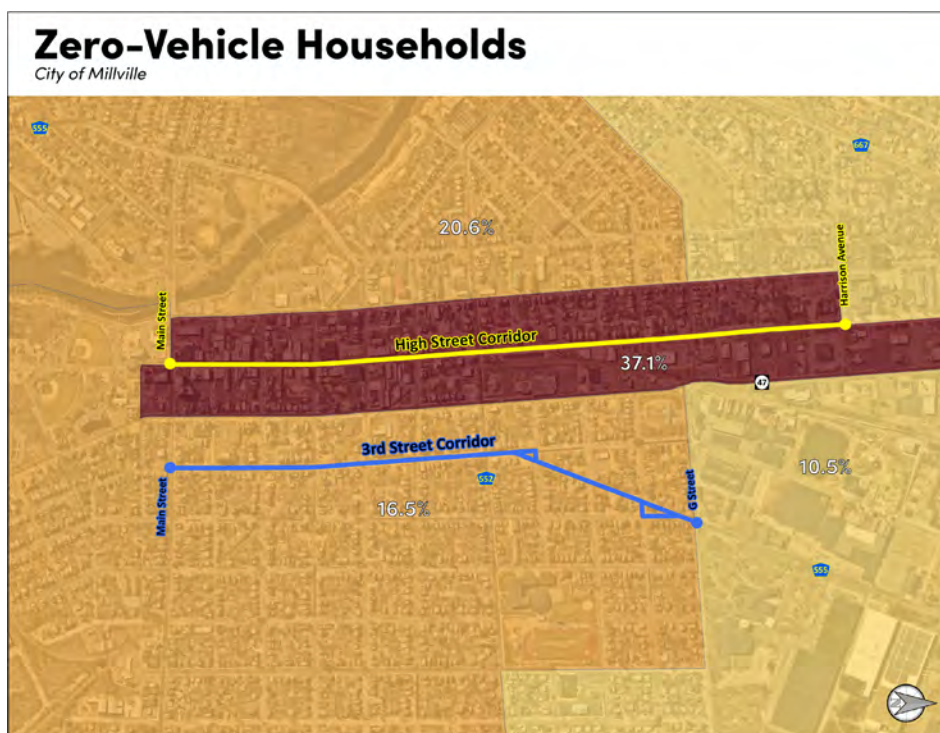


Figure 2: Percentage of Zero-Vehicle Households in Millville, NJ

Characteristics	3rd Street (0.25 mile buffer)	Cumberland County
Population	3,714	154,952
<i>Black or African American</i>	28%	19%
<i>Hispanic/Latino*</i>	29%	30%
<i>White</i>	65%	66%
<i>Asian</i>	<1%	1%
<i>American Indian/Alaskan</i>	1%	1%
<i>Two or More Races Alone</i>	3%	5%
<i>Other</i>	3%	8%
Population by Age		
<i>Age 0-4</i>	6%	7%
<i>Age 0-17</i>	29%	24%
<i>Age 18+</i>	71%	76%
<i>Age 65+</i>	11%	14%
Households	1,411	50,596
<i>Linguistically Isolated Households**</i>	4%	8%
<i>Speak Spanish***</i>	100%	91%
Income		
<i><\$15,000</i>	27%	14%
<i>\$15,000 - \$25,000</i>	16%	12%
<i>\$25,000 - \$50,000</i>	28%	24%
<i>\$50,000 - \$75,000</i>	17%	17%
<i>\$75,000+</i>	12%	33%



Table 1: Community Profile of 3rd Street Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English “very well”,

***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 4> are provided in **Appendix C**.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious.

Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	26	6	1
2013	34	11	0
2014	29	9	0
2015	34	7	0
2016	31	8	0
Total	154	41	1

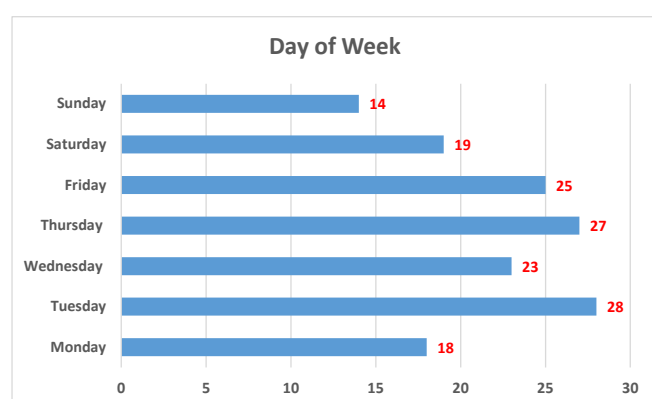
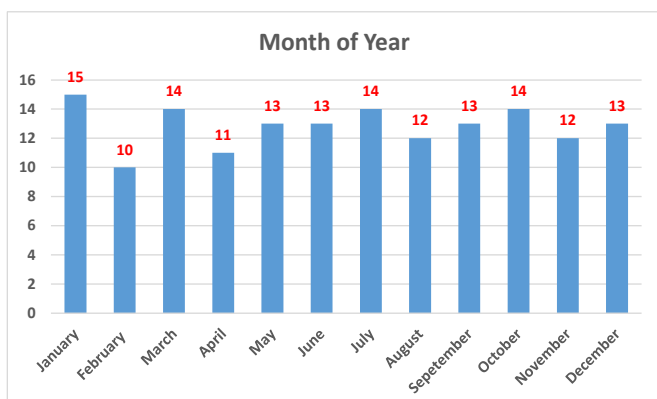
Table 2: Total Crashes by Year – 3rd Street Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	143	77.7%
	Wet	37	20.1%
Illumination	Daylight	93	50.5%
	Dusk	6	3.3%
	Dark (Lit)	72	39.1%
	Dark (Unlit)	7	3.8%

Table 3: Environmental Conditions – 3rd Street Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	18	11.5%
Fixed Object	12	7.7%
Animal	0	0.0%
Encroachment	1	0.6%
Backing	6	3.8%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	3	1.9%
Opposite Direction (Head-on)	2	1.3%
Left-Turn/U-Turn	9	5.8%
Right Angle	76	48.7%
Same Direction (Sideswipe)	10	6.4%
Same Direction (Rear End)	15	9.6%
Pedalcyclist	0	0.0%
Pedestrian	4	2.6%

Table 4: Collision Type – 3rd Street Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012–2016 analysis period there were a total of 4 pedestrian and 0 bicyclist crashes, representing 2.6% of all crashes within the study area. Of the total number of crashes during this period, pedestrian crashes disproportionately resulted in serious injury and fatality (KA), representing 100% of all KA crashes.

Crash Type	Total Crashes	Percentage
<i>Collision with Pedestrian</i>	4	100.0%
<i>Collision with Cyclist</i>	0	0.0%
Crash Severity		
<i>Fatality</i>	0	0.0%
<i>Incapacitating Injury</i>	1	25.0%
<i>Moderate Injury</i>	2	50.0%
<i>Pain</i>	0	0.0%
<i>Property Damage Only</i>	1	25.0%

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
<i>Crashes often occur at or near intersections</i>
<i>Speeding</i>
<i>Inadequate lighting</i>
<i>Crashes in crosswalks are often due to Left-Hand turn movements</i>

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the 3rd Street PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✓	Limited safety benefit potential	May reduce total crashes by 1%-25%
✓✓	Limited to moderate safety benefit potential	May reduce total crashes by 26%-49%
✓✓✓	Moderate safety benefit potential	May reduce total crashes by 50%-74%
✓✓✓✓	High safety benefit potential	May reduce total crashes by +75%
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition and new funding
🕒	Short term	Could be accomplished within 1 year
🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
🕒	Long term	Could be accomplished in 3 years or more; may require full engineering

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)	✓	\$	🕒	Millville/County
2	Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)	✓	\$	🕒	Millville
3	Inspect, repave and restripe the roadway as needed	✓	\$\$	🕒	Millville/County/ NJDOT
4	Remove obstacles in sidewalk in compliance with ADA requirements (i.e. utility poles, signs)	✓	\$\$	🕒	Millville/County
5	Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed	✓	\$\$	🕒	Millville/NJDOT/ County
6	Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment	✓✓	\$	🕒	Millville/County/ NJDOT
7	Consider installing sharrows or bicycle lanes, when possible, to improve multimodal accommodations	✓✓	\$	🕒	Millville/County

8	Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results	✓✓✓	\$\$\$	●	Millville
9	Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location	✓✓✓	\$	●	Millville
10	Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)	✓✓✓	\$\$\$	●	Millville/NJDOT
Site-Specific					
3rd Street					
11	Consider installing buffered bike lanes per NJ Complete Street Design Guide	✓✓✓	\$	●	Millville/County
12	Consider installing parking protected bike lanes per NACTO Urban Bikeway Design Guide	✓✓✓	\$	●	Millville/County
Segment: Main Street-Broad Street					
13	Install curb extensions/bumpouts at every intersection	✓✓✓	\$\$\$	●	Millville/NJDOT/County
Intersection: Main Street					
14	Extend queue lane	✓✓	\$\$	●	NJDOT
15	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	●	NJDOT
Intersection: Broad Street					
16	Install leading pedestrian interval (LPI) or all pedestrian phase	✓✓✓	\$	●	County
Intersection: Oak Street					
17	Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings, advance warning signal)	✓	\$	●	Millville/County
18	Install high-visibility marked crosswalks	✓✓	\$	●	Millville/County
Segment: D Street Triangle					
19	Coordinate improvements between D Street & F Street Triangles	✓	\$	●	Millville/County
20	Evaluate reconfiguration of street network to remove number of conflicts	✓✓✓	\$	●	Millville/County
21	Consider replacement of unsignalized y-intersection with a modern roundabout	✓✓✓✓	\$\$\$	●	Millville/County
Segment: F Street Triangle					

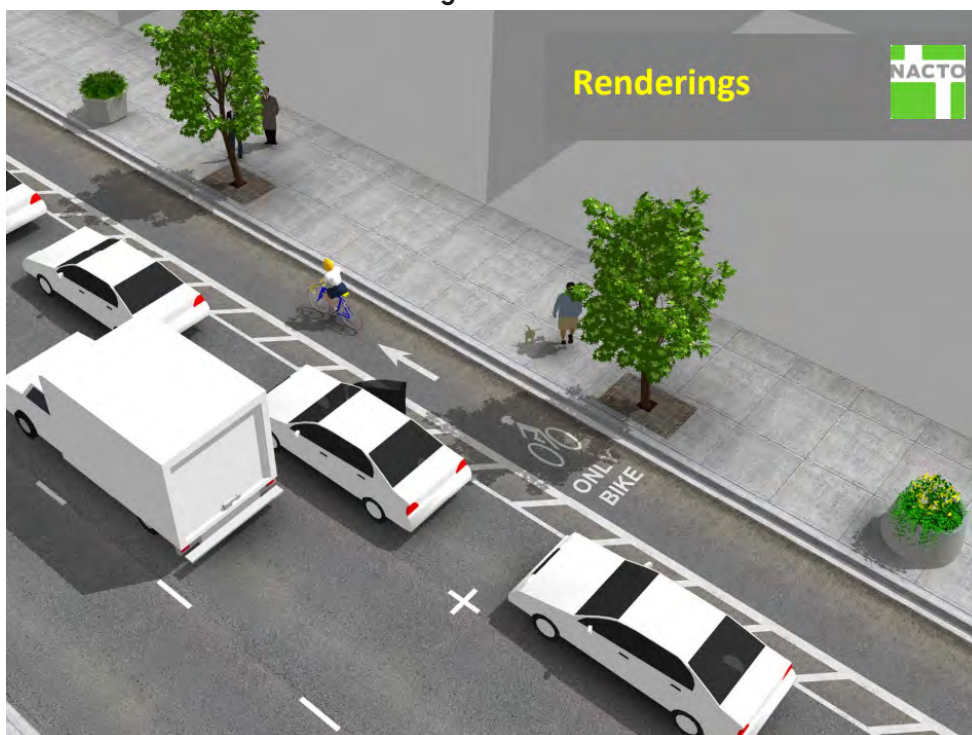
22	Coordinate improvements between D Street & F Street Triangles	✓	\$	①	Millville/County
23	Evaluate reconfiguration of street network to remove number of conflicts	✓✓✓	\$	①	Millville/County
Intersection: G Street					
24	Install right-turn lane onto G Street from Wheaton Avenue southern approach	✓	\$\$	①	Millville/County
25	Install right-turn signal phasing	✓	\$	①	Millville/County
26	Remove sight line obstacles (i.e. trees, utility poles etc.)	✓✓	\$\$	①	Millville/County
Wheaton Avenue					
27	Install stop bars on east-west approaches	✓	\$	①	Millville
28	Move stop signs closer to intersection at east-west approaches	✓✓	\$	①	Millville
29	Closure of roadway segment to through traffic. Divert traffic from G Street to 3rd Street	✓✓✓	\$\$\$	①	Millville/County/ NJDOT

Table 7: 3rd Street PRSA Recommendations

Recommendation Visualizations

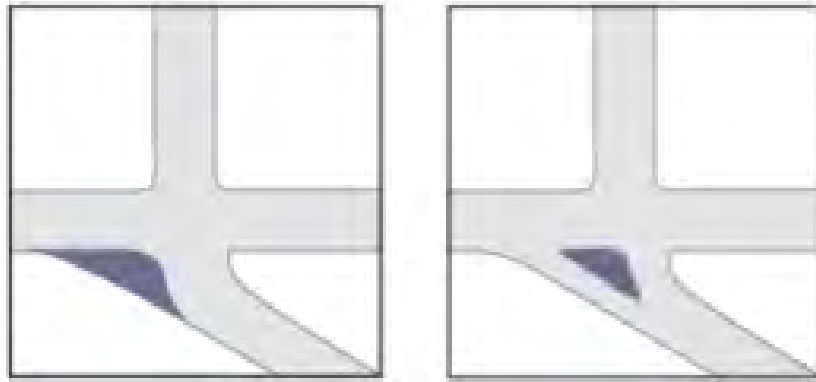
Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the 2017 *NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Parking Protected Bike Lanes



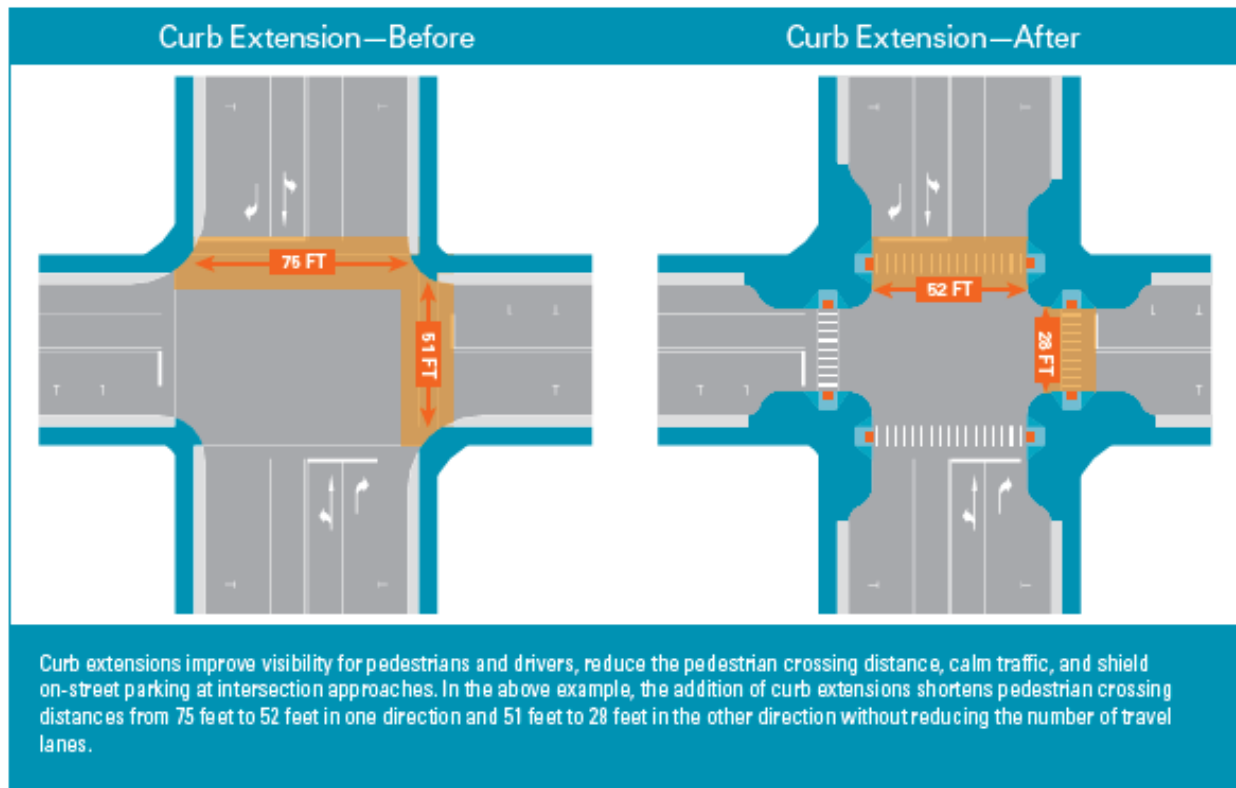
Source: (NACTO-US)

Triangle Reconfigurations



Source: (NACTO-US)

Daylighting Intersection/Traffic Calming/Pedestrian Safety (i.e. Curb extension/bumpout)



Source: (CSDG)

Road Owner Response

As the roadway owners, City of Millville and County of Cumberland are encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Millville and County of Cumberland should use its experience in planning and engineering to determine which recommendations in **Table 7** can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County, City of Millville).

City of Millville and County of Cumberland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in **Appendix D**.

Appendix A



Audit Team Members

Name	Agency
City of Vineland	
Chestnut Avenue Corridor - Pedestrian Road Safety Audit - December 5, 2019	
Alan Huff	SJTPO
Stephanie Wakeley	SJTPO
Joe Rapp	NJDOT
Leroy Gould	NJDOT
Jelena Lasko	NJDOT
Robert Brewer	Cumberland County Planning Department
Cassandra Rodriguez	Cumberland County Planning Department
David Maillet	Vineland Engineering Department
Rick Caudill	Vineland Engineering Department
Ryan Headley	Vineland Planning Department
Amy Holmes	Vineland Health Department
Nicholas English	Vineland Health Department
Douglas Whitaker	Cumberland County Engineering Department
Patrick Farley	Cross County Connection TMA
Scott Diehl	Urban Engineers
Bill McGarrigel	Urban Engineers
Daniel Hutton	Urban Engineers
Jay Etzel	Urban Engineers
East Avenue Corridor - Pedestrian Road Safety Audit - December 20, 2019	
Alan Huff	SJTPO
Stephanie Wakeley	SJTPO
Douglas Whitaker	Cumberland County Engineering Department
David Maillet	Vineland Engineering Department
Ryan Headley	Vineland Planning Department
Daniel Hutton	Urban Engineers
City of Bridgeton	
Irving Avenue Corridor & Atlantic Street Corridor - Pedestrian Road Safety Audits - December 11, 2019	
Alan Huff	SJTPO
Stephanie Wakeley	SJTPO
Leroy Gould	NJDOT
Jelena Lasko	NJDOT
William Riviere	NJDOT
Robert Brewer	Cumberland County Planning Department
Cassandra Rodriguez	Cumberland County Planning Department
Jessica Atkinson	Cumberland County Health Department
Douglas Whitaker	Cumberland County Engineering Department
Anthony Bertolini	Bridgeton Police Department
Todd Bowen	Bridgeton Fire Department
Eric Derer	Cross County Connection TMA
Daniel Hutton	Urban Engineers
Scott Diehl	Urban Engineers
Jay Etzel	Urban Engineers

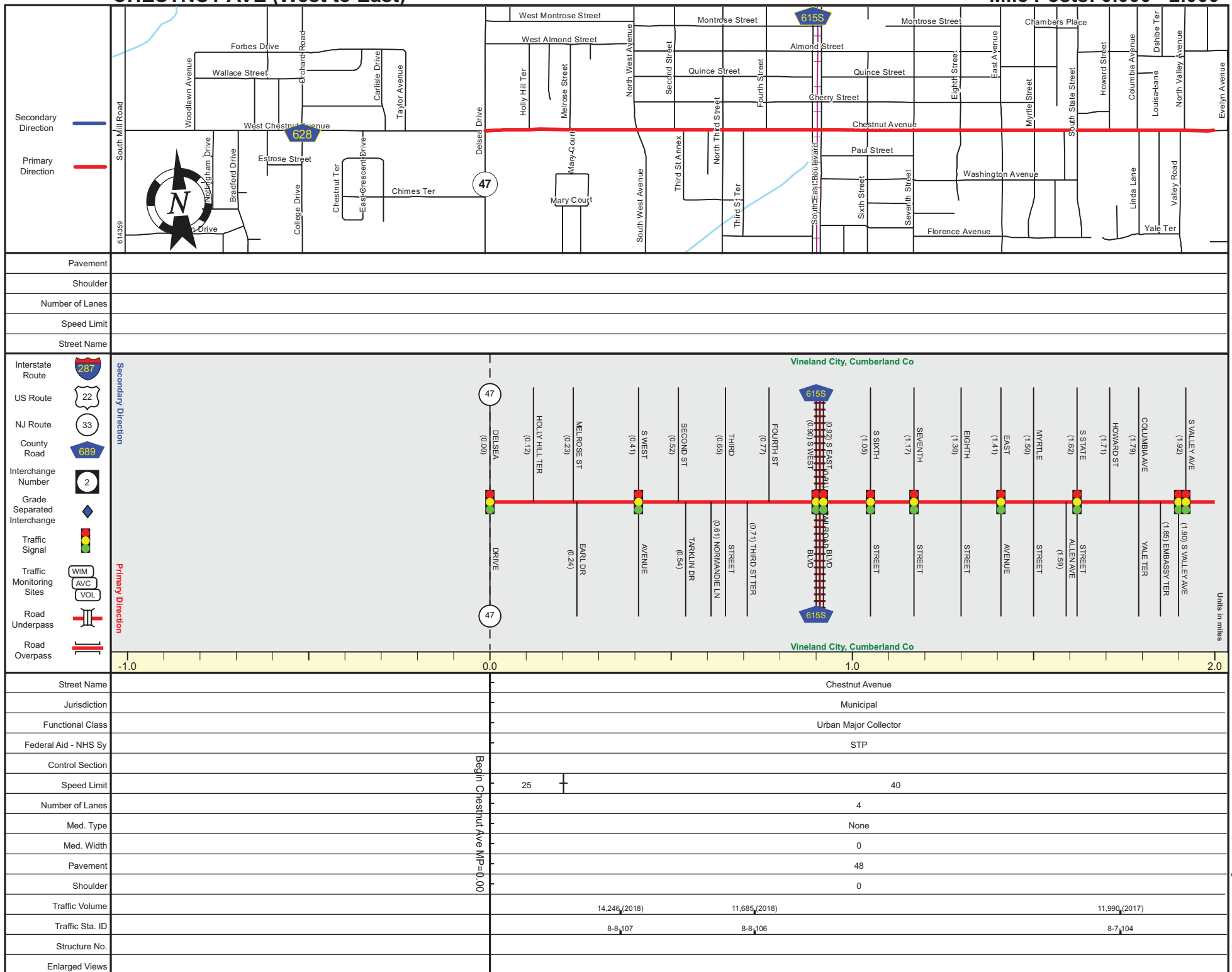
City of Millville	
High Street Corridor & 3rd Street Corridor - Pedestrian Road Safety Audits - January 6, 2020	
Alan Huff	SJTPO
Stephanie Wakeley	SJTPO
Joe Rapp	NJDOT
Leroy Gould	NJDOT
William Riviere	NJDOT
Robert Brewer	Cumberland County Planning Department
Cassandra Rodriguez	Cumberland County Planning Department
Jessica Atkinson	Cumberland County Health Department
Brian Prohowich	Millville Engineering Department
Michelle Baker	Millville Engineering Department
Samantha Silvers	Millville Planning Department
William Stonick III	Millville Police Department
Douglas Whitaker	Cumberland County Engineering Department
Jason Simmons	Cross County Connection TMA
Daniel Hutton	Urban Engineers
Scott Diehl	Urban Engineers

Appendix B

Traffic Counts

CHESTNUT AVE (West to East)

Mile Posts: 0.000 - 2.000



SRI = 06141029__

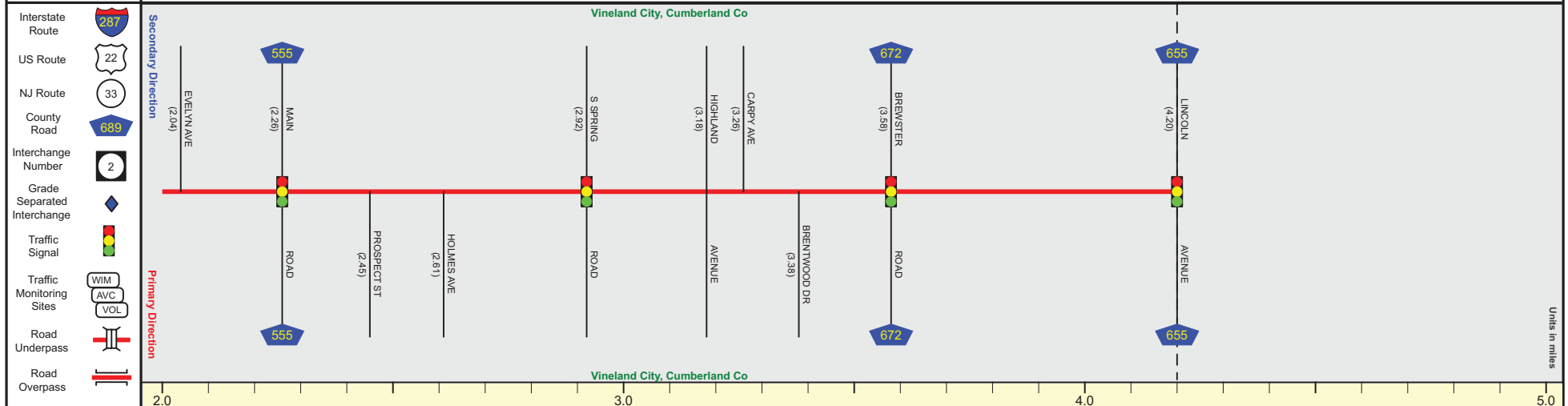
Date last inventoried: October 2015

CHESTNUT AVE (West to East)

Mile Posts: 2.000 - 4.200



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



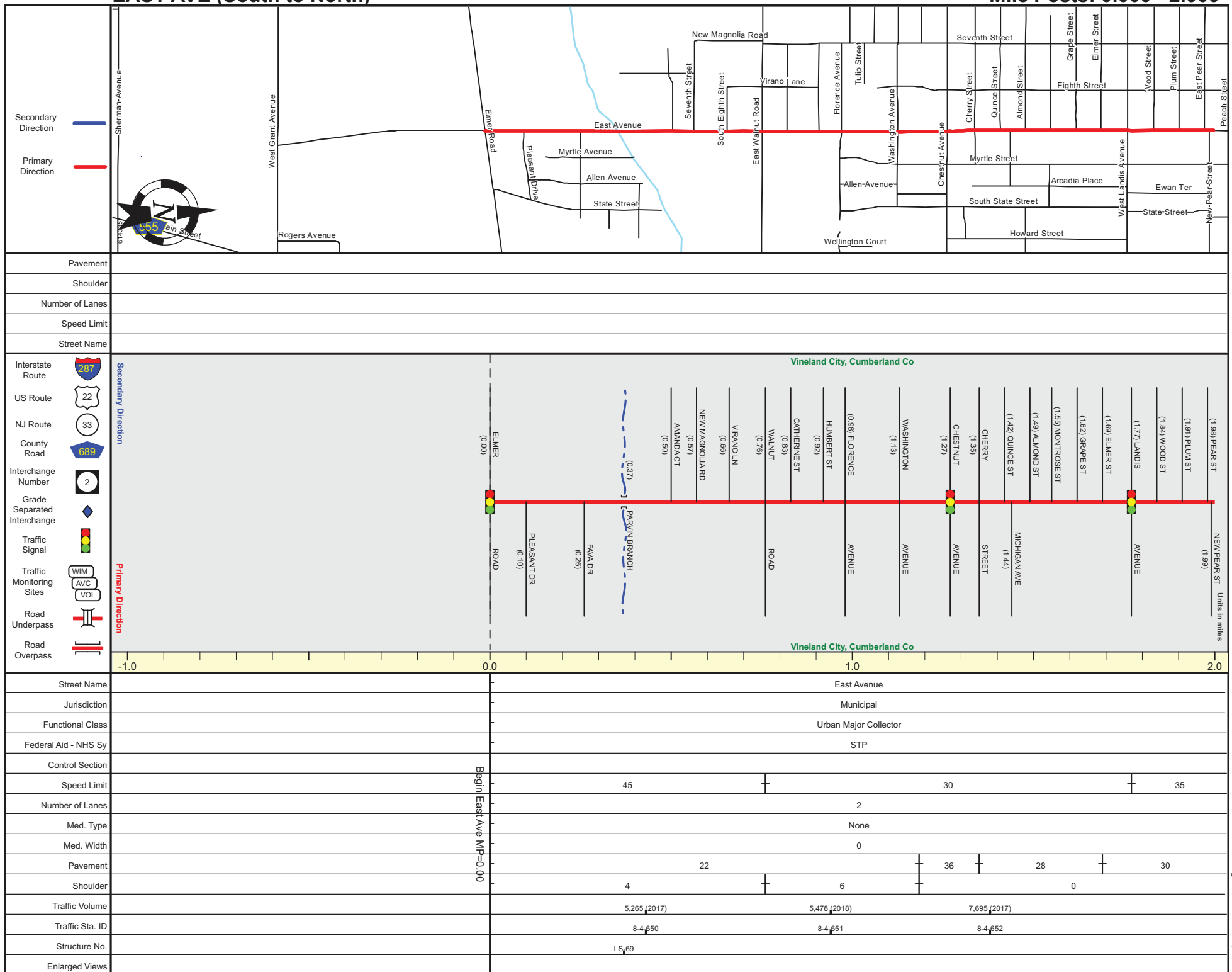
Street Name	Chestnut Avenue										End Chestnut Ave MP=4.20	
Jurisdiction	Municipal											
Functional Class	Urban Major Collector											
Federal Aid - NHS Sy	STP											
Control Section												
Speed Limit	40		50									
Number of Lanes	4		2									
Med. Type	None											
Med. Width	0											
Pavement	48		24		36		24		36			24
Shoulder	0		8		1		8		0		8	
Traffic Volume	16,240 (2018)		11,433 (2017)				4,668 (2018)					
Traffic Sta. ID	8-8_103		8-8_102				8-8_100					
Structure No.												
Enlarged Views												

SRI = 06141029__

Date last inventoried: October 2015

EAST AVE (South to North)

Mile Posts: 0.000 - 2.000

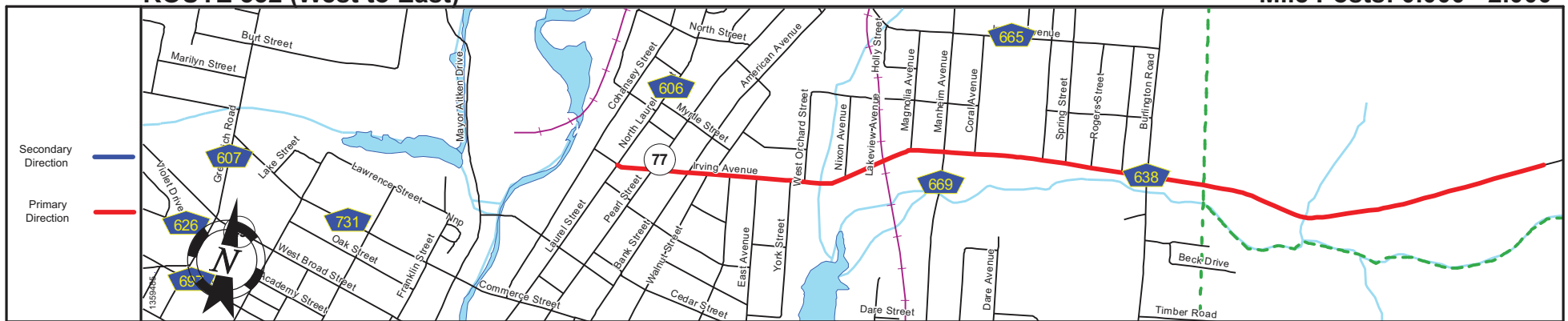


SRI = 06141025__

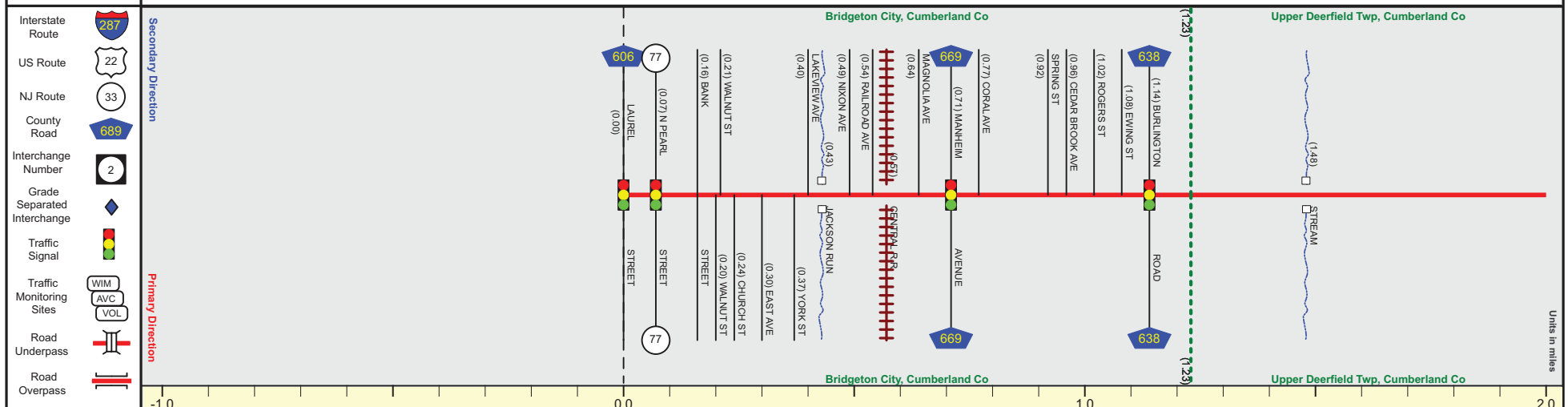
Date last inventoried: October 2015

ROUTE 552 (West to East)

Mile Posts: 0.000 - 2.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



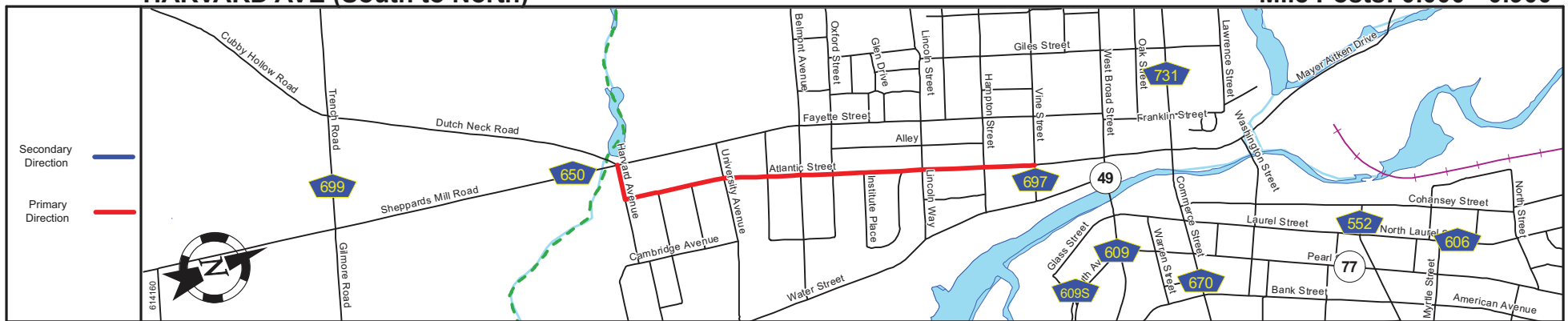
Street Name	Irving Avenue
Jurisdiction	County
Functional Class	Urban Minor Arterial
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	25
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	36
Shoulder	0
Traffic Volume	6,652 (2017)
Traffic Sta. ID	7-7-P65
Structure No.	
Enlarged Views	

SRI = 0000552__

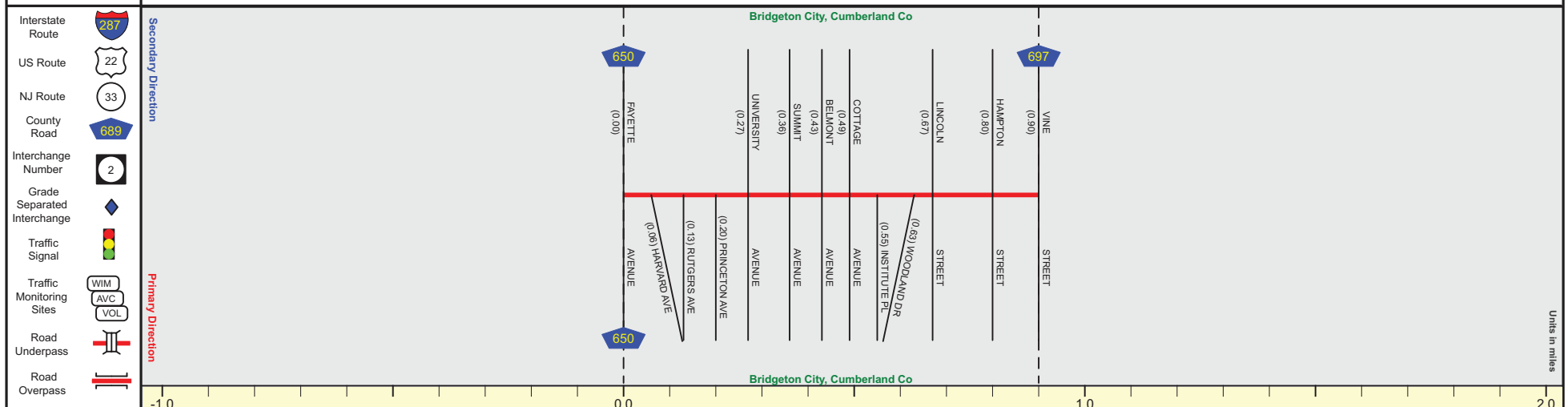
Date last inventoried: June 2012

HARVARD AVE (South to North)

Mile Posts: 0.000 - 0.900



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



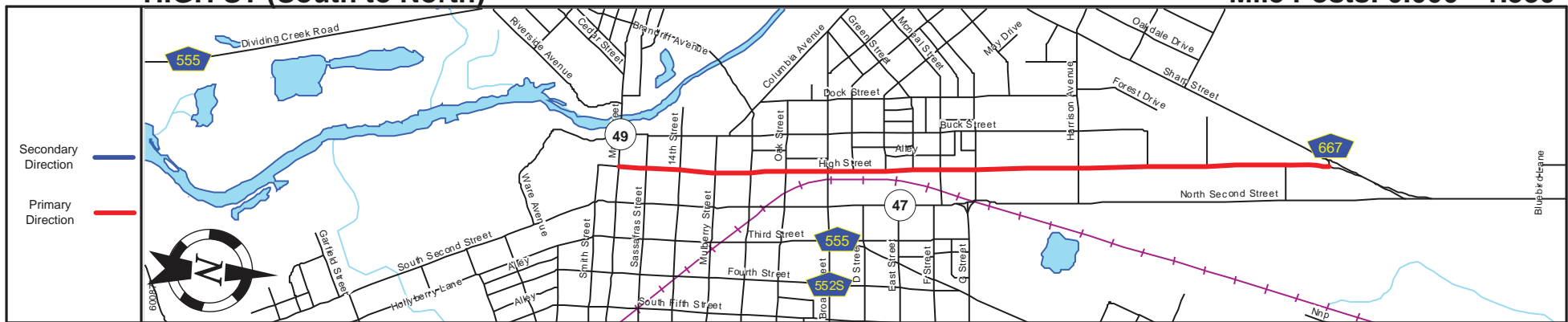
Street Name	Harvard Avenue	Atlantic Street	
Jurisdiction		Municipal	
Functional Class		Urban Major Collector	
Federal Aid - NHS Sy		STP	
Control Section	Begin Harvard Ave MP=0.00		End Harvard Ave MP=0.90
Speed Limit		25	
Number of Lanes		2	
Med. Type		None	
Med. Width		0	
Pavement		34	
Shoulder		0	
Traffic Volume		1,829 (2017)	
Traffic Sta. ID		7-8,041	
Structure No.			
Enlarged Views			

SRI = 06011182__

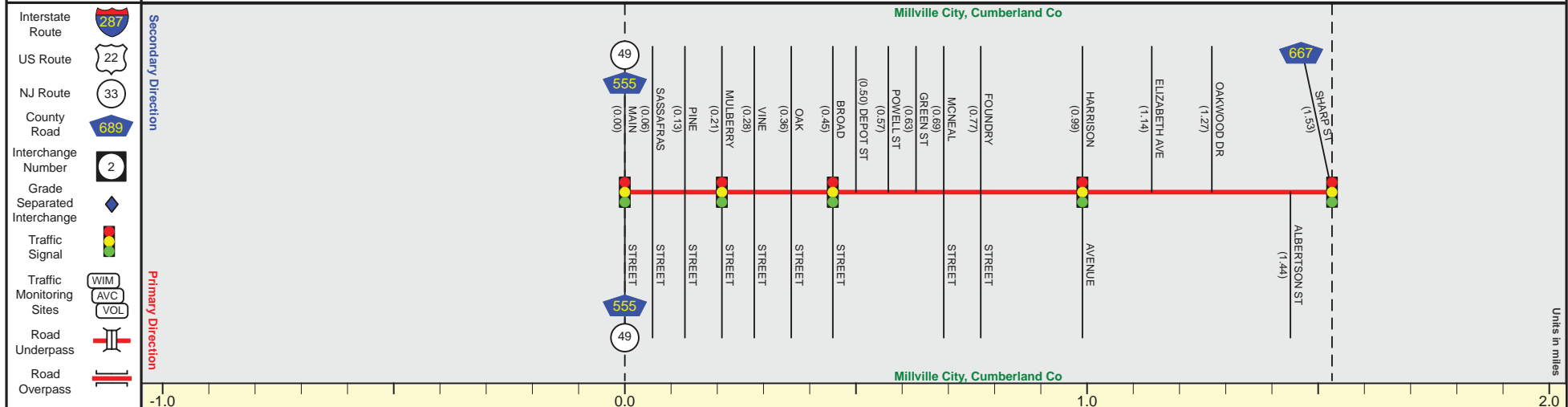
Date last inventoried: September 2015

HIGH ST (South to North)

Mile Posts: 0.000 - 1.530



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



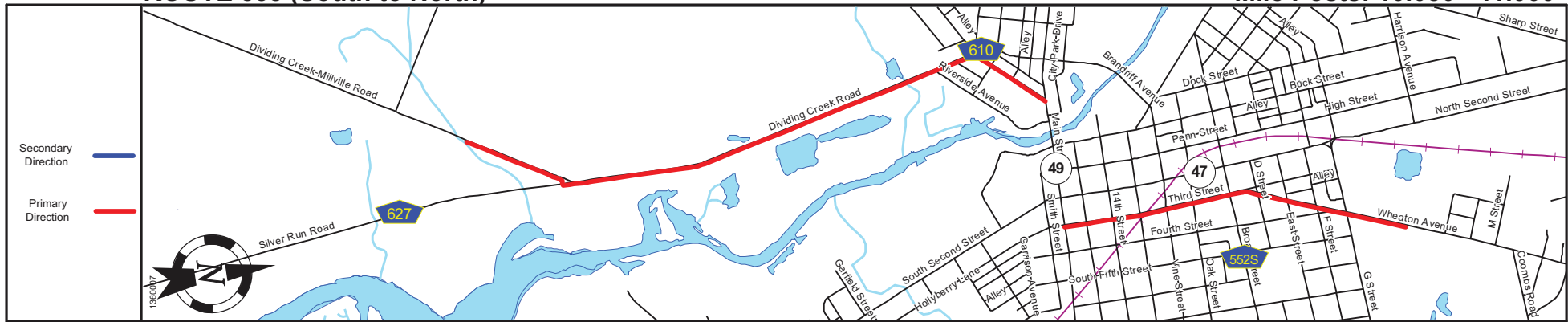
Street Name	High Street
Jurisdiction	Municipal
Functional Class	Urban Major Collector
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	25
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	40
Shoulder	0
Traffic Volume	5,193 (2010) 7,900 (2011) 11,554 (2012)
Traffic Sta. ID	8-5-075 8-8-578 120623
Structure No.	
Enlarged Views	

SRI = 06101010__

Date last inventoried: August 2011

ROUTE 555 (South to North)

Mile Posts: 10.050 - 11.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



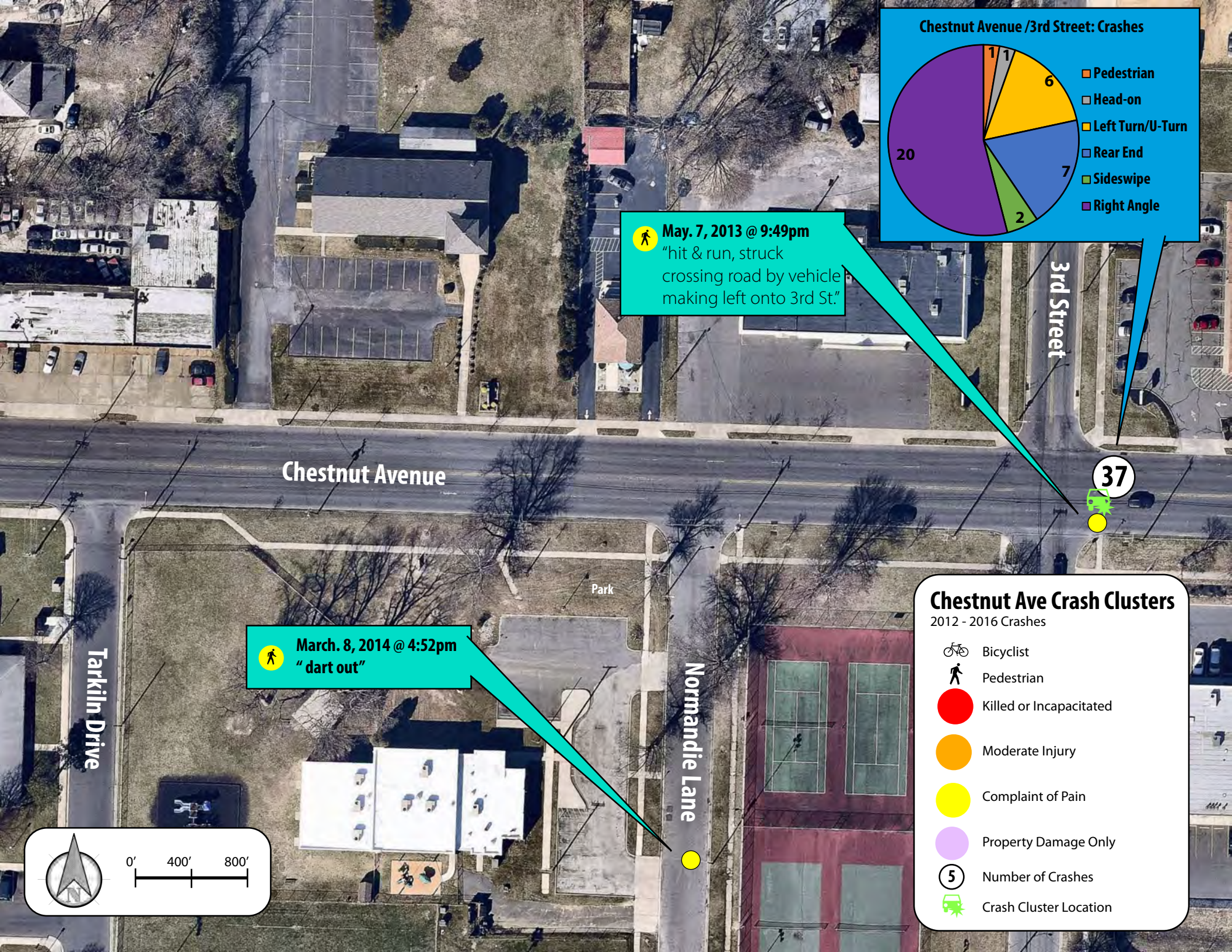
Street Name	Third Street	Wheaton Avenue
Jurisdiction	Municipal	County
Functional Class	Urban Local	Urban Minor Arterial
Federal Aid - NHS Sy	Non-Federal Aid	STP
Control Section		
Speed Limit	25	45
Number of Lanes	2	
Med. Type	None	
Med. Width	0	
Pavement	40	22
Shoulder	0	8
Traffic Volume	3,574 (2018)	12,236 (2017)
Traffic Sta. ID	8-8-034	8-4-412
Structure No.		
Enlarged Views		

SRI = 0000555__

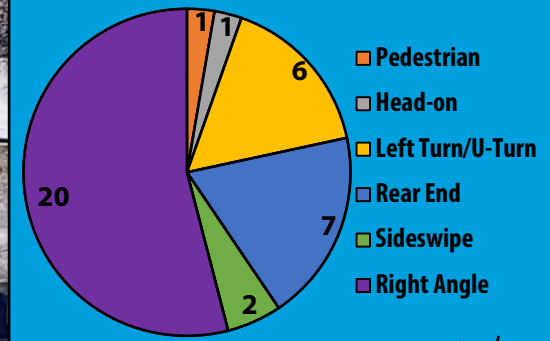
Date last inventoried: June 2012


Appendix C

Crash Maps



Chestnut Avenue /3rd Street: Crashes




 **May. 7, 2013 @ 9:49pm**
"hit & run, struck crossing road by vehicle making left onto 3rd St."

Chestnut Avenue

3rd Street

37

 **March. 8, 2014 @ 4:52pm**
"dart out"

Normandie Lane

Tarklin Drive

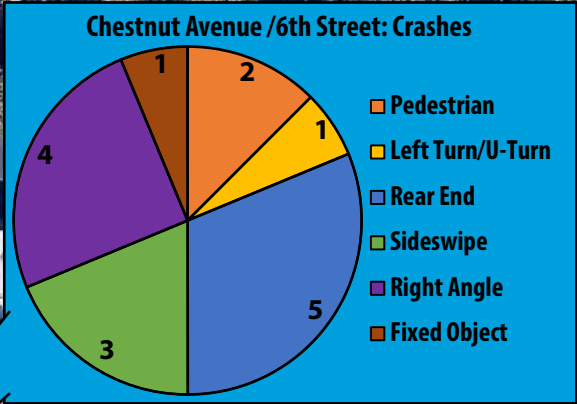
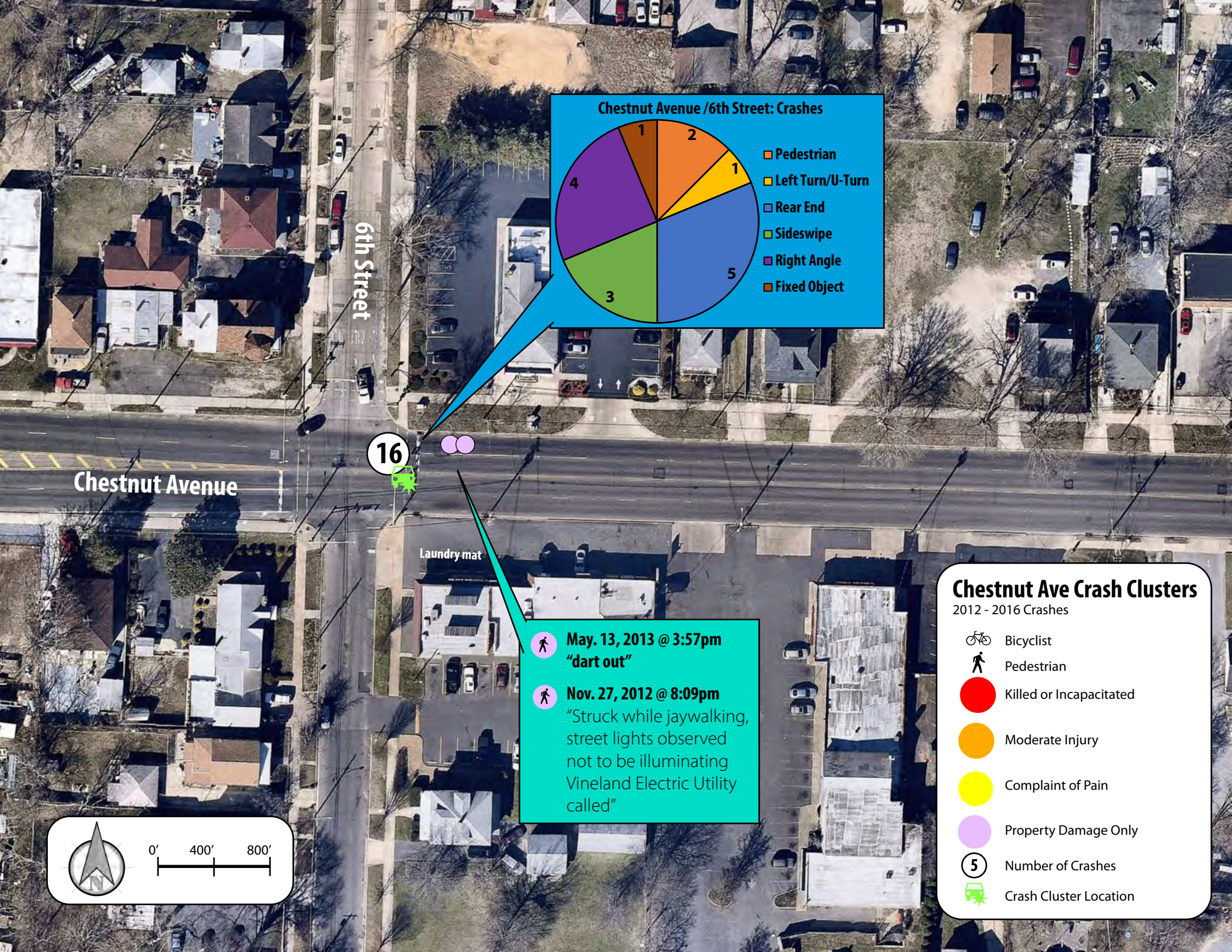
Chestnut Ave Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location




0' 400' 800'




16



Laundry mat

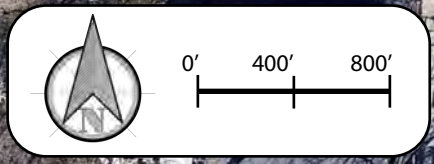
 **May. 13, 2013 @ 3:57pm**
"dart out"

 **Nov. 27, 2012 @ 8:09pm**
"Struck while jaywalking, street lights observed not to be illuminating Vineland Electric Utility called"

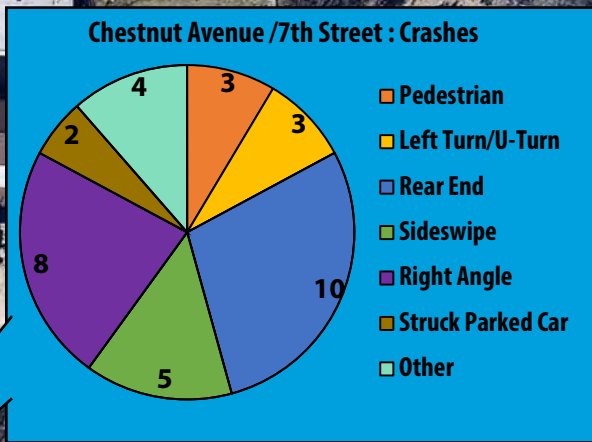
Chestnut Ave Crash Clusters


2012 - 2016 Crashes


-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location




Feb. 7, 2014 @ 2:13pm
"Motorcycle struck by vehicle making a left onto 7th Street on green light"



 **Aug. 23, 2013 @ 1:06pm**
"Struck outside crosswalk by vehicle making left onto Chestnut Ave"

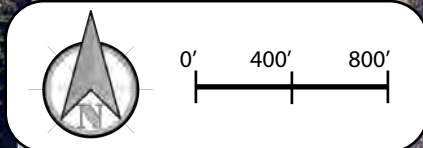
 **Jan. 18, 2012 @ 6:54pm**
"J-walking"

 **Dec. 3, 2016 @ 2:08pm**
"Struck crossing illegally by vehicle traveling west with green light"

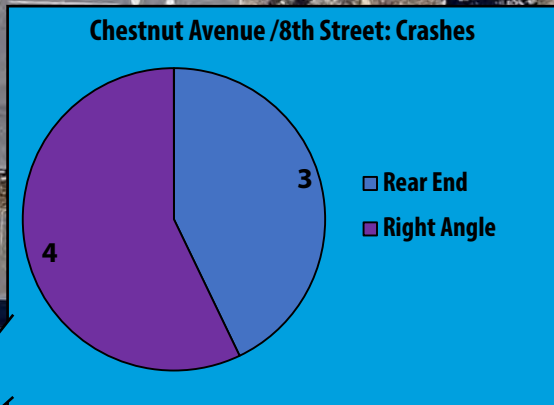
Chestnut Ave Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location



Feb. 15, 2012 @ 1:18pm
"Truck struck making a left onto 8th Street by vehicle racing down Chestnut Avenue"
2 Fatalities



Chestnut Avenue

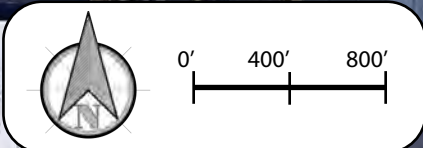
8th Street

7

Oct. 24, 2012 @ 9:50am
"hit & run", backing

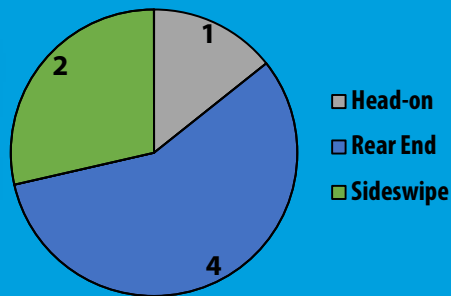
Chestnut Ave Crash Clusters
2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



Delsea Drive

Delsea Drive (North): Crashes

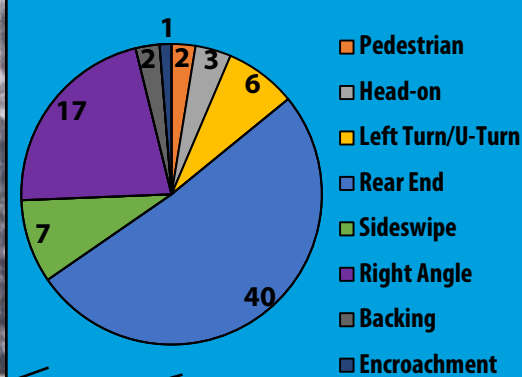


Jun. 14, 2015 @ Dusk
n/a



April. 15, 2013 @ 10:09pm
"dart out"

Chestnut Avenue /Delsea Drive: Crashes



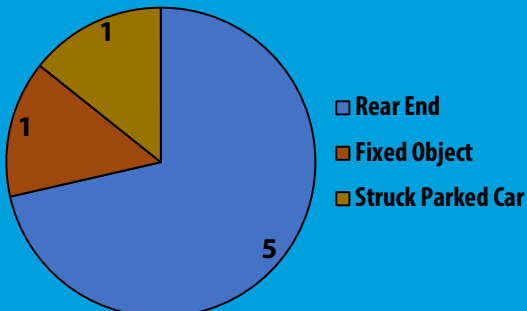
Mar. 03, 2012 @ 6:28pm



"Struck in parking lot
at night while walking
into church"

Chestnut Avenue

Delsea Drive (South): Crashes



Chestnut Ave Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



Property Damage Only



Number of Crashes



Crash Cluster Location



0' 400' 800'

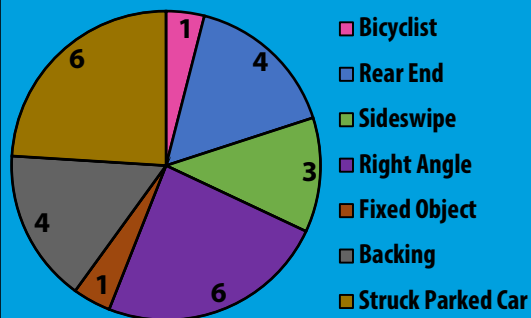
78

7

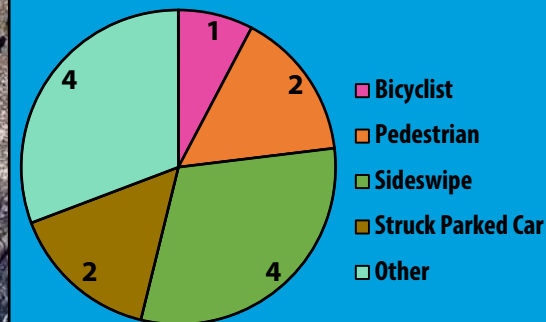
Holly Hill Terrace

Melrose Street

Chestnut Avenue /Holly Hill Terrace: Crashes



Chestnut Avenue /Earl Dr./Melrose St.: Crashes




Chestnut Avenue


25


13


2nd Street

Earl Drive

 **Sep. 10, 2014 @ 6:51pm**
"Struck while crossing"

 **Dec. 8, 2014 @ 5:09pm**
"j-walking to get home"

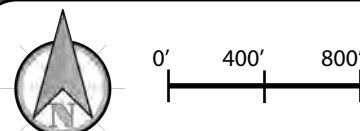
 **Oct. 10, 2013 @ 7:03am**
"Struck in crosswalk while walking to bus stop" by vehicle turning left onto Chestnut Ave"

 **Aug. 3, 2015 @ 9:30am**
"Struck in crosswalk going west on sidewalk"

Chestnut Ave Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location





April. 8, 2012 @ 7:58pm

"Struck illegally crossing Chestnut Avenue by vehicle traveling east"



Sep. 26, 2015 @ 1:52pm

"Struck illegally crossing Chestnut Avenue by vehicle traveling east"



May. 22, 2012 @ 4:43pm

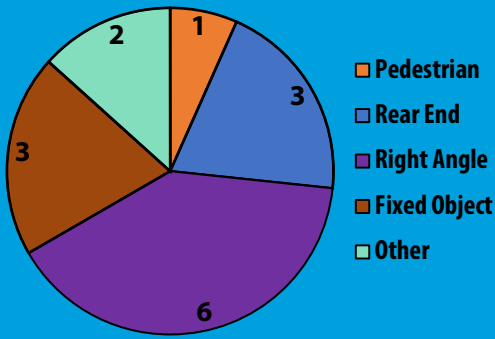
"Skateboarder struck while illegally crossing at crosswalk by truck traveling east"



Aug. 21, 2014 @ 11:46am

"hit & run, struck outside of crosswalk by vehicle traveling west"

Chestnut Avenue / Myrtle Street : Crashes



East Avenue

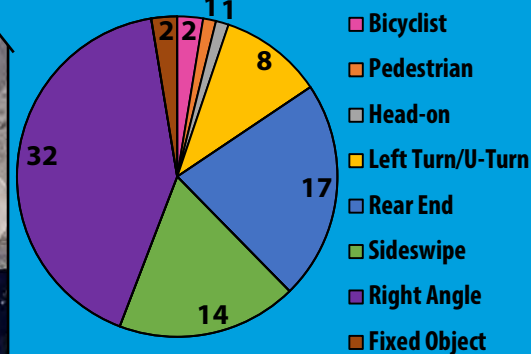
Myrtle Street

Chestnut Avenue

77

15

Chestnut Avenue / East Avenue : Crashes



Chestnut Ave Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



Property Damage Only



Number of Crashes



Crash Cluster Location

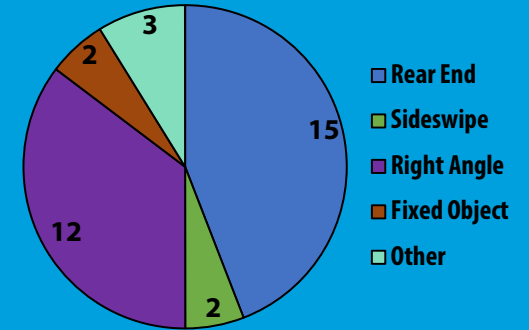


0' 400' 800'

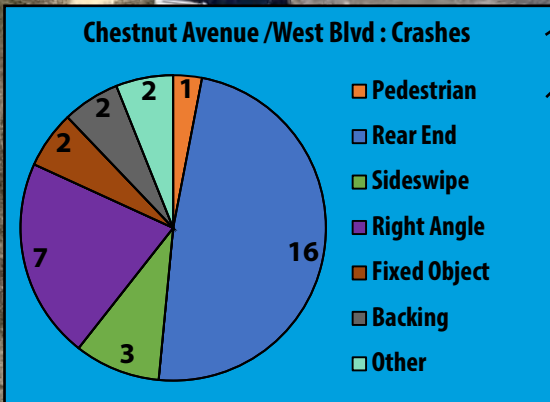


March. 9, 2013 @ 10:32pm
 "hit & run", backing

Chestnut Avenue /East Blvd : Crashes



Chestnut Avenue /West Blvd : Crashes



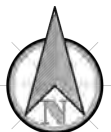
Chestnut Ave Crash Clusters

2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



Aug. 14, 2012 @ 9:48pm
 "Struck in crosswalk,
 driver statement: 'blinded
 by oncoming northbound
 train'"



0' 400' 800'

Train

Evelyn Avenue

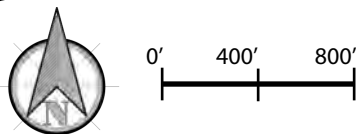
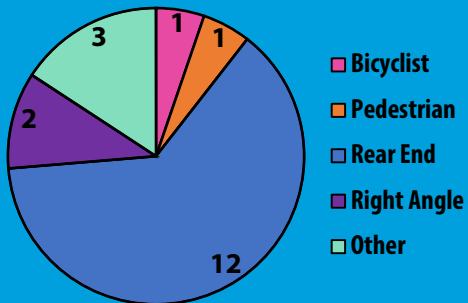
Dec. 25, 2013 @ 5:44pm
"J-walking, intoxicated"

Sep. 10, 2012 @ 8:30am
"Struck illegally crossing
Chestnut Avenue by
vehicle traveling east"

19

Chestnut Avenue

Chestnut Avenue / Evelyn Avenue : Crashes



Chestnut Ave Crash Clusters

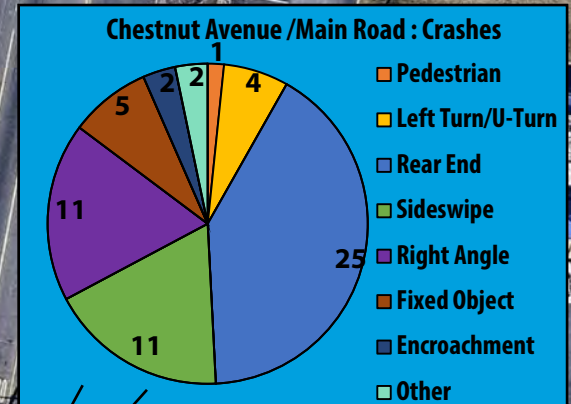
2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location

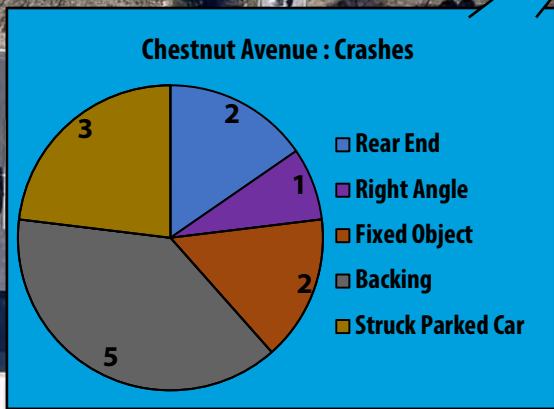
Veterans Memorial Middle School

Aug. 20, 2012 @ 2:55pm
 "Vehicle making left onto Main Road struck vehicle speeding through intersection with yellow light"

Feb. 15, 2012 @ 8:21am
 "Student darted out in front of oncoming traffic to cross over to CVS"



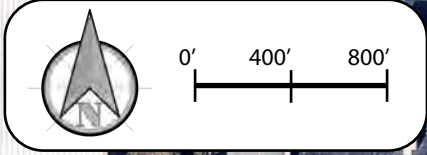
Chestnut Avenue



Chestnut Ave Crash Clusters

2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



13

61

Main Road

CVS

State Street

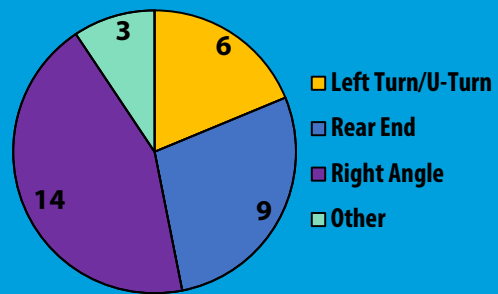
Howard Street

Chestnut Avenue

32

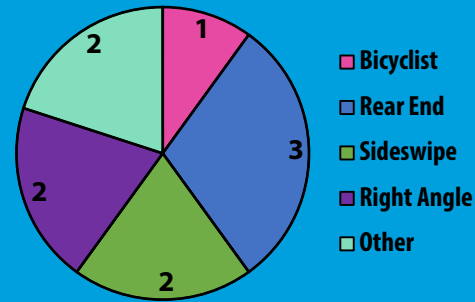
10

Chestnut Avenue / State Street: Crashes



March. 9, 2016 @ 7:04am
"hit & run", bicyclist was traveling east with traffic and was hit from behind"

Chestnut Avenue / Howard Street : Crashes



Chestnut Ave Crash Clusters

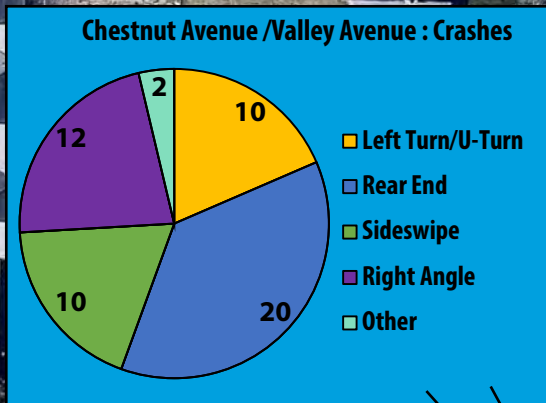
2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location

Nursing Home
→



0' 400' 800'



Chestnut Avenue

Valley Avenue

54



July. 1, 2012 @ 4:05pm

"Vehicle struck traveling west by vehicle traveling south, running a flashing red signal"

East/West Traffic using flashing yellow signal

Chestnut Ave Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



Property Damage Only



Number of Crashes



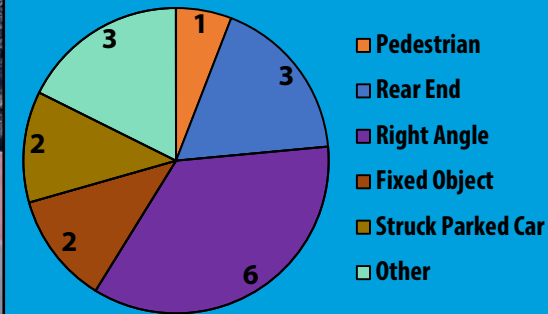
Crash Cluster Location



0' 400' 800'

Valley Avenue

Chestnut Avenue /2nd Street: Crashes



Nov. 25, 2014 @ 1:41pm



"Teen struck in crosswalk running across while light was yellow"
2 Crossing Guards Present

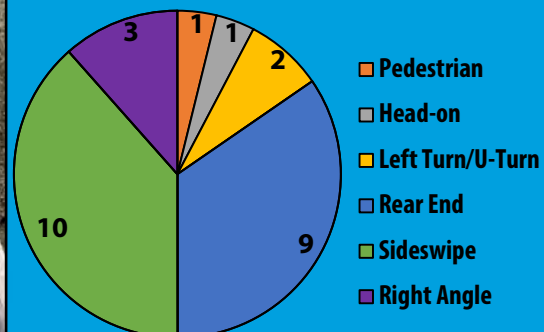


April. 15, 2013 @ 10:09pm

"Struck crossing to north side by vehicle on 2nd Street making left, east, on Chestnut"

Chestnut Avenue

Chestnut Avenue /West Avenue: Crashes



Chestnut Ave Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



Property Damage Only



Number of Crashes



Crash Cluster Location



0' 400' 800'

West Avenue

2nd Street

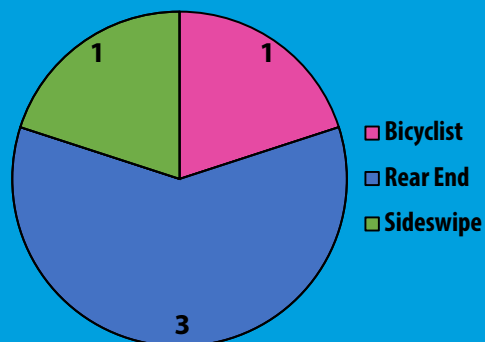
26

17

East Avenue

Cunningham Academy

East Avenue/Almond Street : Crashes



Bicyclist

Rear End

Sideswipe

Almond Street



May. 5, 2016 @ 2:41pm

"Lost control of bicycle on sidewalk while traveling south on East Ave and struck vehicle traveling north on East Ave"

5



East Avenue Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



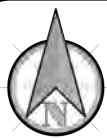
Property Damage Only



Number of Crashes



Crash Cluster Location



0' 400' 800'



East Avenue



March 3, 2012 @ 11:54pm
"hit & run, backing"



0' 400' 800'

East Avenue Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



Property Damage Only




Number of Crashes



Crash Cluster Location



 **Nov. 16, 2013 @ 3:13pm**
"Fell and struck towtruck repossessing vehicle"

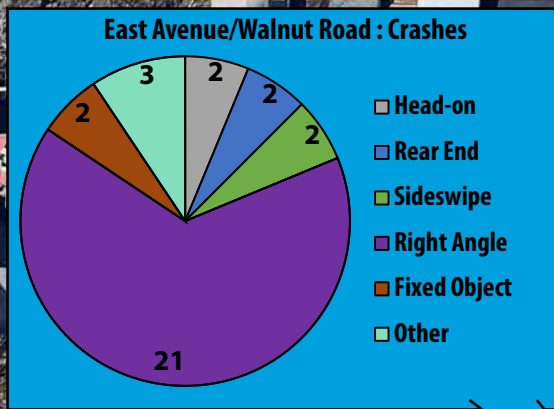
Humbert Street

East Avenue

East Avenue Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location



32

Walnut Road

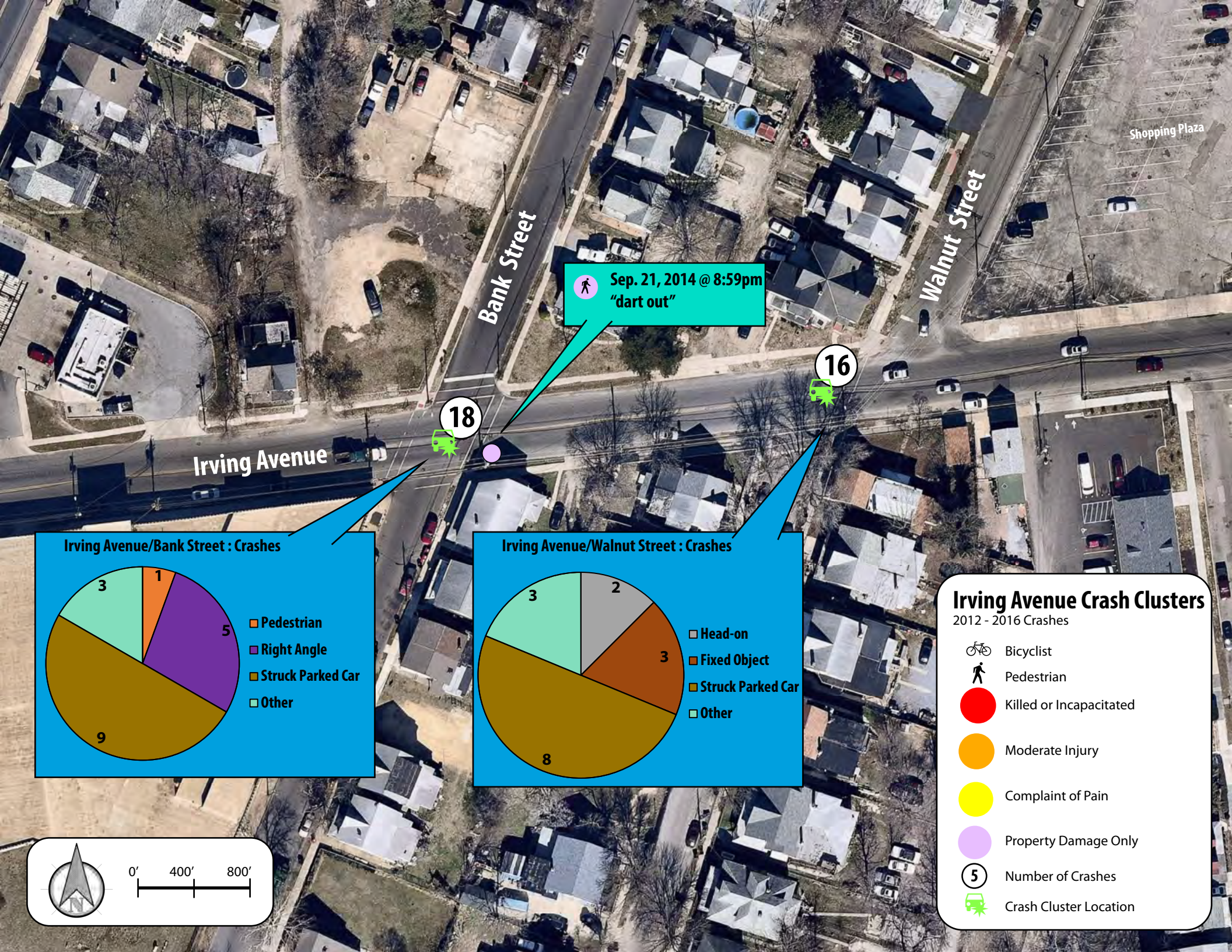
East Avenue Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location



0' 400' 800'



Shopping Plaza

Bank Street

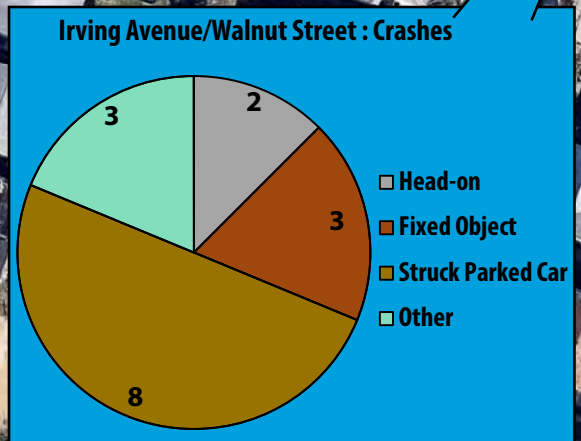
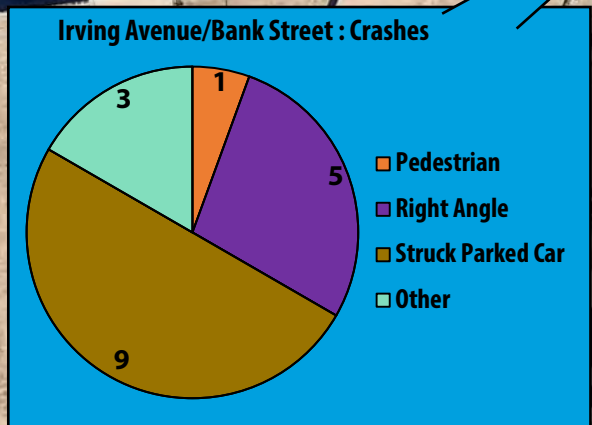
Walnut Street

Irving Avenue

Sep. 21, 2014 @ 8:59pm
"dart out"

18

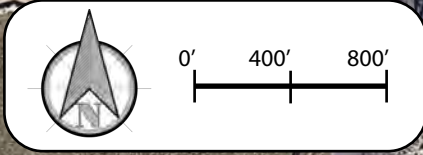
16




Irving Avenue Crash Clusters

2012 - 2016 Crashes

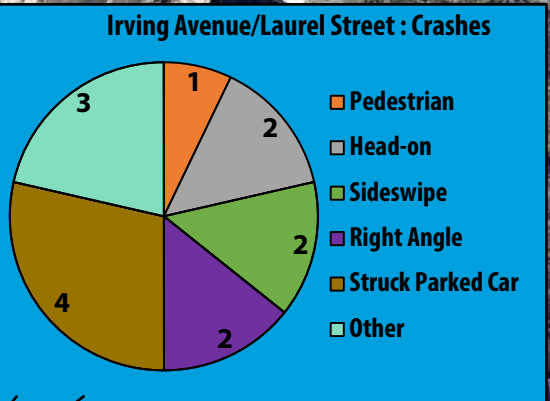
- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location





 **Sep. 7, 2013 @ 12:52pm**
n/a


Laurel Street

14



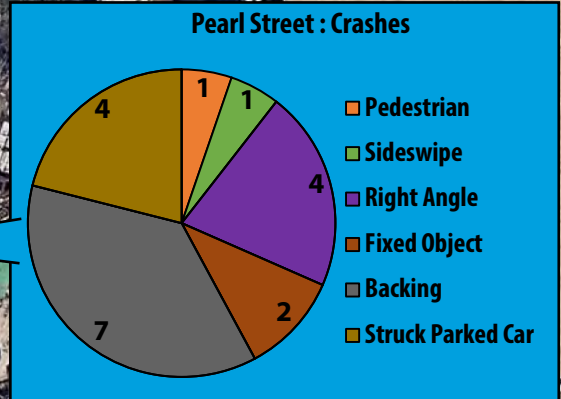
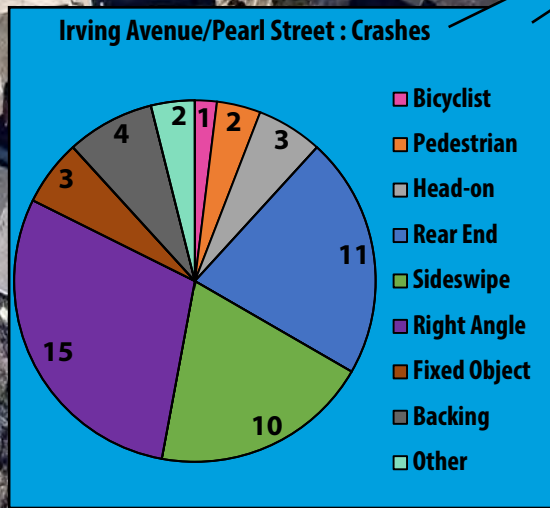
 **Sep. 19, 2015 @ 7:45pm**
n/a

 **Jun. 27, 2016 @ 11:39am**
"dart out"


 **Oct. 26, 2014 @ 10:54am**
"Struck in crosswalk by vehicle making a left onto Irving Ave traveling east"

Irving Avenue

51

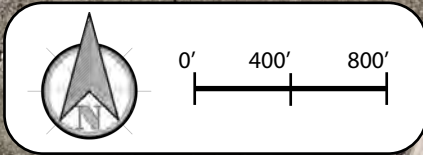


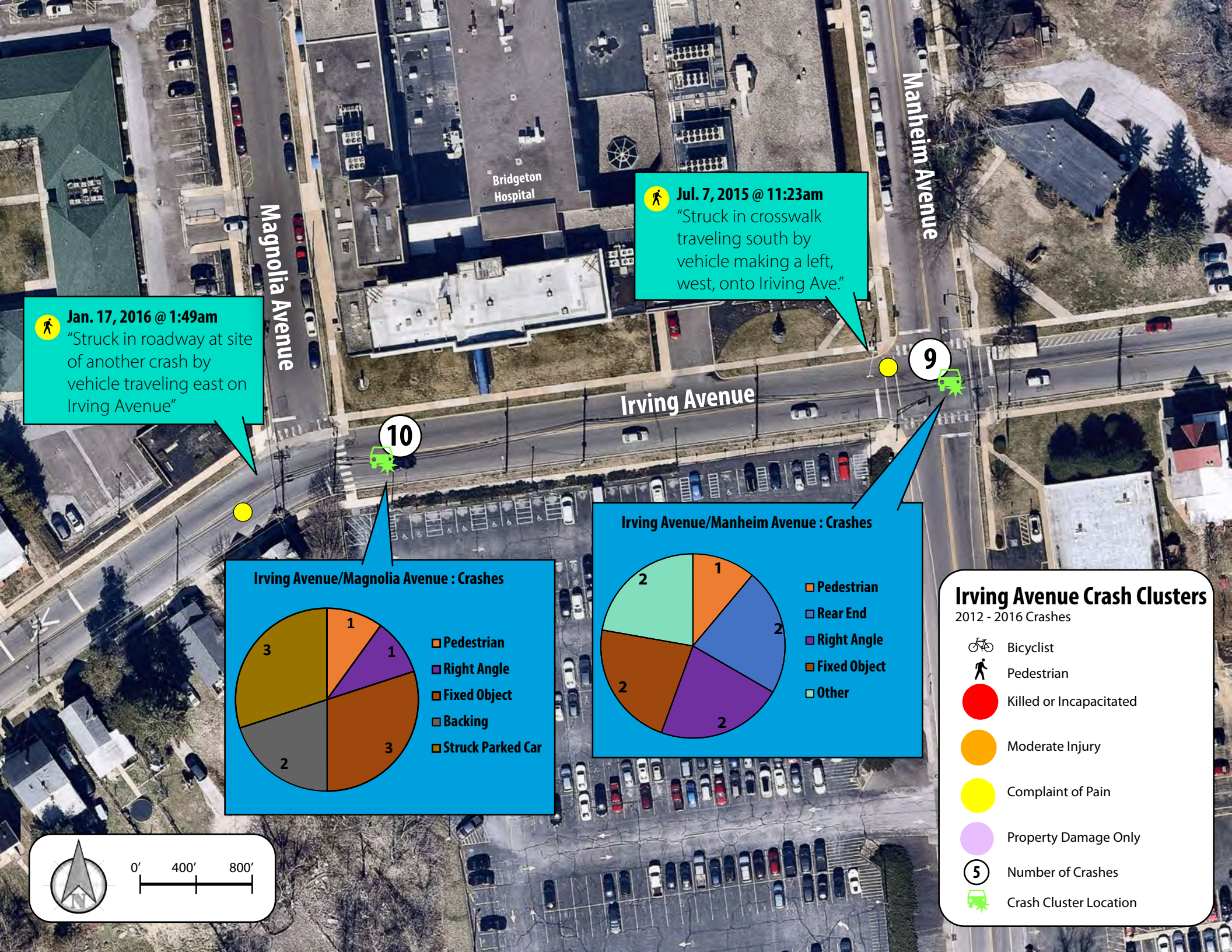
19

 **Jan. 22, 2014 @ 2:49pm**
n/a - slush on ground

Irving Avenue Crash Clusters
2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location





Bridgeton Hospital

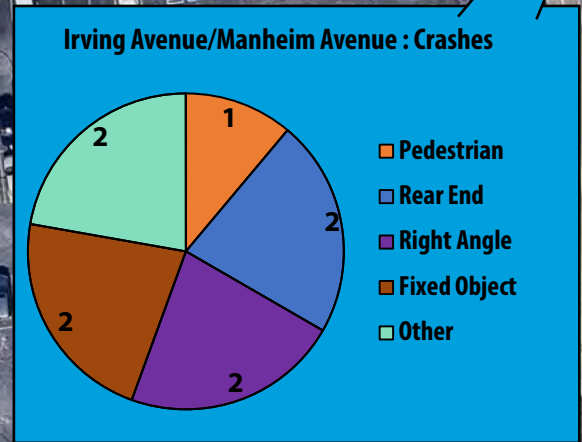
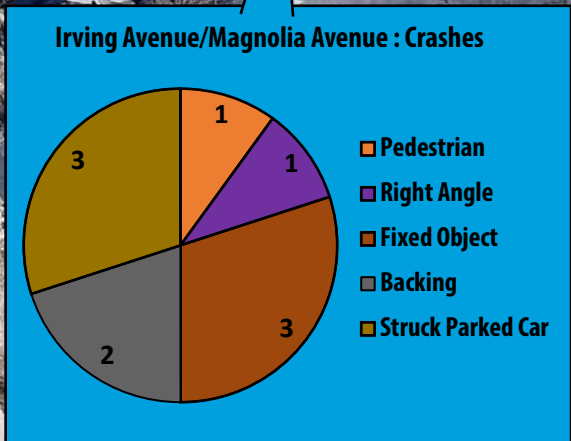
Magnolia Avenue

Manheim Avenue

Irving Avenue

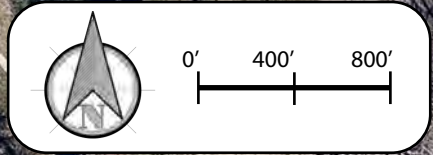
Jul. 7, 2015 @ 11:23am
"Struck in crosswalk traveling south by vehicle making a left, west, onto Irving Ave."

Jan. 17, 2016 @ 1:49am
"Struck in roadway at site of another crash by vehicle traveling east on Irving Avenue"



Irving Avenue Crash Clusters
2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



Walnut Street

Shopping Plaza

Restaurant

Irving Avenue

East Avenue

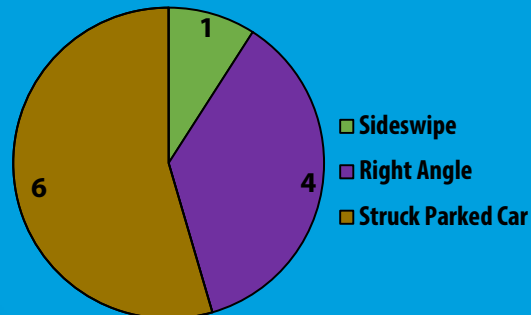
Church Street

Irving Avenue Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location

Irving Avenue/Church Street : Crashes



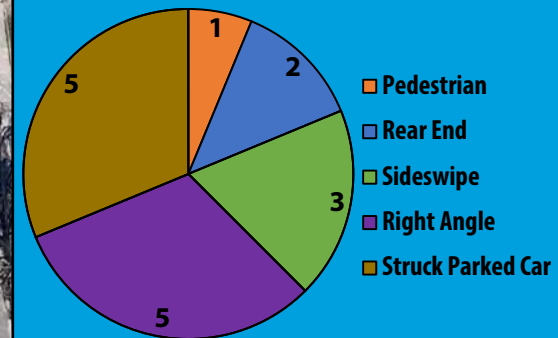
Jun. 5, 2013 @ 6:42am

"Struck crossing south to get picked up for work by vehicle traveling west on Irving Avenue"


16

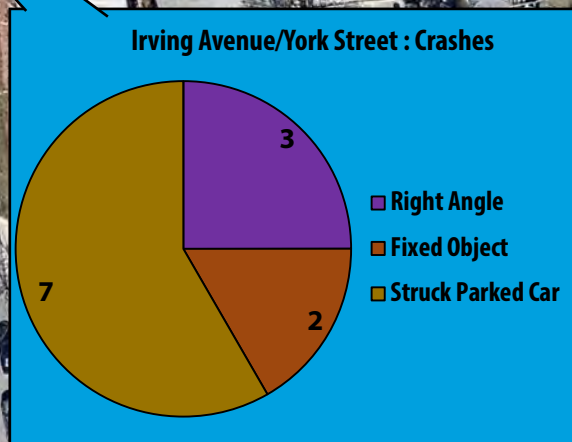
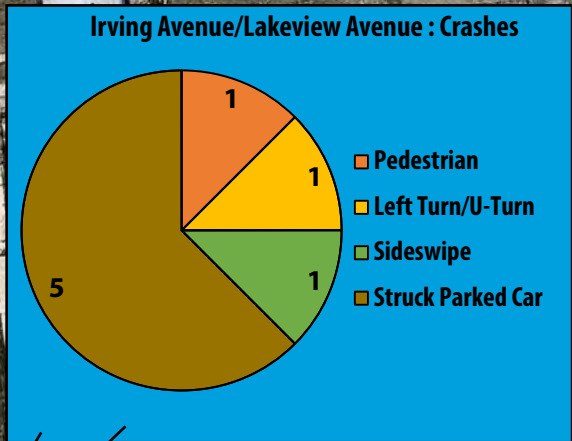
11

Irving Avenue/East Avenue : Crashes



0' 400' 800'

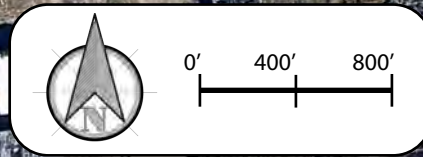
 **March. 8, 2016 @ 3:45am**
 "Struck crossing south
 after getting dropped off
 by vehicle traveling west
 on Irving Avenue"



Irving Avenue Crash Clusters

2012 - 2016 Crashes

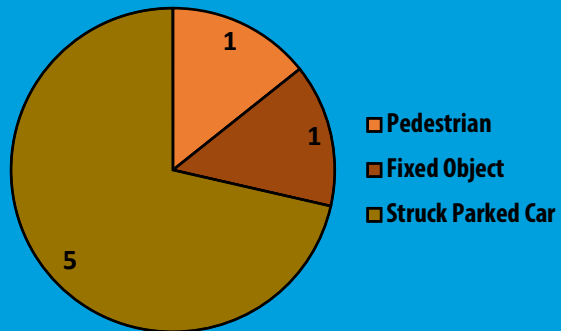
-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location



Cottage Avenue

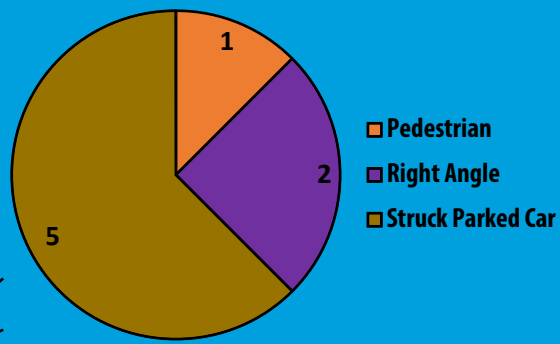
7

Atlantic Street/Cottage Avenue : Crashes



Dec. 15, 2015 @ 10:06pm
 "Struck by vehicle from behind then assaulted"

Atlantic Street/Belmont Avenue : Crashes



8



Nov. 4, 2012 @ 10:11pm
 "dart out"

Atlantic Street

Belmont Avenue

Atlantic Street Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



Property Damage Only



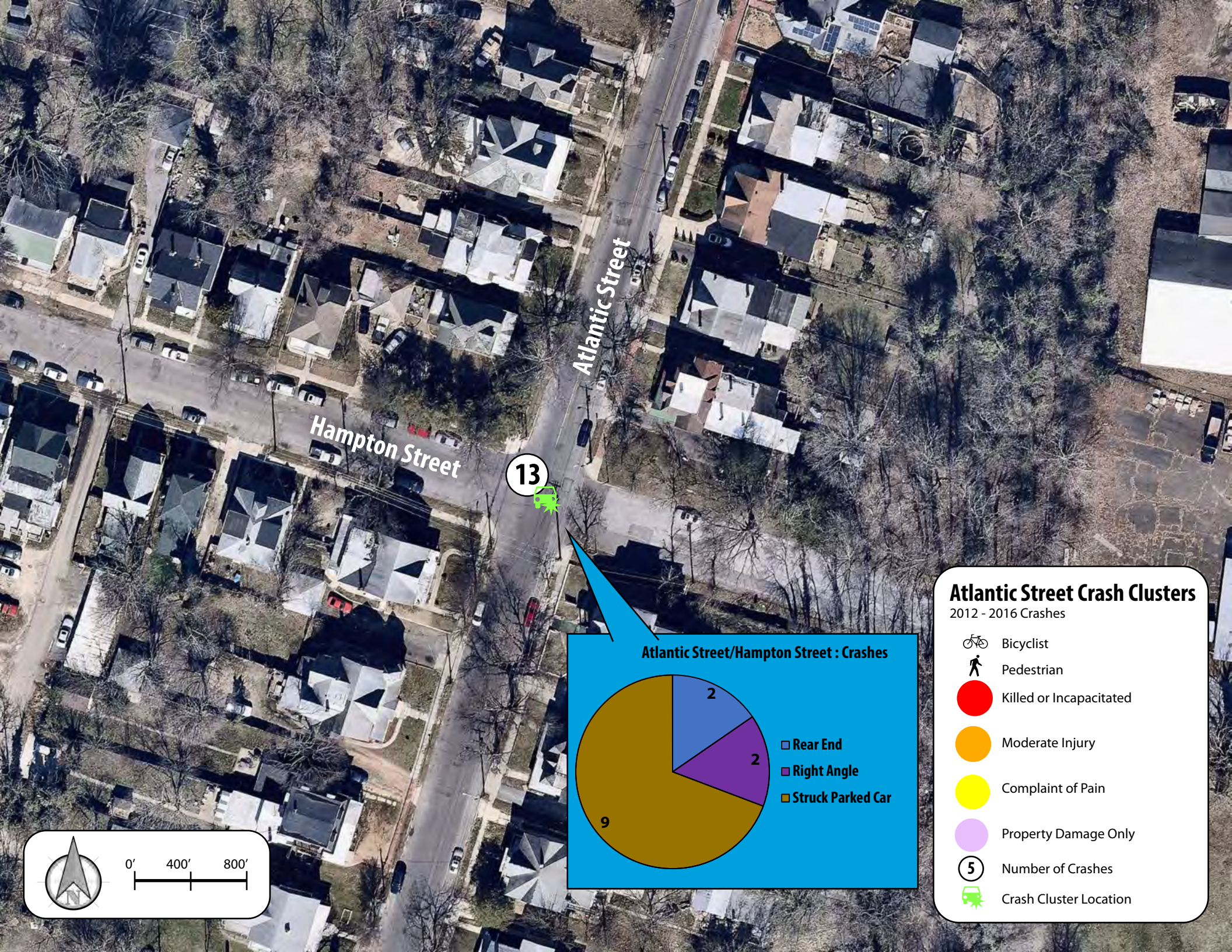
Number of Crashes



Crash Cluster Location



0' 400' 800'



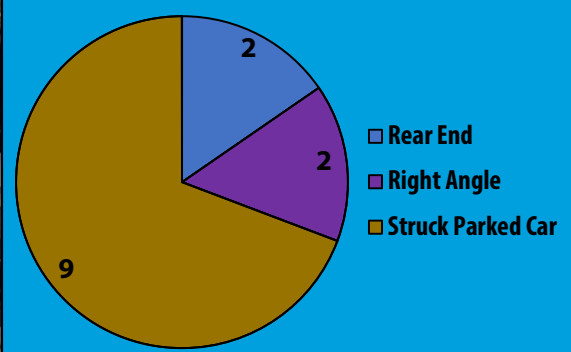
Atlantic Street

Hampton Street

13



Atlantic Street/Hampton Street : Crashes



Atlantic Street Crash Clusters

2012 - 2016 Crashes

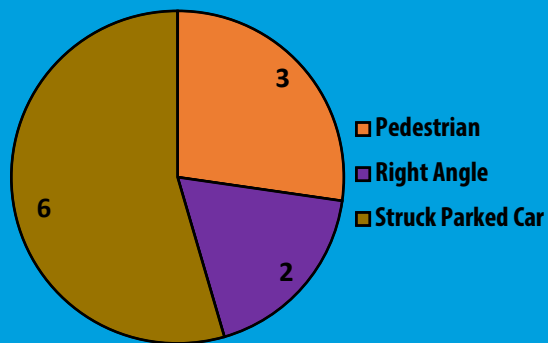
-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location






0' 400' 800'



Atlantic Street/Vine Street : Crashes

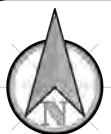


-  **June. 30, 2015 @ 6:24am**
"Struck in crosswalk traveling north by vehicle making a right onto Vine Street traveling east"
-  **Jun. 27, 2016 @ 5:30am**
n/a
-  **June. 7, 2015 @ 2:55pm**
"dart out"


Atlantic Street Crash Clusters


2012 - 2016 Crashes


-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location




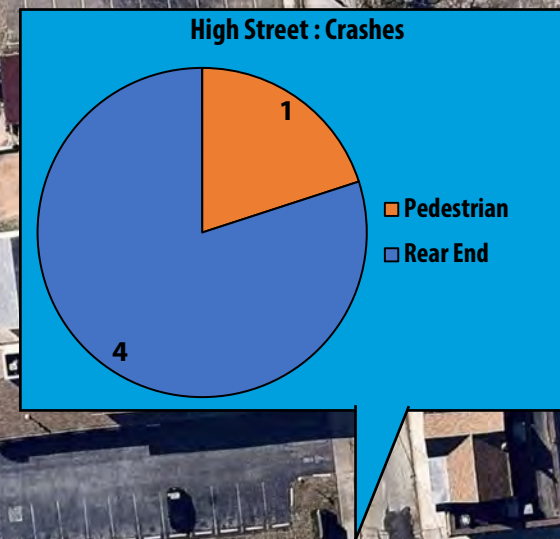
0' 400' 800'


 **Jun. 3, 2015 @ N/A**
N/A

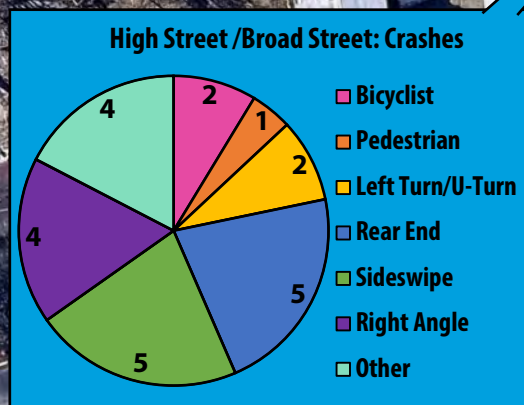
 **Aug. 20, 2015 @ 12:43pm**
"bicycle crossed going wrong direction with person on handlebars"

 **Sep. 14, 2012 @ 5:50pm**
"dart out"

 **Dec. 22, 2012 @ 3:44pm**
"J-walking"



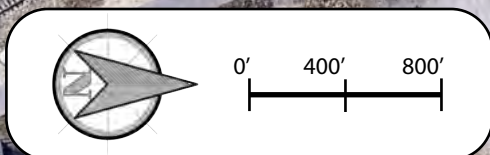
 **Aug. 28, 2012 @ 2:06pm**
"dart out"

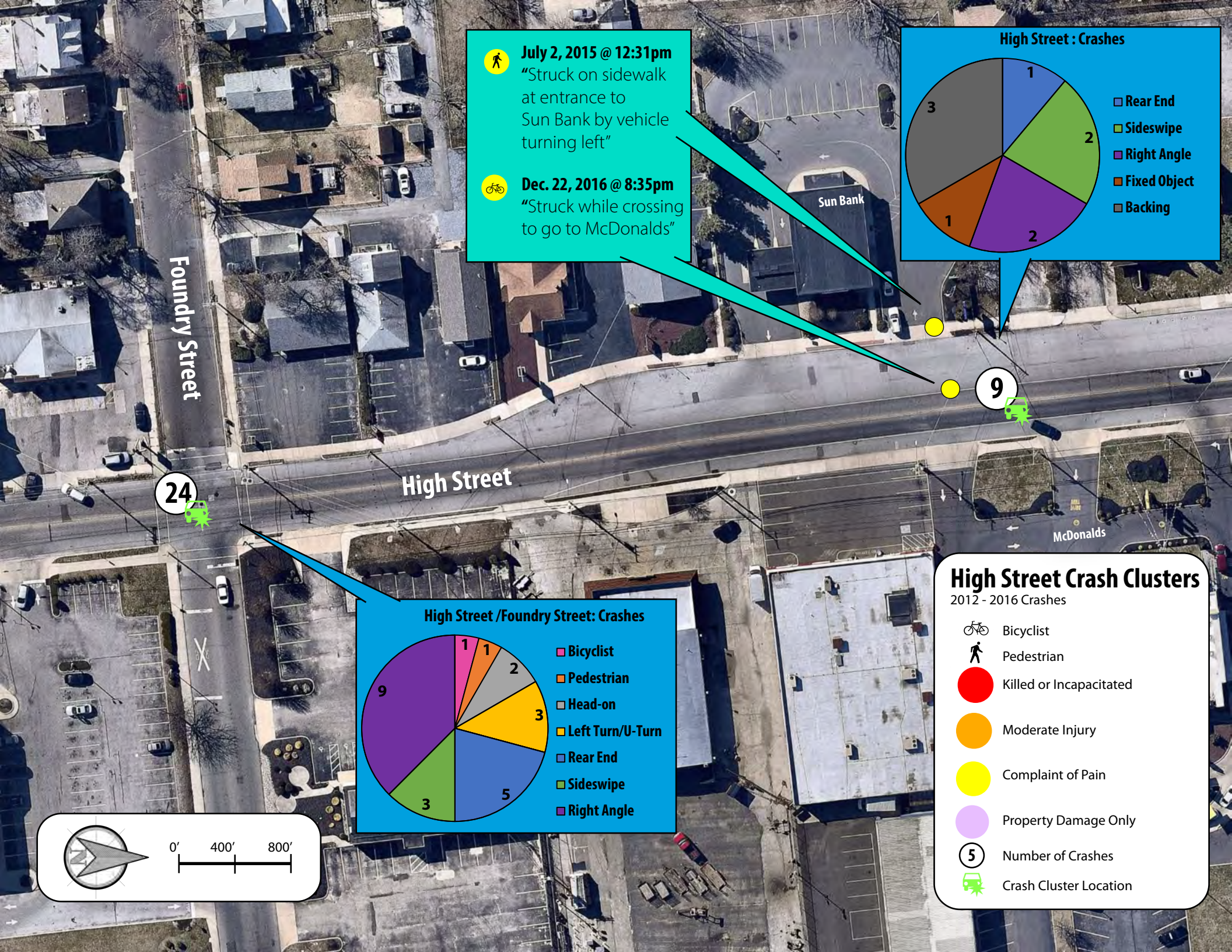



High Street Crash Clusters


2012 - 2016 Crashes

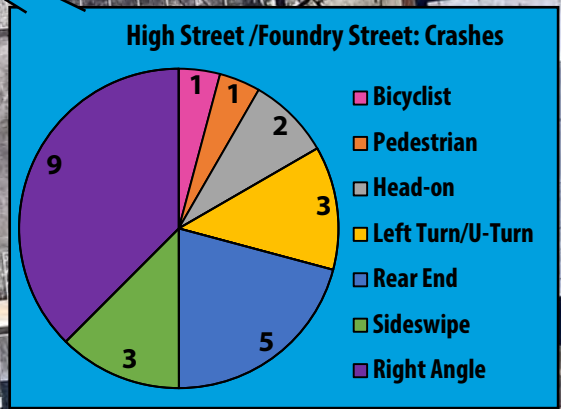
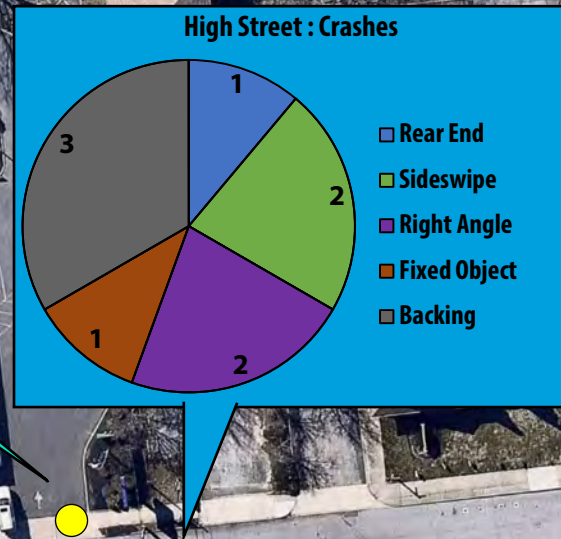
-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location







 **July 2, 2015 @ 12:31pm**
"Struck on sidewalk at entrance to Sun Bank by vehicle turning left"

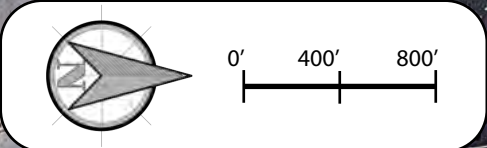
 **Dec. 22, 2016 @ 8:35pm**
"Struck while crossing to go to McDonalds"



High Street Crash Clusters

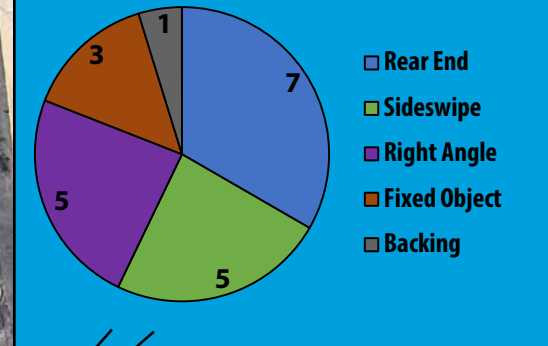
2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location

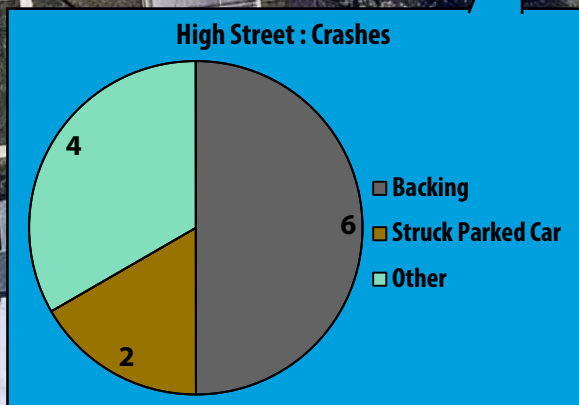


Dec. 22, 2014 @ 7:01pm
 "Struck in crosswalk
 by vehicle making a
 left, north onto
 High Street"
Too dark to see pedestrian

High Street /Harrison Avenue: Crashes



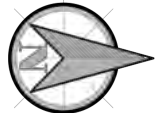
High Street : Crashes



High Street Crash Clusters

2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



0' 400' 800'

22

12

High Street

Harrison Avenue



Dec. 13, 2012 @ 11:24am

"Struck in crosswalk by van making left onto High Street"



Feb. 2, 2012 @ 10:22am

"Struck in crosswalk by vehicle making left onto High Street"



Sep. 6, 2013 @ 2:24pm

"Struck in crosswalk by vehicle making left onto High Street"

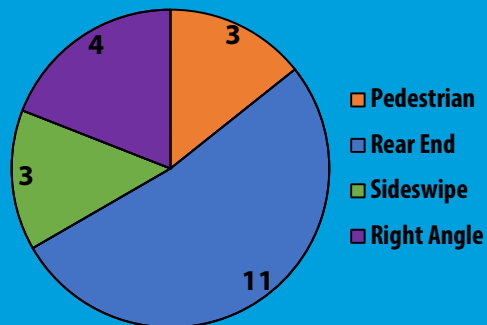
City Hall

Sassafras Street

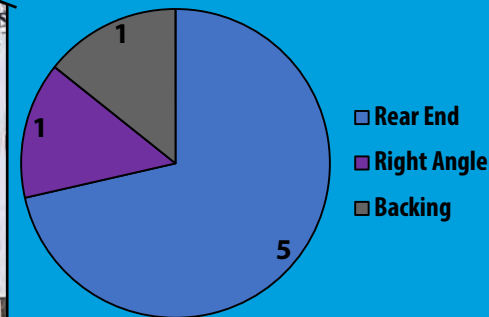
High Street

Main Street (SR 49)

High Street /Main Street: Crashes



Main Street: Crashes



High Street Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



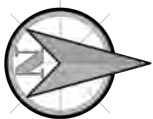
Property Damage Only



Number of Crashes



Crash Cluster Location



0' 400' 800'

Green Street

McNeal Street



Mar. 19, 2015 @ 3:55pm
"Struck riding south in northbound lane by vehicle going west"



Nov. 29, 2016 @ 5:40am
"Struck in crosswalk by vehicle making left onto McNeal Street"



Aug. 29, 2013 @ 8:57pm
"Struck in crosswalk by vehicle making left onto McNeal Street"

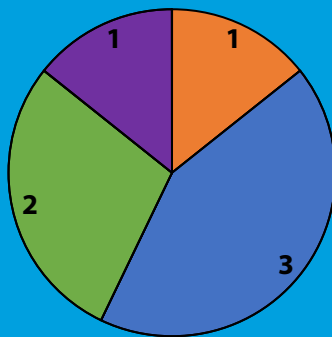


Aug. 19, 2014 @ 8:57pm
"dart out"

7

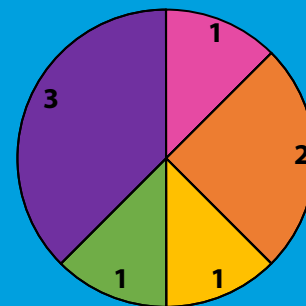
8

High Street /Green Street: Crashes



■ Pedestrian
■ Rear End
■ Sideswipe
■ Right Angle

High Street /McNeal Street: Crashes



■ Bicyclist
■ Pedestrian
■ Left Turn/U-Turn
■ Sideswipe
■ Right Angle

High Street Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain



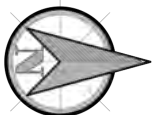
Property Damage Only



Number of Crashes



Crash Cluster Location



0' 400' 800'



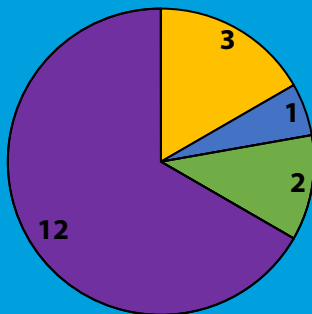
High Street

19

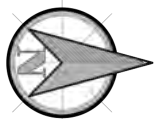


Vine Street

High Street /Vine Street: Crashes



- Left Turn/U-Turn
- Rear End
- Sideswipe
- Right Angle



0' 400' 800'

High Street Crash Clusters

2012 - 2016 Crashes



Bicyclist



Pedestrian



Killed or Incapacitated



Moderate Injury



Complaint of Pain




Property Damage Only

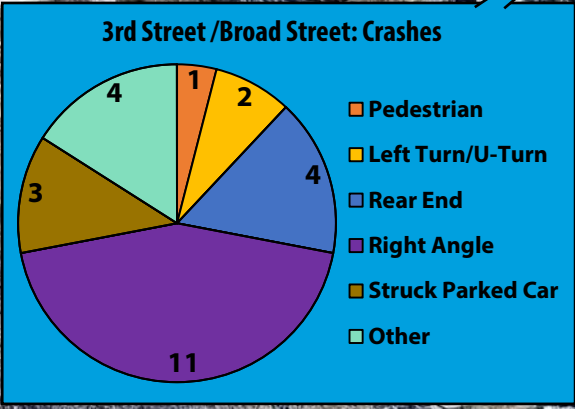
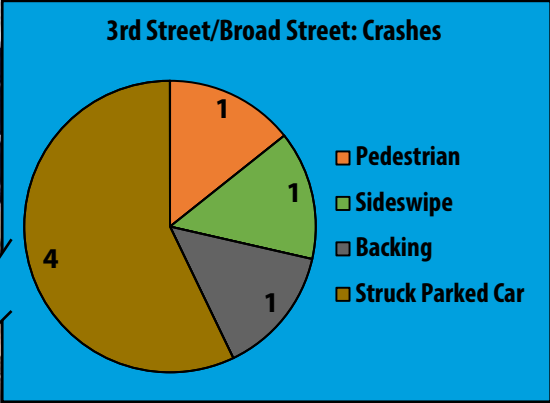


Number of Crashes



Crash Cluster Location

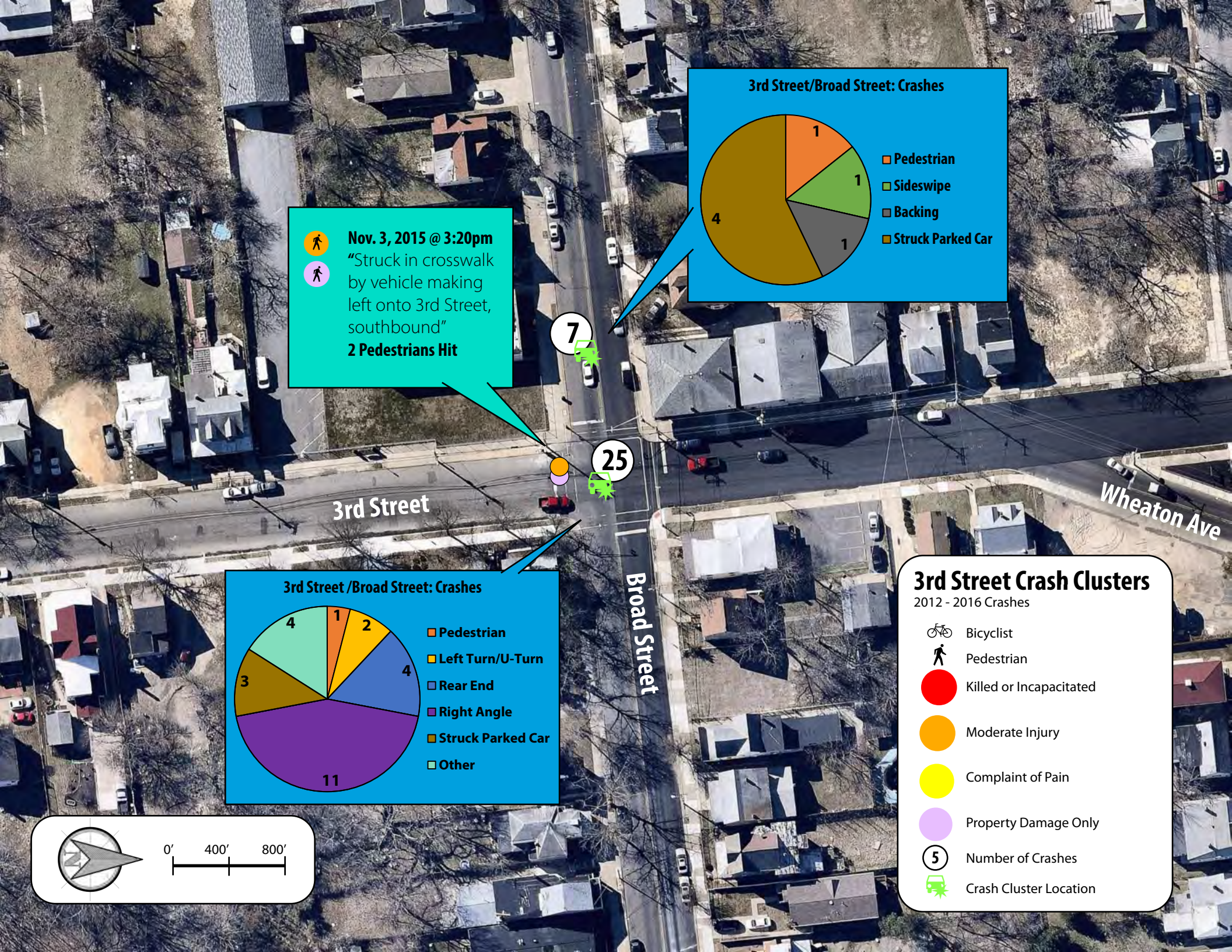
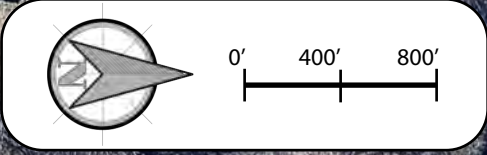
 **Nov. 3, 2015 @ 3:20pm**
 "Struck in crosswalk
 by vehicle making
 left onto 3rd Street,
 southbound"
2 Pedestrians Hit

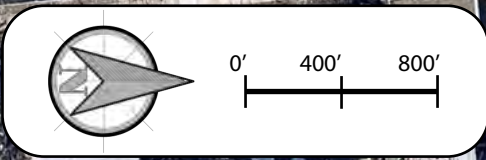


3rd Street Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location

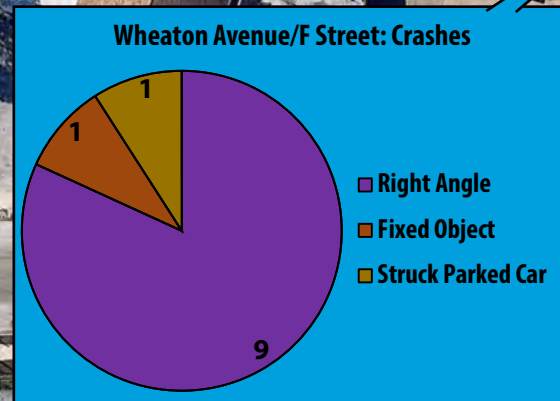
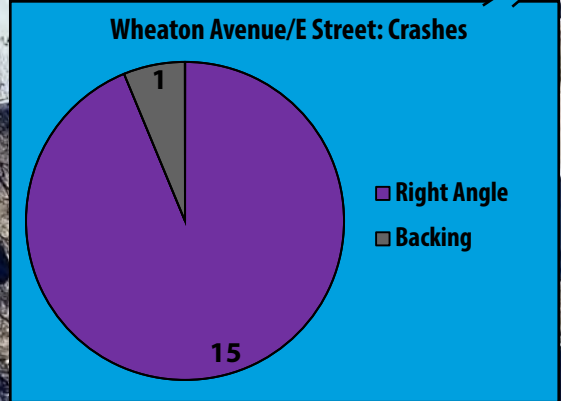


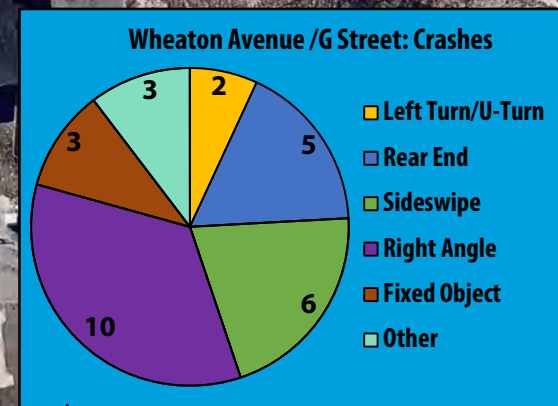


Wheaton Ave Crash Clusters

2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location

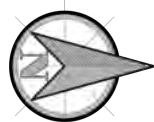




Wheaton Ave Crash Clusters

2012 - 2016 Crashes

- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



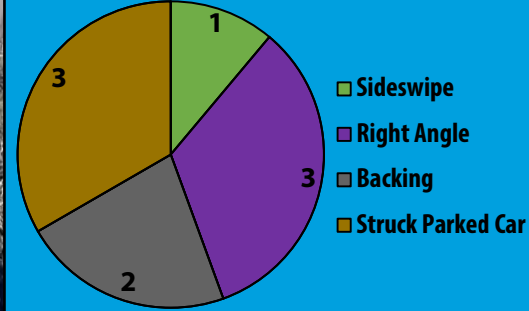
0' 400' 800'



Mar. 3, 2012 @ 8:15pm

"Struck in crosswalk by vehicle making a rolling right turn at a red-light onto Main Street"

3rd Street /Sassafras Street: Crashes

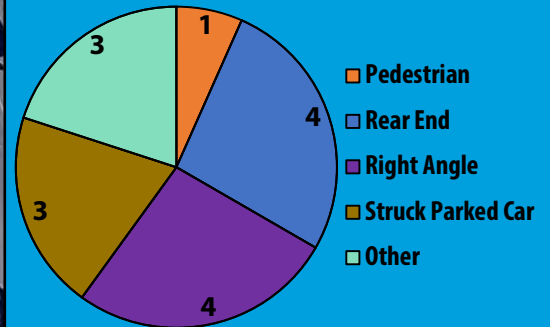


Sassafras Street

Main Street (SR 49)

3rd Street

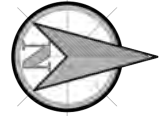
3rd Street /Main Street: Crashes



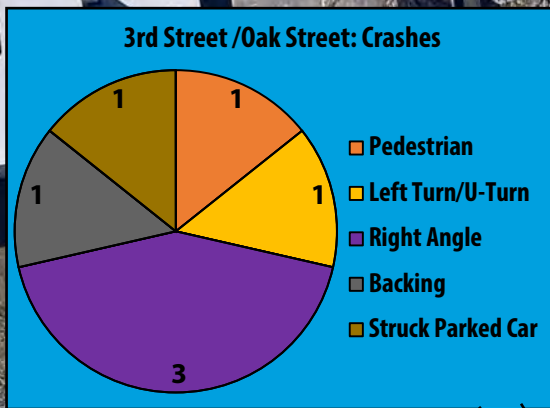
3rd Street Crash Clusters


2012 - 2016 Crashes

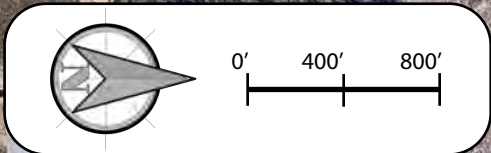
- Bicyclist
- Pedestrian
- Killed or Incapacitated
- Moderate Injury
- Complaint of Pain
- Property Damage Only
- Number of Crashes
- Crash Cluster Location



0' 400' 800'



 **Nov. 20, 2014 @ 4:55pm**
"domestic dispute"



3rd Street Crash Clusters

2012 - 2016 Crashes

-  Bicyclist
-  Pedestrian
-  Killed or Incapacitated
-  Moderate Injury
-  Complaint of Pain
-  Property Damage Only
-  Number of Crashes
-  Crash Cluster Location

Appendix D

Roadway Owner Response