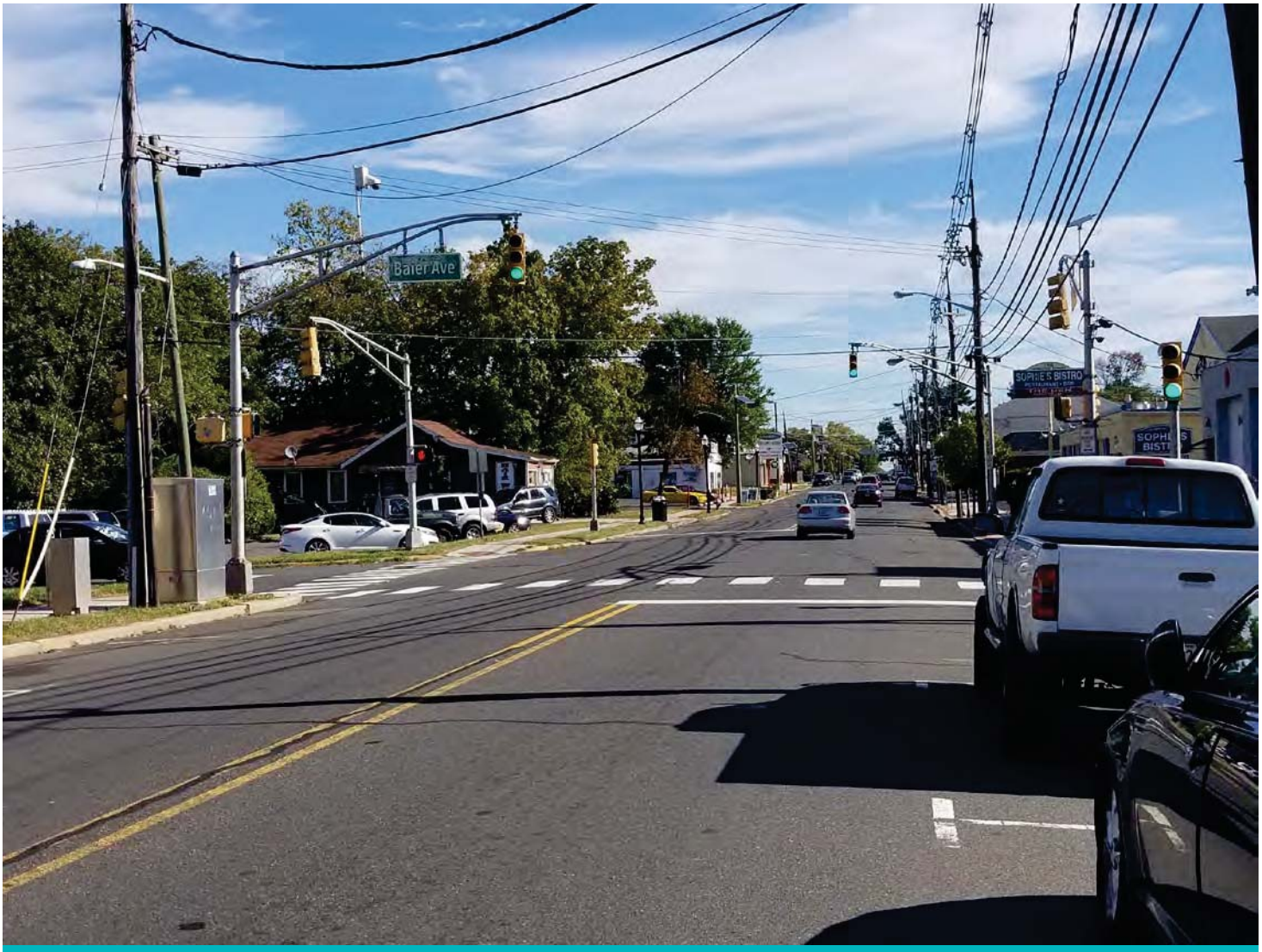

Road Safety Audit:

CR 514 (Hamilton Street) between Berry Street
and New Brunswick Border
Franklin Township, Somerset County

DEPARTMENT OF TRANSPORTATION
THE STATE OF NEW JERSEY

MARCH 2018

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Executive Summary

This document is the final report of the CR 514, Hamilton Street Road Safety Audit (RSA). It was conducted from Berry Street to the New Brunswick border (MP 22.35-23.85) in Franklin Township, Somerset County. An RSA is an effective way of identifying crash-causing trends and appropriate countermeasures utilizing a nontraditional approach that promotes transportation safety while maintaining mobility.

This section of CR 514, Hamilton Street was identified on NJTPA's Local Safety Program Network Screening list as a high priority location. According to the NJDOT crash database, 250 crashes occurred during the three-year period between January 1, 2014 and December 31, 2016 along the study area section of CR 514, Hamilton Street with 78, 82 and 90 crashes occurring in 2014, 2015 and 2016, respectively. Additionally, 16 pedestrian crashes occurred over the five-year period between January 1, 2012 and December 31, 2016, one of which was fatal.

This one-day RSA was conducted on Thursday, October 19, 2017 from 9:00 am to 3:30 pm. The pre- and post-audit meetings were held in the Council Chambers at the Franklin Township Municipal Complex, located at 475 Demott Lane, Somerset, NJ. Representatives from FHWA, NJDOT, NJTPA, Somerset County and Franklin Township were in attendance with NJDOT serving as the facilitator.

The RSA site and crash history is described in Sections II and III of this report, respectively. Section II also identifies previous and on-going studies conducted by the aforementioned agency representatives. Corridor-wide and site-specific issues and recommendations, organized by location, are discussed in Section IV. The most common recommendations were to consider developing an access management and parking plan; traffic signal and ADA ramp upgrades; and investigate curb extensions at unsignalized intersections.

The recommendations contained herein were developed collaboratively with the roadway owner and local stakeholders from the RSA Team (members listed in Appendix A). The study partners have expressed interest in implementing many of the recommendations as time and funds allow. Many of the maintenance items, which are typically low cost, can be addressed without additional engineering.

Please note this RSA report does not constitute an engineering report. The agency responsible for design and construction should consult a licensed professional engineer in preparing the design and construction documents, to implement any of the safety countermeasures mentioned in this report.

I. Introduction

A. Site Selection

The section of CR 514, Hamilton Street (herein referred to as Hamilton Street), from Berry Street to the New Brunswick border (MP 22.35-23.85), was identified on NJTPA's Local Safety Program Network Screening list as a high priority location, as shown in the below FY 2017-2018 ranking. Of note, these rankings are based on 2011-2013 vehicular and 2009-2013 pedestrian crash data.

Table 1 – Hamilton Street NJTPA FY 2017-18 LSP Ranking

Regional Corridors	Ped Corridors	Intersections	Pedestrian Intersections
#2 County, MP 22.35-23.35	#5 County, MP 23.57-24.57	#3 Lewis/Berry St	#18 County: Lafayette Ave
#101 County, MP 23.56- 24.56	#233 NJTPA Region	#38 Franklin Blvd	#20 County: Sydney Pl
#45 NJTPA Region		#54 Home St	#28 County: Home St

B. What is a Road Safety Audit?

A Road Safety Audit (RSA) is a formal safety performance examination of an existing or future road or intersection by a multi-disciplinary audit team. It qualitatively estimates and reports on existing and potential road safety issues and identifies opportunities for improvements in safety for all road users. RSAs can be used on any size project, from minor maintenance to mega-projects, and can be conducted on facilities with a history of crashes, or during the design phase of a new roadway or planned upgrade. RSAs consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a formal response from the road owner.

The RSA program is conducted to generate improvement recommendations and countermeasures for roadway segments demonstrating a history of, or potential for, a high frequency of crashes, or an identifiable pattern of crash types. Recommendations range from low-cost, quick-turnaround safety improvements to more complex strategies. Implementation of improvement strategies identified through this process may be eligible for Local Federal Aid Safety Funds. Because the RSA process is adaptable to local needs and conditions, recommendations can be implemented incrementally as time and resources permit.

The RSA process, one of FHWAs proven safety countermeasures, is shown in the figure below.

C. The Hamilton Street RSA Event

This one-day RSA was conducted on Thursday, October 19, 2017 from 9:00 am to 3:30 pm. The pre- and post-audit meetings were held in the Council Chambers at the Franklin Township Municipal

Complex, located at 475 Demott Lane, Somerset, NJ. Representatives from FHWA, NJDOT, NJTPA, Somerset County and Franklin Township were in attendance with NJDOT serving as the facilitator. A list of team members can be found in Appendix A.

II. Corridor Description and Analysis

A. Study Location

The study area consists of approximately 1.5 miles of CR 514 (Hamilton Street) from the Lewis/Berry Street intersection to the municipal/County border with New Brunswick City/ Middlesex County. The area lies within Franklin Township, Somerset County. This stretch of Hamilton Street is a mix of commercial and residential properties. Commercial sites consist of mainly one- and two-story retail, automotive repair and service, eating establishments, churches, beauty salons, banks, and grocery store-anchored shopping plazas. Residential units are primarily detached single family homes. An apartment complex is located in the eastern project limits. Of note, this section of Hamilton Street is part of the Hamilton Street Special Improvement District (SID) and a Priority Growth Investment Area (PGIA) in Somerset County. Hamilton Street provides access to downtown New Brunswick, Rutgers University and Robert Wood Johnson University Hospital.

B. Roadway and Intersection Characteristics

Hamilton Street is classified as an urban minor arterial. The corridor study section is two-lanes, undivided, with a posted speed limit of 25 and 35 mph east and west of Franklin Boulevard, respectively. On-street parking is allowed in designated areas. The roadway's horizontal alignment is tangential, with the exception of the eastern and western limits. There are four (4) signalized intersections, 25 unsignalized intersections and numerous driveways along this section of Hamilton Street.

C. Existing Bicycle/Pedestrian Accommodations

Sidewalks are provided on both sides of Hamilton Street throughout the study area. Sidewalk conditions vary from newly installed to needing maintenance. Continental style crosswalks are provided at most intersections; however, not all crossings are marked across Hamilton Street. Norma Avenue and Highland Avenue are signed as school crossings. A bus shelter was also identified near Franklin Boulevard (see Part E for additional information). There is no defined bicycle lane along Hamilton Street and bicyclists were observed traveling either along the roadway or on the sidewalk.

Of additional note, the Franklin Township School District rezoned its schools for the 2018-2019 school year to create Pre-K through Grade 5 elementary schools and a grades 6-8 middle school on two campuses, referred to as the *One Less Move* Referendum. This rezoning aims to improve the educational experience by reducing school changes and address overcrowding. The District anticipates that an increasing number of students will walk to school based on this rezoning and a Safe Routes to School travel plan may be necessary to safely accommodate the increase in pedestrian traffic.

D. Traffic Volumes

Based on available data, the ADT along Hamilton Street ranges from approximately 11,300 to 16,900 in the eastern and western portions of the study area, respectively. A copy of the available data can be found in Appendix C.

E. Transit Service

NJ Transit bus or rail services do not directly serve Hamilton Street. However, the corridor is served by Somerset County's CAT 1R and DASH 853 bus routes. One bus shelter was identified near Franklin Boulevard. The New Brunswick Park and Ride, located along Route 27 near Matilda Avenue, is serviced by Suburban Transit, which operates three lines between Princeton and New York City. The NJ Transit Northeast Corridor Line stop at the Jersey Avenue and New Brunswick Train Stations are located within one mile of Hamilton Street.

F. Community Profile

The *Supporting Priority Investment in Somerset County Phase III Study* conducted an Environmental Justice (EJ) Assessment along Hamilton Street and within a 500-foot buffer of the same. The EJ analysis utilized data from the 2010 U.S. Census and updates through the 2014 American Community Survey (ACS) estimate. A summary of the demographics is listed below and a portion of the Technical Memorandum with additional detail and figures can be found in Appendix I.

Table 2 – Hamilton Street Area Demographics

Characteristic		Hamilton St Area	County Average
Poverty		7.9%	4.9%
Minority	Black or African American	41.8%	8.5%
	Hispanic/Latino	32.6%	13.0%
Limited English Proficiency (LEP)		11.1%	5.3%

In addition, approximately 2.4% of the population uses public transportation. It is evident that the limited service noted above results in low usage.

G. Redevelopment

As aforementioned, Hamilton Street is part of the Hamilton Street SID and a PGIA in Somerset County. Properties along this corridor are currently or are anticipated to be redeveloped to include more mixed-use, multi-story buildings with first-floor retail and upper floor residential units. Due to its proximity and convenient access to New Brunswick, the transportation improvements in the *Phase III Study* focused on multimodal mobility, such as expanded bus service and enhanced pedestrian and bicyclist connectivity. Specifically, the *Phase III Study* recommends investigating shared-use pavement markings (connecting to those installed in New Brunswick). The study also proposes to create a bicycle boulevard along Lewis Street, which runs parallel to Hamilton Street, as well as improved pedestrian crossings, wider sidewalks and enhanced streetscape.

The *Supporting Priority Investment in Somerset County Through Access and Mobility Improvements Study* goal was to identify land use and transportation improvements to support redevelopment and targeted growth. The study identified, screened, and evaluated candidate locations, and proposed a series of pilot sites to serve as templates for redevelopment of other sites. One pilot site in the *Access and Mobility Study* was the Nora Shopping Center, located along Hamilton Street within the

RSA limits. In addition to creating additional retail space on the site, proposed transportation improvements included bicycle, pedestrian, and streetscape improvements along Hamilton Street; access control at the site; and investigation of improved transit service along Hamilton Street. The study also recommended improvements along Hamilton Street near the Nora Shopping Center such as traffic signal upgrades, ADA curb ramps, high visibility crosswalks, "sharrow" markings and transit accommodations. Excerpts from the *Phase III Study* and *Access and Mobility Study* can be found in Appendix I.

III. Crash Findings

The analysis used in the RSA was based on reportable crashes that resulted in a fatality, injury and/or property damage as found in the NJDOT crash database. Corridor-wide crash characteristics and overrepresentations were compared to the 2016 statewide average for the county road system as further detailed below. All crashes were plotted onto a collision diagram, which can be found in Appendix D.

A. Temporal Trends

According to the NJDOT crash database, there were 250 crashes from 2014 to 2016 along the study area section of Hamilton Street with 78, 82 and 90 crashes occurring in 2014, 2015 and 2016, respectively. Total crashes were highest in March and lowest in June compared to the county average. Day of week trends were similar to the county averages.

Additionally, 16 pedestrian crashes occurred over the five-year period from 2012 to 2016, one of which was fatal. The majority of these crashes included minor injury and occurred during the day, on Wednesdays and Thursdays, and in March. It should be noted that the low number of crashes compared to the county road system may be statistically insignificant since they could not be correlated with an identified event. For example, while the monthly chart indicates 11% of pedestrian crashes occurred in March, this equates to a total of 28 crashes versus the county average of 2505 crashes (8%) for the same month.

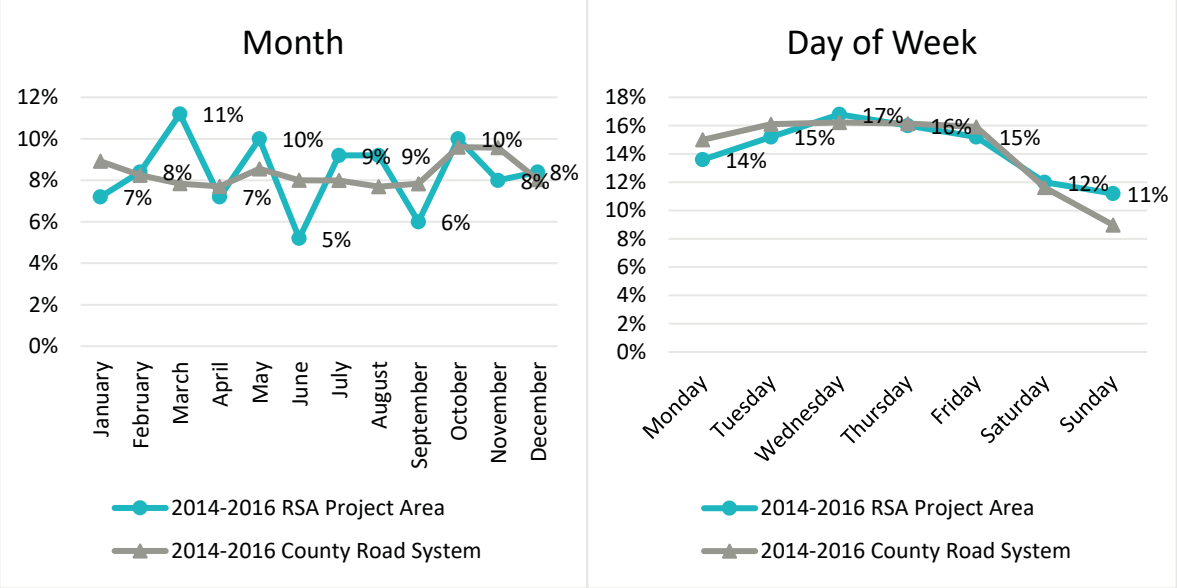


Figure 1 – Total Crashes by Month and Day of Week

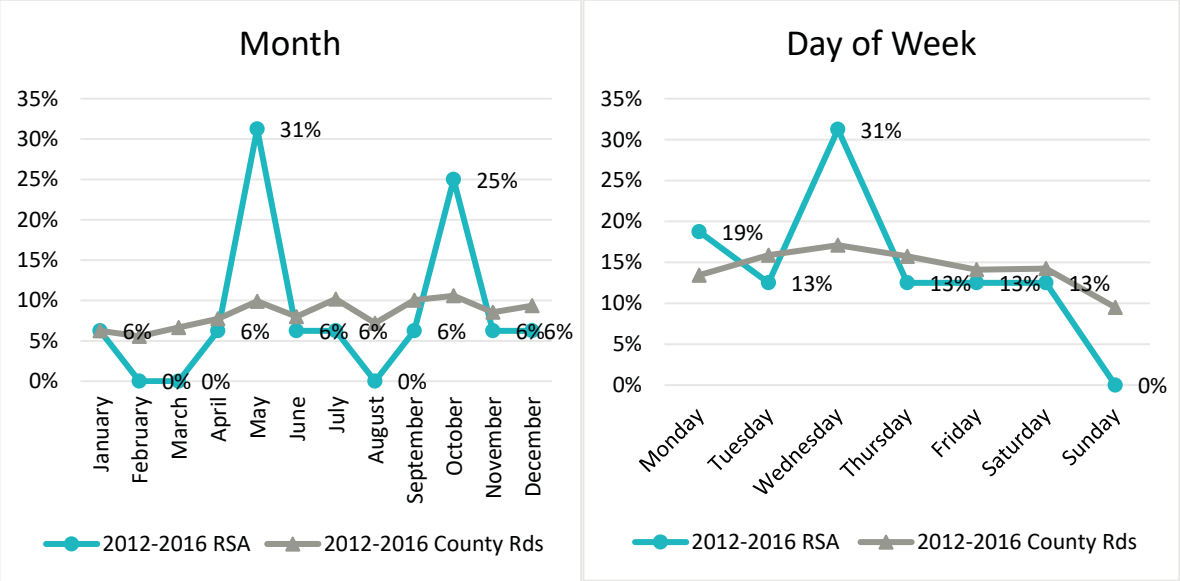


Figure 2 – Pedestrian/Bicyclist Crashes by Month and Day of Week

B. Collision Types

Overrepresented crash types over the three-year period from 2014 to 2016 included right angle, left turn, parked vehicle, and pedestrian/cyclist. The availability of on-street parking contributes to the struck parked vehicle crashes. Of the 16 pedestrian/cyclist crashes over the five-year period from 2012 to 2016, one was a bicyclist travelling with traffic adjacent to the on-street parking. Right angle crashes were concentrated at both signalized and unsignalized intersections. Left turn crashes had similar concentrations, but also included crashes where one vehicle was performing a U-turn maneuver into a parking space on the opposite side of the roadway. Parked vehicle and pedestrian crashes were more dispersed throughout the corridor.

Table 3 – Overrepresented Crash Types (2014-2016)

Collision Type	Count	% of Total	2016 County Road System Average
Right Angle	71	28.40%	18.26%
Struck Parked Vehicle	40	16.00%	5.89%
Left Turn/U Turn	25	10.00%	4.06%
Pedestrian/Cyclist*	8	3.20%	2.64%

* An additional eight (8) crashes occurred from 2012 to 2013

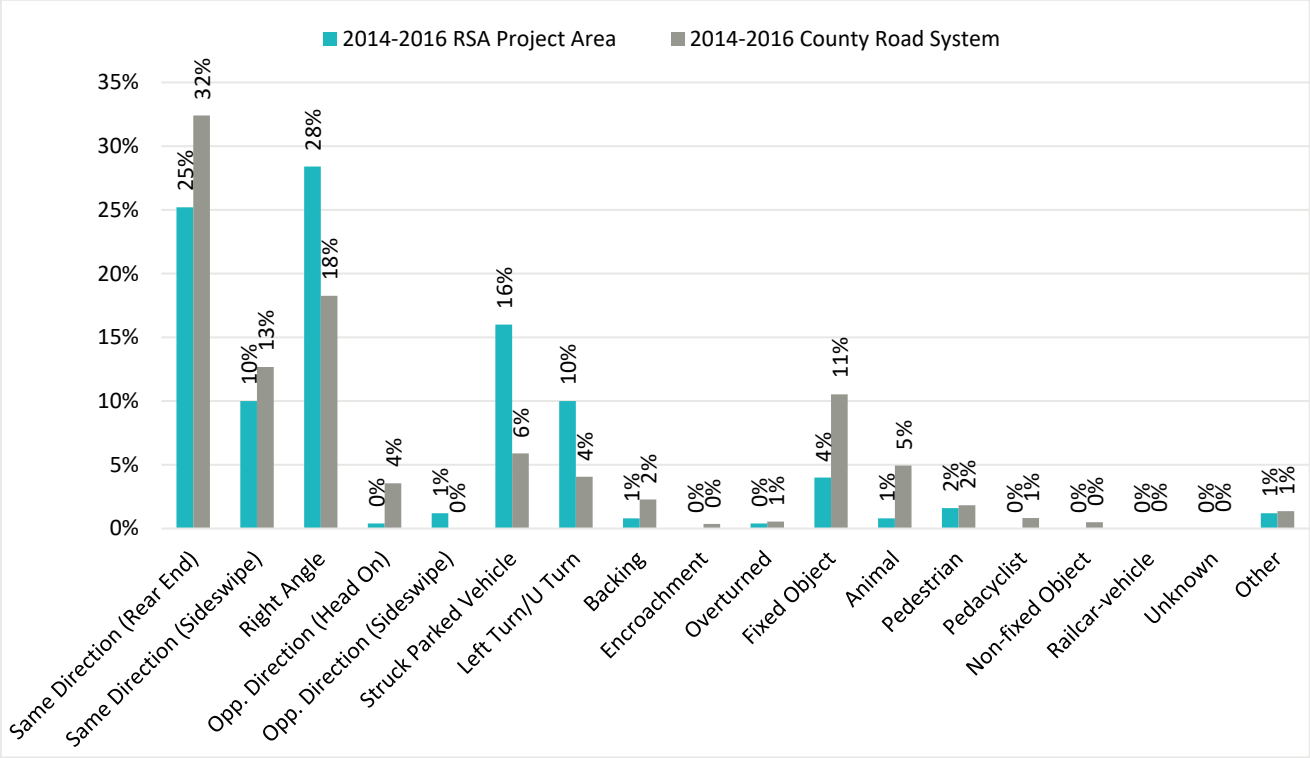


Figure 3 – Crash Type Breakdown

C. Severity

Crashes resulting in injury were overrepresented compared to the county road system. This is due to the overrepresented crash types of right angles and left turns, which tend to be more severe crashes. The majority of injury-related crashes resulted in minor injuries, while the county road system had a higher percentage of moderate injuries. In addition, one fatal crash occurred in 2012 and resulted in the death of one pedestrian and injury of another.

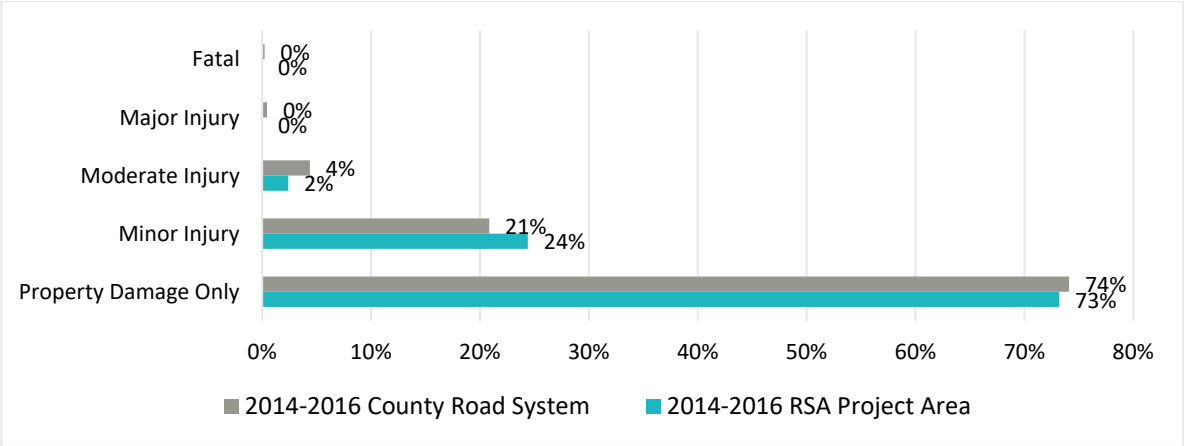


Figure 4 – Severity (All Crashes)

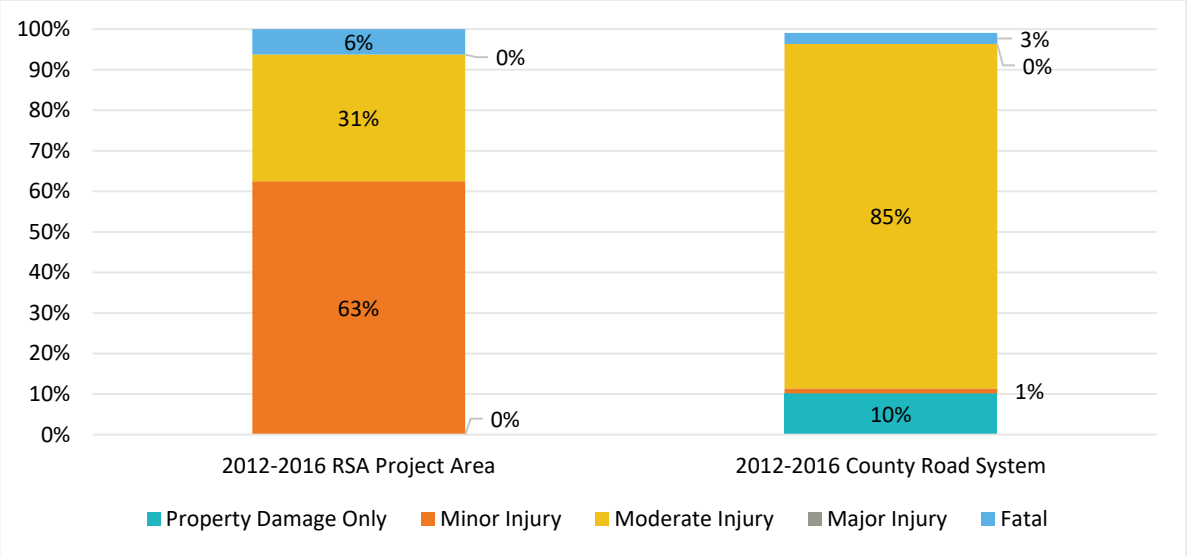


Figure 5 – Severity (Pedestrian/Bicycle Crashes)

D. Roadway Surface & Light Condition

Overrepresented crash types included dry surface and at night. Dry surface conditions accounted for approximately 85% of total crashes, suggesting that road surface was not a significant contributing factor in the majority of crashes. While 71% of crashes occurred during daylight, approximately 26% occurred at night, which is slightly higher than the county road statewide average of 24%.

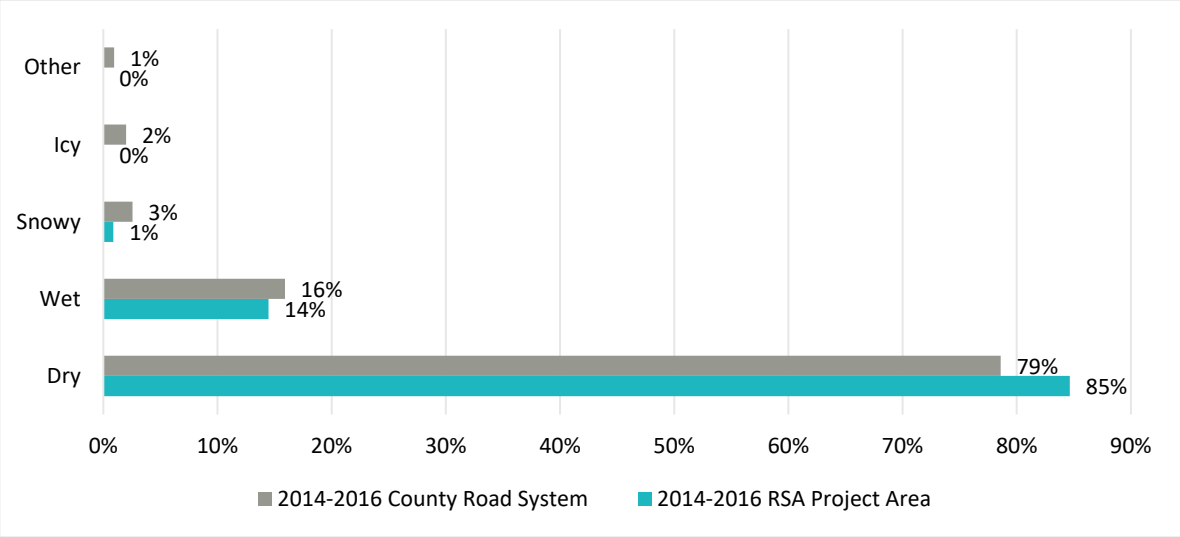


Figure 6 – Surface Conditions (All Crashes)

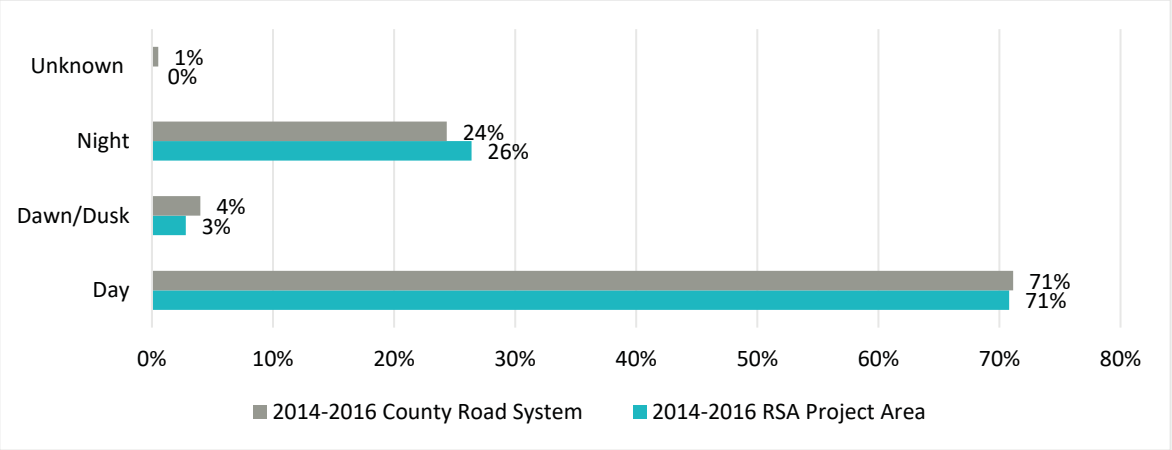


Figure 7 – Light Conditions (All Crashes)

In addition, two (2) or approximately 13% of pedestrian crashes occurred during dawn or dusk, which is more than double the county road statewide average of 40 crashes or 5%. The low number of crashes compared to the county road system may be statistically insignificant.

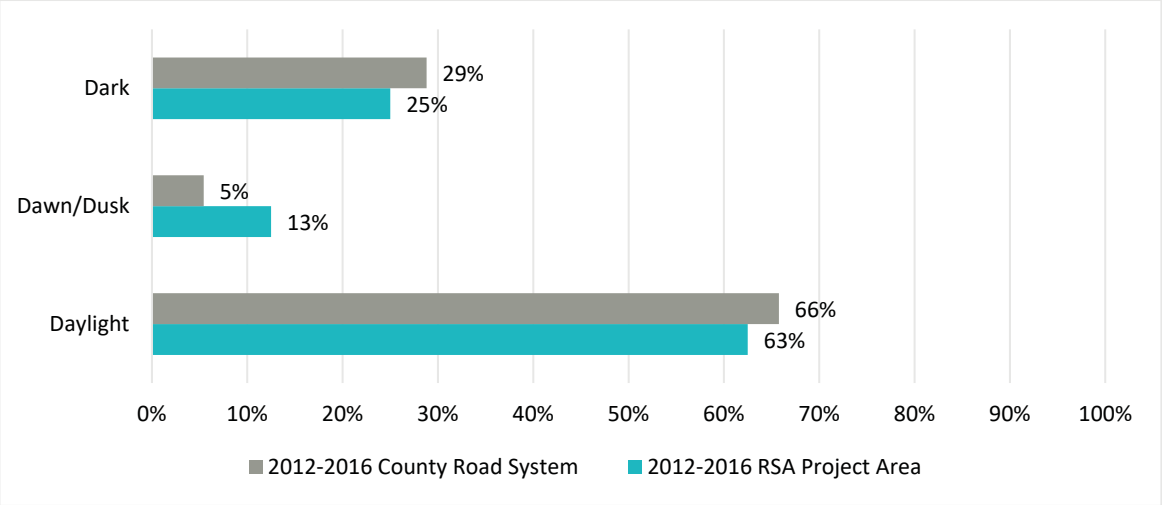


Figure 8 – Light Conditions (Pedestrian/Bicycle Crashes)

E. Location

Crashes at unsignalized intersections were overrepresented compared to the county road system average. Thirty percent (30%) of crashes occurred at unsignalized intersections compared to 24% on all county roads. More crashes occurred at or near Lewis/Berry Street, Franklin Boulevard and Matilda, Lawrence and Highland Avenues. Crash frequency in 0.1-mile increments for the three-year period from 2014 through 2016, as shown in the following figure, shows the highest concentration of crashes at Franklin Boulevard.

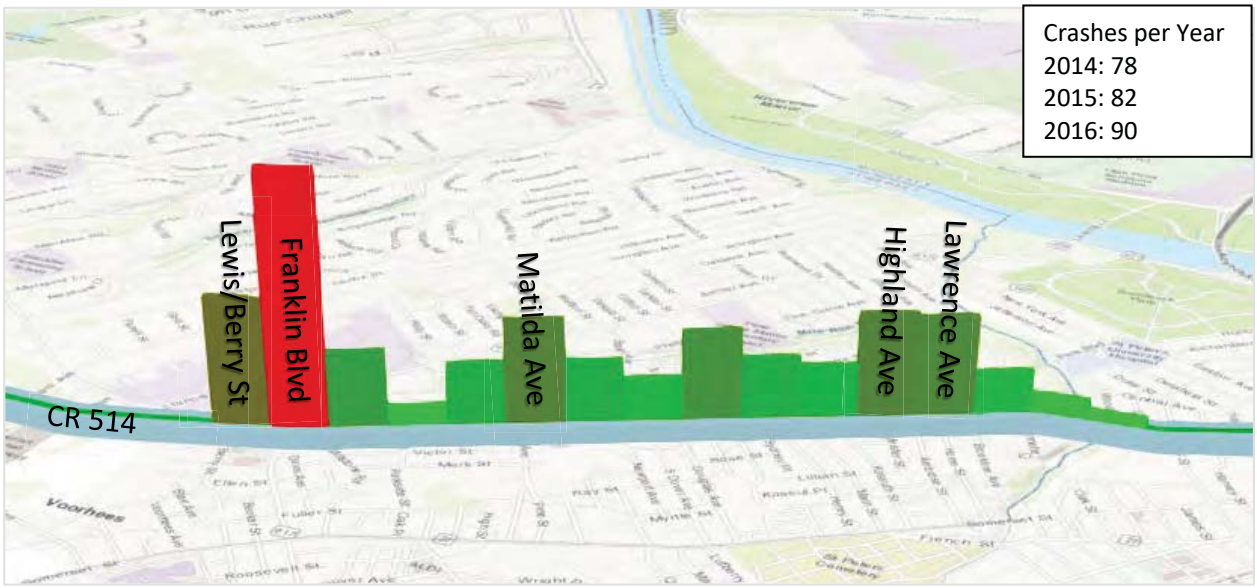


Figure 9 – Total Crash Locations (2014-2016)

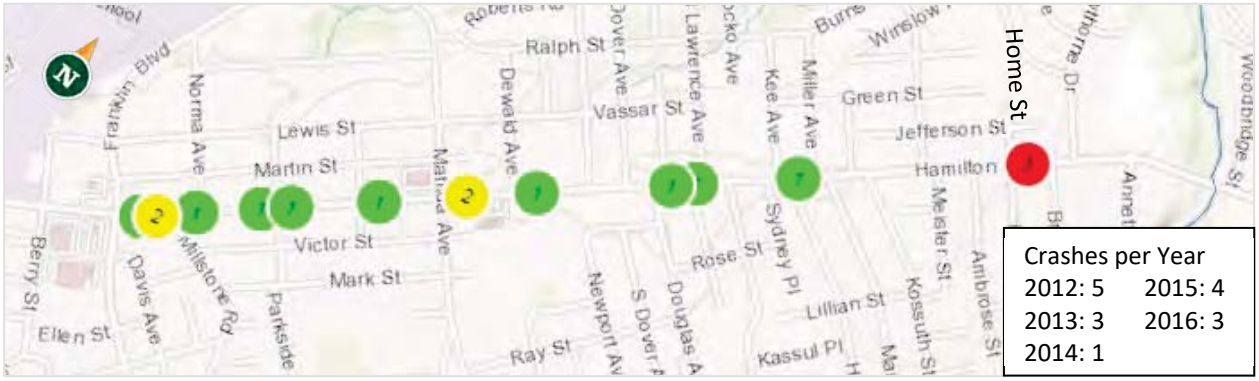
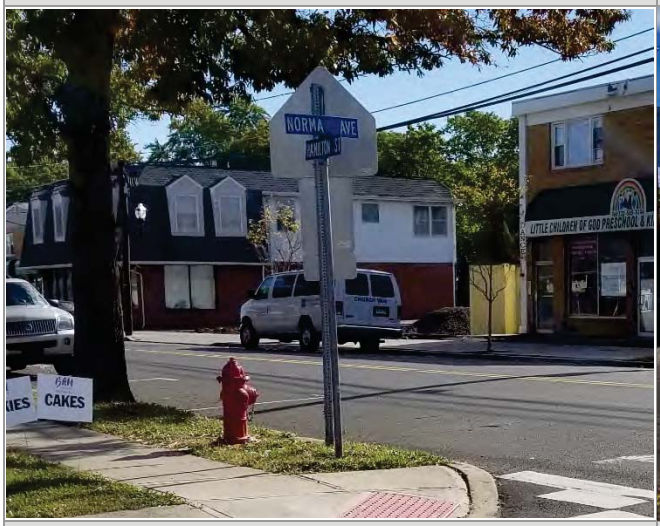
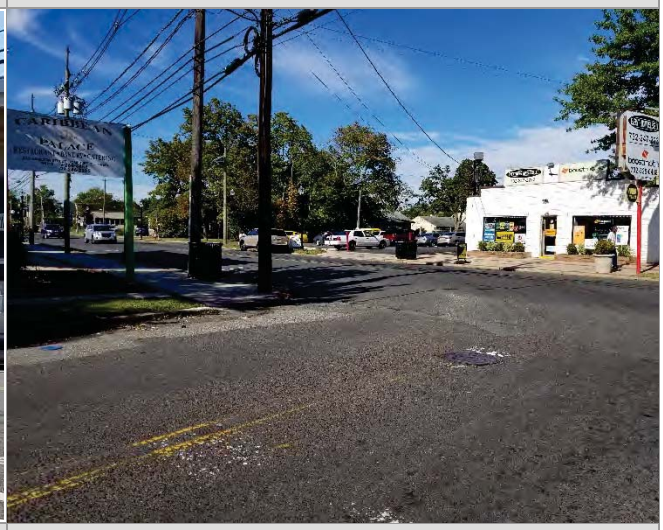


Figure 10 – Pedestrian Crash Locations (2012-2016)

IV. Identified Issues

This section summarizes the site-specific and corridor-wide safety issues identified during the RSA. They are categorized into operations (including visibility), pedestrian, bicyclist, and maintenance. Additional issues and photographs can be found in Appendix F.

Pedestrian	Bicyclist
	
Pedestrians were observed crossing midblock	Lack of on-street bicycle facilities
	
Many side streets lacked sidewalks (Berry St NB)	Many bicyclists were observed riding on sidewalks
	
Parking on sidewalks was a common issue	There was a lack of bicycle corals/racks

Operations & Visibility	Maintenance
	
4-lane section at Berry St causes shadowing crashes	Ponding is an issue at multiple locations
	
Certain signs are obstructing other signage	Many side streets have faded or missing pavement markings
	
Sidewalk not continuous across some driveways	Some curbs and sidewalks are crumbling

Operations & Visibility	Maintenance
	
Signal heads are blocked by overhead wiring	The Nora Shopping Center parking lot needs attention
	
Private fences, hedges and vehicles parked at corner limit driver sight distances and block sidewalk	Overgrown vegetation covers important signage

Additional issues, observations and details identified during the RSA include the following, listed from west to east:

- Berry Street is in a speed transition area (45-35-25 mph) and the four-lane section results in a high number of right angle crashes due to shadowing. There were also a lot of kids crossing here to get to the schools.
- A common issue was cars parked too near the intersection blocking the sight triangle. Other cars were parked in the intersection (especially at T-intersections).

V. Findings and Recommendations

This section summarizes the site-specific and corridor-wide safety issues, potential strategies and recommendations to improve the same, safety benefit, time frame, cost, and jurisdiction. Ratings used in the recommendation tables are described as follows:

Symbol	Meaning	Definition
✓	Low safety benefit potential	May reduce total crashes by 1-25%[1]
✓✓	Low to moderate safety benefit potential	May reduce total crashes by 26-49%[1]
✓✓✓	Moderate safety benefit potential	May reduce total crashes by 50-74%[1]
✓✓✓✓	High safety benefit potential	May reduce total crashes by 75+%[1]
$	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

A. Recommendations

The following represents the specific findings and recommendations made by the independent RSA team. Section B discusses the County's response to these suggestions. RSAs identify opportunities to improve safety, with the understanding that there may be competing or conflicting suggestions, and that some RSA recommendations may not or could not be implemented.

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.

Table 4 – Corridor-Wide Recommendations

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
	Operations				
1	Consider development of an access management plan within the project limits (many sidewalks are disrupted by poorly constructed/wide driveways)	✓	**$$**	◑	County/ Township
2	Investigate on-street parking requirements where business have existing parking lots (parking analysis study) and for conformance with Title 39.	✓[2]	**$$**	◑	Township

[1] Based on existing Crash Modification Factors (CMFs), the Highway Safety Manual (HSM), FHWA Proven Safety Countermeasures and current research, where applicable. All safety benefits are approximate.

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
3	Consider upgrading all ramps for ADA compliance	✓✓✓[2]	**$$$**	◕	County
4	Consider addressing ponding issues at street junctions	✓[2]	**$$**	◑	County
5	Consider corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retroreflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)	✓✓✓	**$$$**	◕	County
6	Consider extending safety improvements listed in this RSA to Francis Street (i.e. speed and/or lane reduction) since this is this is the middle school entrance	✓[2]	**$**	◔	County
7	Study improvements to existing highway and pedestrian scale lighting	✓✓✓	**$$**	◑	County/ Township
8	Investigate converting to a 3-lane section (2 travel lanes, TWLTL and bike lanes; i.e. road diet) west of Franklin Blvd	✓	**$$**	◑	County
9	Explore one-way street operation along side streets such as Berry St (one-way away both sides) and Home St (one-way away northern side)	✓✓	**$**	◑	Township/ County
10	Examine installation of edge lines where there is no parking to help bicyclists and slow vehicular speeds	✓[2]	**$**	◑	County
11	Explore extension of reduced speed limit west of Berry Street either permanently or via school speed limit zone and consider conducting a speed study	✓	**$**	◑	County
12	Consider impacts of new zoning regulations and new residential buildings that will increase number of vehicles/pedestrians within the project area	N/A	**$$**	◕	Township/ County
13	Examine existing cross slope for proper drainage	✓[2]	**$$**	◕	County
14	Investigate the location of boxes, poles, and posts to minimize their interference of sight distances	✓✓	**$$**	◑	Township/ County
15	Investigate timing directives; coordinate signals if they are not currently coordinated	✓✓	**$$**	◑	Township/ County
	Bicycle/Pedestrian				
16	Inspect, repair and construct sidewalks in compliance with ADA as needed.	✓✓✓	**$$**	◔	Township
17	Examine inlets and install bicycle-safe grates	✓[2]	**$$**	◔	County
18	Consider installing a bicycle lane or sharrow striping on Hamilton St per NJ Complete Streets Design Guide (extension of striping in New Brunswick)	✓	**$**	◑	County/ Township

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
19	Study corridor-wide implementation of curb extensions (bump outs) based on the site-specific recommendations to maintain consistency with green infrastructure elements such as bioswales	✓✓[2]	$$	◕	County
20	Investigate widening sidewalk to 10-12' for a shared use path per NJ Complete Streets Design Guide	✓✓✓	$$$	◑	County/ Township
21	Consider accommodations for bicyclists stopped at signalized intersections	None[3]	$	◑	County
	Maintenance				
22	Consider performing necessary foliage trimming and obstacle removal to improve visibility of signs and pedestrian pathways, respectively	✓✓	$	◔	County/ Township
23	Inspect existing crosswalk striping for wear and restripe accordingly	✓✓	$	◔	County
24	Inspect and replace faded, damaged or incorrect/ outdated signage as needed (i.e. signs mounted below 7' or back-to-back signs that obscure shapes [e.g. Do Not Enter behind Stop sign])	✓	$	◔	County
25	Investigate ponding/drainage issues at intersection corners (Millstone, Chester/Shevchenko, N Dover and Baier Avenues)	✓[2]	$$$	◕	County
	Education				
26	Consider sidewalk, crosswalk, multimodal education campaign and code enforcement (Safe Routes to School Plan and Street Smart campaign)	✓[2]	$	◑	County/ Township/ RideWise
27	Consider obtaining observations from residents who seem apprehensive to new developments; added traffic may cause safety concerns	N/A	$	◔	County/ Township

The following site-specific recommendations are in addition to the corridor-wide improvements, except where noted otherwise.

Table 5 – Site-Specific Recommendations

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
	Berry Street				
28	Study the need for a traffic signal or HAWK by performing a warrant analysis per MUTCD	✓✓✓	$$	◕	County
29	Investigate a roundabout	✓✓✓✓	$$$	◕	County

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.
[3] HSM Table 14A-1 indicates that bicycle lanes at signalized intersections appear to have no crash effect. Clearinghouse CMFs range from 0.8 to 2.03.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
30	Consider extending sidewalk onto Berry Street for connectivity to the school (as well as adding a "Gateway" to the schools)	✓✓✓	**$$**	◑	Township
31	Explore prohibiting left turns from Berry Street during peak hours	✓✓✓	**$**	◔	County/ Township
32	Investigate designating this location as an official school crossing	✓[2]	**$$**	◑	Township
33	Consider maintaining one lane westbound past Berry Street and restripe for a shoulder due to the overrepresentation of right angle crashes (ranked #3 in the county for high crash intersection)	✓[2]	**$**	◑	County
34	Consider merging eastbound into one lane west of Berry Street and restripe for a shoulder	✓[2]	**$**	◑	County
35	Investigate installing stop bars on the Berry Street southbound approach to Hamilton Street	✓✓	**$**	◔	County/ Township
36	Consider corridor-wide recommendation 11 regarding the extension of the school speed zone westward, beyond Berry Street	✓	**$**	◑	County
37	Consider sidewalk widening (students walk in roadway due to limited width on sidewalks)	✓✓✓	**$$**	◑	County/ Township
38	Explore options to make pedestrians more visible during school hours (i.e. striping, colored and/or textured pavement, signing, curb extensions)	✓✓	**$**	◔	County/ Township
	Franklin Boulevard				
39	Study additional lead left phasing for Franklin Boulevard approaches	✓	**$**	◔	County
40	Investigate providing unobstructed view of signal heads (currently obstructed by aerial wires)	✓	**$$**	◑	County
41	Consider advanced signing for eastbound lane drop (into left turn only)	✓	**$**	◔	County
42	Explore incorporating Lead Pedestrian Intervals (LPI) into the signal timing	✓✓✓	**$**	◔	County
43	Consider revisions to the signal timing to include pedestrian recall (does not require push button activation) so that pedestrian walk and clearance intervals come up each cycle	✓✓✓[2]	**$**	◔	County
44	Investigate revisions to the NW corner curb radius to accommodate truck turns since they currently traverse over the sidewalk	✓[2]	**$$**	◑	County
45	Consider making the bus stop/shelter ADA compliant (possibly moving back to improve intersection visibility)	✓✓[2]	**$$**	◑	County

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
46	Examine additional delineation of lane use via striping along WB approach	✓	$	◔	County
47	Explore options to make pedestrians more visible during school hours (i.e. striping, colored and/or textured pavement, signing, curb extensions)	✓✓	$	◔	County/ Township
48	Consider corridor-wide recommendation 11 regarding the extension of the speed zone	✓	$	◑	County
49	Investigate a road diet to accommodate left turning vehicles and bicyclists between Franklin Boulevard and Berry Street	✓✓	$$	◑	County
	Millstone Road				
50	Consider removal of any existing on-street parking striping between this intersection and Norma Ave	✓	$	◔	County/ Township
51	Explore geometric changes to the Millstone Road approach to make it perpendicular and reduce pedestrian crossing distance	✓✓[2]	$$$	◕	County/ Township
52	Consider upgrading sidewalks and ramps for ADA compliance	✓✓✓[2]	$$	◑	County/ Township
53	Investigate additional signing since this intersection is adjacent to a school crossing	✓	$$	◑	County
54	Explore feasibility of installing HAWK via MUTCD warrant analysis	✓✓✓	$$$	◕	Township/ County
55	Consider the removal of on-street parking on Hamilton Street WB, between Norma Avenue and Millstone Road (see corridor-wide recommendation 2 regarding a parking study)	✓	$	◔	County/ Township
	Norma Avenue, Chester/Shevchenko Avenue & N. Dover Avenue				
56	Investigate installing curb extensions to reduce crossing time across Hamilton Street	✓✓[2]	$$$	◕	County/ Township
57	Consider adding curb along Chester/Shevchenko Avenues	✓	$$	◑	Township
58	Consider adding crosswalks across Hamilton Street	✓✓	$	◔	County
59	Study the need for a traffic signal at Chester/ Shevchenko Avenues by performing a warrant analysis per MUTCD	✓✓✓	$$$	◕	Township/ County
	Pershing Avenue				
60	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓	$$	◕	County
61	Consider connecting northern sidewalk between Pershing and Chester/Shevchenko Avenues (missing slabs) and replacement where settlement was	✓	$	◔	Township

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
	patched with asphalt between this intersection and Norma Avenues				
62	Consider corridor-wide recommendation 3 regarding ADA upgrades	✓✓✓	$$	◑	County
63	Examine intersection sight distance and consider clearing vegetation to improve the same	✓✓	$	◔	Township/ County
	Matilda Avenue				
64	Consider corridor-wide recommendation 5 regarding signal upgrades (i.e. countdown pedestrian signal heads and corresponding push button signs)	✓✓	$$	◑	County
65	Consider corridor-wide recommendation 3 regarding ADA upgrades	✓✓✓	$$	◑	County
66	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓	$$	◕	County
67	Consider adding a sidewalk along Matilda Avenue	✓✓✓	$	◔	Township
68	Investigate the cause of many potholes at this intersection	✓[2]	$	◔	Township/ County
69	Investigate intersection operation due to impacts of new residential development south of intersection	N/A	$	◔	Township/ County
	Dewald Avenue				
70	Explore feasibility of installing HAWK via MUTCD warrant analysis	✓✓✓	$$	◕	County
71	Investigate a roundabout	✓✓✓✓	$$$	◕	County
72	Evaluate a speed table and pedestrian crossing signs	✓✓	$$	◑	County
73	Investigate how new housing development in NW corner will impact intersection operation	N/A	$	◔	Township/ County
	Baier Avenue				
74	Consider upgrades to the existing emergency preemption for the firehouse and possibly incorporating the same into all signals	✓✓[2]	$$	◑	Township/ County
75	Investigate installing a crosswalk on the westbound approach	✓✓	$	◔	County
76	Consider corridor-wide recommendation 5 regarding signal upgrades	✓✓	$$	◑	County
77	Consider corridor-wide recommendation 3 regarding ADA upgrades	✓✓✓	$$	◑	County
78	Explore Do Not Block intersection markings	✓✓[2]	$$	◔	County

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
79	Investigate impact of new development on NW corner that will have: parking (1st floor), retail (2nd), residential (3rd)	N/A	**$**	◕	Township/ County
	Douglas Avenue				
80	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
81	Consider elimination of on-street parking to improve intersection sight distance in conformance with Title 39	✓	**$**	◔	Township/ County
82	Explore on-street parking restrictions since vehicles are parking too close to the corner in conformance with Title 39	✓	**$**	◔	Township/ County
83	Consider realigning intersection	✓✓[2]	**$$$**	◕	County
84	Consider adding a crosswalk across Douglas Avenue	✓✓	**$**	◔	County
	N. Lafayette Street				
85	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
86	Consider installing a striped crosswalk to cross Hamilton Street. Because pedestrians were hit crossing at striped crosswalks both on Hamilton Street and Douglas Avenue, consider installing some type of traffic control signal flashing beacon, HAWK, etc., in conjunction with the striped crosswalk to Hamilton Street.	✓✓	**$**	◔	County
	N. & S. Lawrence Avenue				
87	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
88	Consider revisions to the sidewalk area (to reduce areas that give the appearance of a crossing point), green infrastructure elements such as pervious strips, and on-street parking adjacent to Nora Shopping Center in conformance with Title 39	✓	**$$**	◑	County/ Township
89	Examine removal or relocation of the solid fence in the NW corner of N. Lawrence Avenue that is obstructing intersection sight distance	✓✓	**$**	◔	Township
90	Investigate consolidating Nora Shopping Center driveways (from Lawrence Avenue to Kee Avenue)	✓	**$**	◑	Township
91	Investigate left turn lane (many cars are passing left turning vehicles in the parking lane)	✓	**$**	◔	County

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
	Prospect Street				
92	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
93	Explore feasibility of installing HAWK via MUTCD warrant analysis	✓✓✓	**$$**	◕	County
94	Consider foliage maintenance to improve sight distance at this intersection	✓✓	**$$**	◑	County
	Sydney Place				
95	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
96	Consider enhanced signing and delineation of the crosswalk between this intersection and Kee Avenue	✓	**$**	◔	County
	Kee Avenue & Henry Street				
97	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
98	Explore on-street parking restrictions since vehicles are parking too close to the corner in conformance with Title 39	✓	**$**	◔	Township/ County
99	Consider adding and/or restriping worn crosswalk and stop bars on the Kee Avenue and Henry Street approaches	✓✓	**$**	◔	County
	Miller and Dunham Avenues & Meister and Ambrose Streets				
100	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
	Main Street				
101	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County
102	Examine removal or relocation of the fence and vegetation in the SE corner that is obstructing sight distance	✓✓	**$**	◔	Township
103	Consider replacing the stop sign due to its poor condition	✓	**$**	◔	County
	Kossuth Street/Dunham Ave				
104	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	**$$**	◕	County

[2] CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
105	Consider replacing the stop sign due to its poor condition	✓	$	◔	County
106	Investigate the lack of sidewalk at Dunham Avenue	✓✓✓	$$	◑	Township
	Highland Avenue				
107	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks (also along minor street)	✓✓[2]	$$	◕	County
108	Investigate realigning the crosswalk on the westbound approach	✓✓	$	◔	County
109	Consider relocation of controller and meter cabinet	✓✓	$	◔	County
110	Access management should be examined, especially for the Delta station on the NE corner	✓	$	◑	County/ Township
111	Consider corridor-wide recommendations 3 & 4 regarding signal and ADA upgrades	✓✓	$$	◑	County
	Home Street, Brookline Avenue, Hawthorne Drive				
112	Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks	✓✓[2]	$$	◕	County
113	Consider advanced warning (maybe flashing) signs for WB traffic due to vertical curve	✓✓[2]	$	◔	County
114	Explore installing a crosswalk and pedestrian refuge island at Brookline Avenue or Hawthorne Drive	✓✓✓	$$	◑	County
	Annette Court				
115	Consider upgrading the existing pedestrian crossing sign and supplemental plaque to current standard	✓	$	◔	County
116	Consider enhanced delineation and friction for the horizontal curve east of this intersection (chevrons and curve warning signs)	✓✓	$$	◑	County
117	Consider advanced warning (maybe flashing) signs for WB traffic	✓✓[2]	$	◔	County
118	Explore adding a WB, climbing bicycle lane	✓	$$	◑	County

Of note, during the field visit, worn and outdated signs noted by the RSA Team were "called in" to the responsible agency to be flagged for replacement. There was also at least one instance where the police officers on the RSA Team had to stop traffic to allow team members to cross Hamilton Street.

B. Road Owner Response

An important part of the RSA 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 RSA's findings, the road owner must bear in mind 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 time and funds allow in coordination with other projects and priorities. It is also understood that there may be competing or conflicting suggestions, and that some RSA recommendations may not or could not be implemented.

Somerset County delivered their response following the finalization of the findings and recommendations table, a copy of which can be found in Appendix J.

C. Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in Tables 4 and 5 are shown below and are based on current practices and standards. Descriptions and images of each treatment are from the *2017 NJ Complete Street Design Guide* (CSDG) and NACTO's *Urban Street Design Guide* (NACTO-US) and *Urban Bikeway Design Guide* (NACTO-UB), including sources contained therein.

1. Pedestrian Facilities

Curb extensions visually and physically narrow the roadway at intersections and midblock locations, creating safer and shorter pedestrian crossings, while increasing the available space for streetscape. They increase the overall visibility of pedestrians by aligning them with the parking lane and help prohibit vehicles from parking in violation of Title 39. Crossing islands, or pedestrian refuge islands, reduce the exposure time of pedestrians to vehicular traffic. They enable pedestrians to make a crossing in two stages — crossing one direction of vehicular travel lanes, pausing at the island, and then completing the crossing. They are recommended where a pedestrian must cross three lanes of traffic in one or both directions but may be implemented on smaller cross sections where space permits.

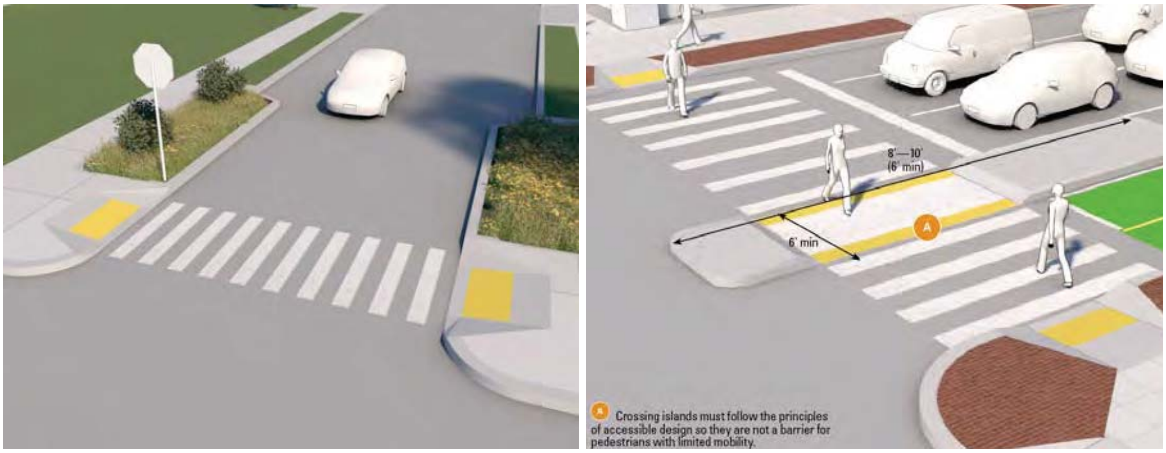


Figure 11 – Pedestrian Facility Examples
Left: Curb Extension. Right: Crossing Island (Source: CSDG)

2. Bicycle Facilities

Bicycle lanes provide an exclusive space for bicyclists using pavement markings and signage. Intended for one-way travel, they are typically located on both sides of a two-way street. Bicycle lanes enable bicyclists to ride at their preferred speed, free from interference from motorists. Where it is not feasible or appropriate to provide dedicated bicycle facilities, shared-lane markings (e.g. "sharrows") may be used to indicate a shared environment for bicycles and vehicles, such as the ones currently implemented along Hamilton Street in New Brunswick.

Bicycle lanes and shared-lane markings should be extended through intersections and major driveways to enhance continuity, guide bicyclists through the intersection, and improve driver awareness of bicycle activity and movement.

Figure 12 – Bicycle Facility Examples

Left: Bicycle Lane Adjacent to Parking or Curb (Source: NACTO-UB). Right: Sharrow Markings (Source: CSDG)

3. Roadway Reconfiguration

This treatment allows reallocation of existing street space (i.e. roadway cross section) to accommodate multi-modal users. Lane configuration and width for travel, turning movements, parking, and bicycle lanes can be adjusted to optimize use for vehicles, pedestrians, bicyclists and transit. The most common roadway reconfiguration, known as a road diet, involves converting an existing four-lane undivided segment into a three-lane segment with two through lanes and a center two-way left turn lane (TWLTL). On an existing two-lane roadway that currently has room on both sides for parking, the road diet could still be implemented to repurpose the cross section for bicycle lanes, bus stops and/or to widen sidewalks.

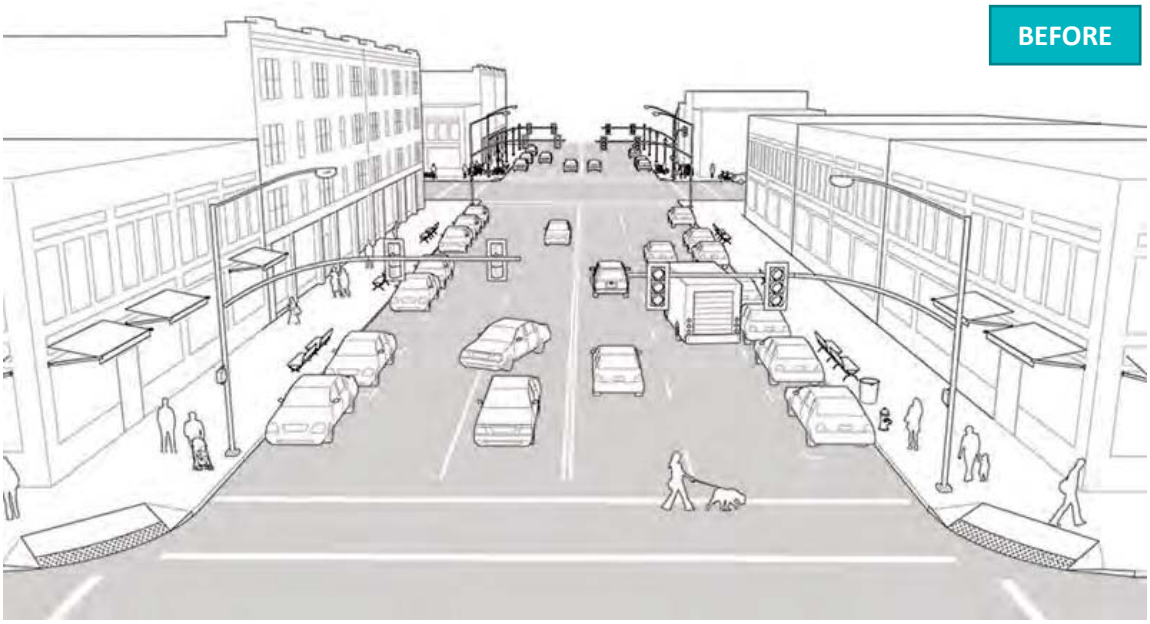


Figure 13 – Typical Four-Lane Main Street Typology (Source: NACTO-US)

Figure 14 – Typical Road Diet Application on a Main Street Typology (Source: NACTO-US)

4. Roundabout

Roundabout design, which was recommended at the intersection of Hamilton Street and Dewald Avenue, should create conditions that reduce vehicle speed and provide a consistent speed into, through, and out of the roundabout. Lower speeds reduce crash frequency and severity for all roadway users, allow safer and easier merging of traffic, provide more reaction time for drivers, and make the facility more accessible for novice users.

Figure 15 – Roundabout Example (Source: CSDG)

Of note, roundabouts typically take up more space than a conventional four-way intersection, but they can also be scaled to fit a wide range of contexts and street typologies. Urban compact roundabouts can balance efficient vehicle flow with the needs of bicyclists and pedestrians.

5. Green Infrastructure

Bioswales are vegetated, shallow, landscaped depressions designed to capture, treat, and infiltrate stormwater runoff as it moves downstream. They are the most effective type of green infrastructure facility in slowing runoff velocity and cleansing water while recharging the underlying groundwater table. They have flexible siting requirements, allowing them to be integrated with medians, curb extensions, and other public space or traffic calming strategies.

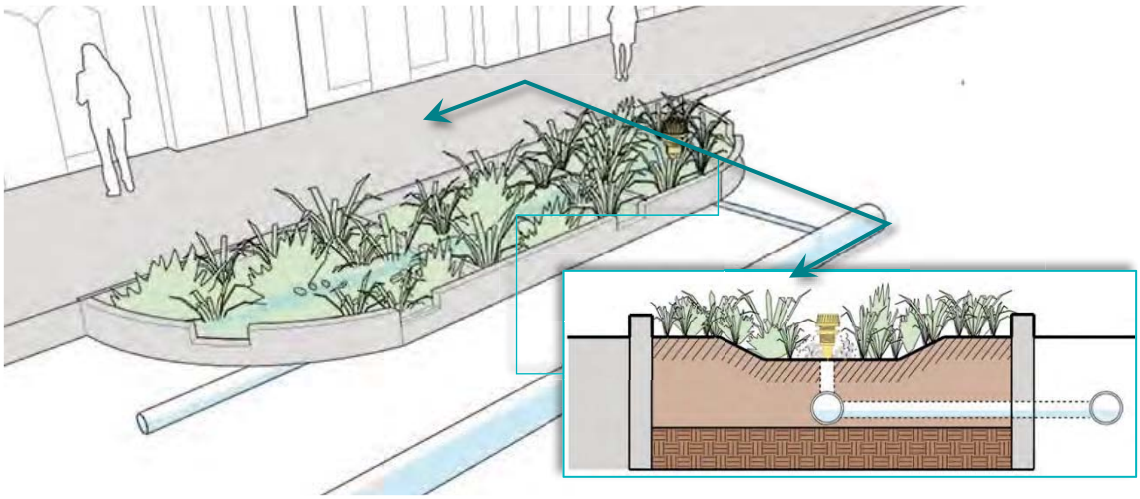


Figure 16 – Example of Bioswale

Pervious strips are long, linear landscaped areas or linear areas of pervious pavement that capture and slow runoff. Depending on the underlying subsurface soil condition, pervious strips can provide some infiltration, but to a much lesser extent than bioswales. Irrigation requirements can be reduced by using pervious pavement and native plantings.

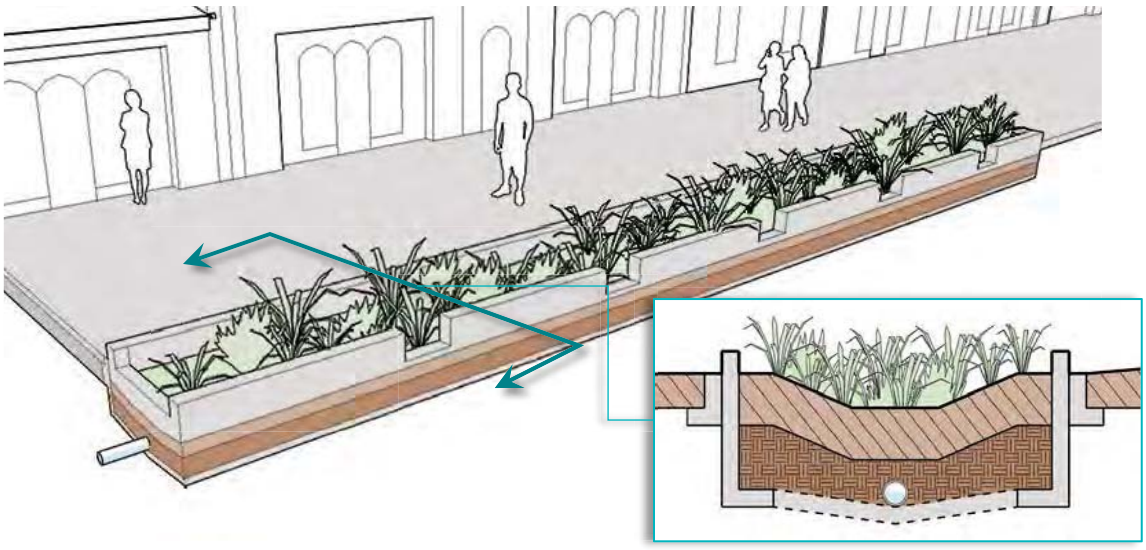


Figure 17 – Example of Pervious Strips

VI. Conclusions

The Hamilton Street RSA was conducted to identify safety issues and corresponding countermeasures that compromise multimodal use of the roadway. The team identified a long list of issues from the field visit, as well as many practical short-, mid- and long-term improvements during the post-audit.

The recommendations documented in this report are designed to improve safety for all users of Hamilton Street. Some of the strategies identified can be implemented through routine maintenance; all will be constrained by available time and budgetary priorities. The audit process and the resulting final document highlight the safety issues and present the needed improvements by location organized for systematic implementation by the roadway owner.

It is important to note that when it comes to improving safety, engineering strategies alone only go so far, especially in areas undergoing redevelopment. Education, with support from a targeted enforcement campaign, is an effective approach for addressing driver and pedestrian behaviors that lead to crashes. Employing a multipronged approach is an effective course of action to advance the goal of improved safety on the corridor.

Appendix A – RSA Team

Audit Team

Name	Agency
Erik Hagman	Franklin Township
Jose Jaime	Franklin Township
John Hauss	Franklin Township
Adam Slutsky	Somerset County
Kenneth Wedeen	Somerset County
Andras Holzmann	Somerset County
Patricia Bates Smith	Somerset County
Bill Prygrocki	Somerset County
Gerry Montague	Somerset County RideWise
Caroline Trueman	FHWA – NJ
Dan LiSanti	NJDOT – Bureau of Transportation Data and Safety
Amon Boucher	NJDOT – Bureau of Transportation Data and Safety
Mark Tozzi	NJDOT – Bureau of Transportation Data and Safety
Pavan Sheth	NJDOT – Bureau of Transportation Data and Safety
Nipa Maniar	NJDOT – Office of Bicycle and Pedestrian Programs
Rela Oduro	NJDOT – Office of Bicycle and Pedestrian Programs
Christine Mittman	NJTPA
Aimee Jefferson	NJTPA
Bernie Boerchers	Greenman-Pedersen, Inc. (NJDOT Consultant)
Andrew Halloran	Greenman-Pedersen, Inc.
Julia Steponanko	Greenman-Pedersen, Inc.

Appendix B – Area Map

NJDOT HSIP
ROAD SAFETY AUDIT
CR 514 (HAMILTON ST)

FRANKLIN TOWNSHIP
SOMERSET COUNTY

PROJECT LOCATION

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

N.T.S.

Appendix C – Traffic Data

New Jersey Department of Transportation

Daily Volume from 04/29/2015 through 05/01/2015

Site Names: 4-4-422, , HAMILTON ST-21.89, 00000514__, Franklin Twp
County: SOMERSET
Funct. Urban Minor Arterial
Location: BET ANNAPOLIS ST GIRARD AVE

Seasonal Factor Group: RG3_FC16
Daily Factor Group: RG3_FC16
Axle Factor Group: RG3_FC16
Growth Factor Group: RG3_FC16

	Sun 04/26/2015			Mon 04/27/2015			Tue 04/28/2015			Wed 04/29/2015			Thu 04/30/2015			Fri 05/01/2015			Sat 05/02/2015		
	ROAD	W	E	ROAD	W	E	ROAD	W	E	ROAD	W	E	ROAD	W	E	ROAD	W	E	ROAD	W	E
00:00													129	48	81	126	62	64			
01:00													55	33	22	61	32	29			
02:00													42	32	10	41	23	18			
03:00													38	24	14	44	31	13			
04:00													75	39	36	78	41	37			
05:00													160	71	89	160	82	78			
06:00													579	330	249	554	326	228			
07:00													1,383	627	756	1,310	619	691			
08:00													1,524	586	938	1,454	565	889			
09:00													1,113	466	647	1,085	449	636			
10:00													831	368	463	890	422	468			
11:00													774	387	387	898	456	442			
12:00										886	432	454	859	432	427						
13:00										973	488	485	923	458	465						
14:00										1,051	577	474	1,069	600	469						
15:00										1,333	724	609	1,351	754	597						
16:00										1,436	835	601	1,503	859	644						
17:00										1,584	884	700	1,574	875	699						
18:00										1,327	718	609	1,377	702	675						
19:00										1,072	567	505	1,097	573	524						
20:00										718	401	317	745	409	336						
21:00										498	286	212	573	312	261						
22:00										388	198	190	442	266	176						
23:00										229	110	119	262	126	136						
Volume										11,495	6,220	5,275	18,478	9,377	9,101	6,701	3,108	3,593			
AM Peak Vol													1,536	646	943	1,486	646	902			
AM Peak Fct													0.91	0.83	0.89	0.97	0.90	0.95			
AM Peak Hr													7:45	7:15	7:45	7:30	7:15	7:45			
PM Peak Vol										1,591	904	712	1,615	938	755						
PM Peak Fct										0.93	0.95	0.92	0.97	0.95	0.97						
PM Peak Hr										16:45	16:45	17:15	16:45	16:45	17:30						
Seasonal Fct										0.984	0.984	0.984	0.984	0.984	0.984	0.972	0.972	0.972			
Daily Fct										1.001	1.001	1.001	0.959	0.959	0.959	0.884	0.884	0.884			
Axle Fct										0.489	0.489	0.489	0.489	0.489	0.489	0.490	0.490	0.490			
Pulse Fct										2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000			

Collected NJDOT
Created 11/20/2015 1:26:06PM

ROAD AADT 16,885 **W AADT 8,631** **E AADT 8,253**

New Jersey Department of Transportation

Daily Volume from 04/29/2011 t5rouh5 04/24/2011

Site Names: 4-4-423, , HAMILTON ST-23.79, 00000514__, Franklin Twp
County: SOMERSET
Funct. Urban Minor Arterial
Location: BET ANNETTE ST WOODBRIDGE ST

Seasonal Factor Type: 2 Urban Other Roadways
Daily Factor Type: 2 Urban Other Roadways
Axle Factor Type: 16
Growth Factor Type:

	gun 04/22/2011			S on 04/29/2011			Tue 04/26/2011			Me7 04/24/2011			T5u 04/28/2011			Wri 04/2d/2011			gat 04/23/2011		
	FROD	M	A	FROD	M	A	FROD	M	A	FROD	M	A	FROD	M	A	FROD	M	A	FROD	M	A
00I00							121	76	45	134	89	45									
01I00							57	32	25	87	57	30									
02I00							52	34	18	67	42	25									
09I00							30	13	17	44	25	19									
06I00							58	17	41	56	15	41									
04I00							174	58	116	180	65	115									
08I00							473	139	334	483	152	331									
0dI00							811	267	544	795	245	550									
03I00							909	312	597	889	292	597									
0: I00							625	273	352	605	230	375									
10I00							505	244	261	496	218	278									
11I00							517	261	256	549	273	276									
12I00							605	301	304	608	307	301									
19I00							697	339	358	644	314	330									
16I00							641	330	311	679	362	317									
14I00				757	415	342	932	560	372												
18I00				904	601	303	1,013	631	382												
1dI00				1,063	705	358	1,113	719	394												
13I00				761	447	314	837	483	354												
1: I00				586	312	274	717	395	322												
20I00				501	267	234	573	314	259												
21I00				411	235	176	491	277	214												
22I00				288	163	125	320	180	140												
29I00				189	110	79	233	126	107												
Volume				5,460	3,255	2,205	12,504	6,381	6,123	6,316	2,686	3,630									
OS Peak Vol							952	349	660	943	312	631									
OS Peak Wet							0.97	0.91	0.93	0.97	0.96	0.97									
OS Peak Hr							7:45	8:15	7:45	7:45	7:45	7:30									
PS Peak Vol							1,185	777	408												
PS Peak Wet							0.91	0.88	0.91												
PS Peak Hr							16:30	16:30	16:30												
geasonal Wet				0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973									
Daily Wet				1.055	1.055	1.055	0.956	0.956	0.956	0.934	0.934	0.934									
Oxle Wet				0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.489									
Pulse Wet				2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000									

Created 07/19/2011 10:13:42AM **FROD OODT 11,294** **M OODT 4,d90** **A OODT 4,404** DV03: Page 1 of 1

New Jersey Department of Transportation

Daily Volume from 07/15/2014 through 07/18/2014

Site Names: 4-8-981, , DOUGLAS AVE-.27, 18081646__, Franklin Twp
County: SOMERSET
Funct. Urban Collector
Location: BET CO 514 NJ 27

Seasonal Factor Group:
Daily Factor Group:
Axle Factor Group:
Growth Factor Group:

	Sun 07/13/2014			Mon 07/14/2014			Tue 07/15/2014			Wed 07/16/2014			Thu 07/17/2014			Fri 07/18/2014			Sat 07/19/2014		
	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N
00:00										26	13	13	34	17	17	50	20	30			
01:00										14	8	6	22	6	16	22	10	12			
02:00										9	2	7	22	11	11	19	7	12			
03:00										10	6	4	11	7	4	17	7	10			
04:00										21	6	15	18	8	10	24	13	11			
05:00										46	20	26	51	21	30	55	25	30			
06:00										120	70	50	128	74	54	123	69	54			
07:00										142	69	73	152	81	71	150	75	75			
08:00										161	80	81	168	80	88	158	73	85			
09:00										153	75	78	150	74	76	174	84	90			
10:00							148	72	76	142	65	77	158	72	86	167	90	77			
11:00							157	73	84	188	95	93	176	95	81	186	94	92			
12:00							195	100	95	197	102	95	217	112	105	203	92	111			
13:00							177	84	93	173	93	80	170	95	75						
14:00							188	84	104	182	77	105	186	95	91						
15:00							205	93	112	196	89	107	193	99	94						
16:00							221	104	117	230	98	132	276	141	135						
17:00							248	112	136	243	122	121	241	117	124						
18:00							207	93	114	263	135	128	272	140	132						
19:00							191	87	104	209	94	115	234	117	117						
20:00							119	53	66	171	82	89	183	88	95						
21:00							112	51	61	159	75	84	159	76	83						
22:00							80	30	50	100	45	55	103	46	57						
23:00							69	34	35	75	33	42	76	39	37						
Volume							2,317	1,070	1,247	3,230	1,554	1,676	3,400	1,711	1,689	1,348	659	689			
AM Peak Vol										188	95	93	176	95	94	186	96	96			
AM Peak Fct										0.83	0.68	0.80	0.88	0.91	0.90	0.85	0.77	0.80			
AM Peak Hr										11:00	11:00	11:00	11:00	11:00	10:15	11:00	9:30	10:30			
PM Peak Vol							254	126	136	266	136	132	281	141	145						
PM Peak Fct							0.95	0.96	0.94	0.91	0.85	0.77	0.79	0.90	0.81						
PM Peak Hr							17:15	17:15	17:00	17:30	17:45	15:45	17:30	16:00	17:30						
Seasonal Fct							1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Daily Fct							1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Axle Fct							0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500			
Pulse Fct							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000			

Collected NJDOT
Created 09/03/2014 1:25:22PM

ROAD AADT 3,254 **S AADT 1,576** **N AADT 1,678**

New Jersey Department of Transportation

Daily Volume from 07/15/5017 t2rou42 07/1h/5017

Site Names: 111815, , FRANKLIN BLVD-.27, 18000617__, Franklin Twp
County: SOMERSET
Funct. Urban Minor Arterial
Location: BET ELLEN ST DAVIS AVE

Seasonal Factor Group: RG3_FC16
Daily Factor Group: RG3_FC16
Axle Factor Group: RG3_FC16
Growth Factor Group: RG3_FC16

	gun 07/10/5017			8 on 07/11/5017			Tue 07/15/5017			S e3 07/1M5017			T2u 07/1h/5017			Wri 07/17/5017			gat 07/1d/5017		
	6 F 9 D	g	N	6 F 9 D	g	N	6 F 9 D	g	N	6 F 9 D	g	N	6 F 9 D	g	N	6 F 9 D	g	N	6 F 9 D	g	N
00I00										127	60	67	120	59	61						
01I00										54	31	23	81	43	38						
05I00										59	27	32	41	16	25						
0MI00										46	22	24	55	31	24						
0hI00										68	38	30	67	36	31						
07I00										270	146	124	229	129	100						
0dI00										663	373	290	651	335	316						
0CI00										839	422	417	861	466	395						
0AI00										957	545	412	963	566	397						
0:I00										839	452	387	813	446	367						
10I00										777	379	398	793	409	384						
11I00										744	377	367	749	380	369						
15I00										854	449	405	904	453	451						
1MI00							949	482	467	842	442	400									
1hI00							924	470	454	924	429	495									
17I00							958	432	526	1,008	466	542									
1dI00							1,065	502	563	1,032	502	530									
1CI00							1,131	527	604	1,138	532	606									
1AI00							974	485	489	999	532	467									
1:I00							870	434	436	975	509	466									
50I00							725	357	368	717	357	360									
51I00							612	309	303	614	318	296									
55I00							390	189	201	358	184	174									
5MI00							260	139	121	289	154	135									
Volume							8,858	4,326	4,532	15,193	7,746	7,447	6,327	3,369	2,958						
9 8 Peak Vol										959	563	427	963	566	414						
9 8 Peak Wet										0.93	0.89	0.95	0.96	0.96	0.94						
9 8 Peak Hr										8:15	8:15	7:45	8:00	8:00	6:30						
P8 Peak Vol										1,138	540	606									
P8 Peak Wet										0.95	0.91	0.90									
P8 Peak Hr										17:00	17:30	17:00									
geasonal Wet							0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972						
Daily Wet							0.954	0.954	0.954	0.946	0.946	0.946	0.955	0.955	0.955						
9 xle Wet							0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490						
Pulse Wet							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						

Collected NJDOT
Created 11/20/2015 1:26:25PM

6 F 9 D 9 9 DT 1M,ChA g 9 9 DT d,: AA N 9 9 DT d,Q10

New Jersey Department of Transportation

Daily Volume from 07/15/1024 through 07/80/1024

Site I a0 es: 111516, , FRAI VUNI BULDK1, 15- - - 61. __, Fran2lin Twp
County: S8 b ERSET
Funct7 MrOan b inor Arterial
Uocation: BET L NVNI G AL E BEUb AR ST

Seasonal Factor Group: RG3_FC16
Daily Factor Group: RG3_FC16
Axle Factor Group: RG3_FC16
Growth Factor Group:

	Sun 07/17/1024			3 on 07/1M1024			Tue 07/1W1024			d e6 07/15/1024			Thu 07/1F/1024			9ri 07/80/1024			Sat 07/82/1024		
	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N
00:00													1k1	. 1	. -	16.	53	5k			
02:00													m6	3k	99	4-	k-	m			
01:00													kk	91	93	. 9	35	3k			
08:00													63	3m	95	. -	3k	36			
04:00													1- 6	mk	m9	115	m4	m4			
07:00													969	133	194	959	13-	1m9			
0M:00													. 91	39m	346	. m1	3. 3	3. 5			
0W:00													1,1k6	mm9	m4k	1,- 5-	m39	mk5			
05:00													1,9- 4	m4-	614	1,1. m	61k	m61			
0F:00													1,- 14	k4-	m94	1,- 3k	k. 4	mmm			
20:00										51-	34m	k1m	4- 3	k1m	k55						
22:00										5m6	k- 5	kk5	5m6	k- 3	km3						
21:00										561	kk3	k15	4- 6	k- 5	k45						
28:00										54-	kk9	kk5	43k	k. 5	km6						
24:00										1,- 69	m1k	mk5	1,13k	m5m	mk4						
27:00										1,969	6- .	6nm	1,335	6- 5	. 3-						
2M:00										1,9m5	63m	693	1,95-	6- -	65-						
2W:00										1,k- k	6- 4	. 4m	1,kk-	6k3	. 4.						
25:00										1,996	691	6- m	1,3- k	6. k	63-						
2F:00										413	kk1	k. 9	1,- 16	m3m	k51						
10:00										64k	363	331	563	km	k- 6						
12:00										m6.	31m	9m9	6. m	3m-	39m						
11:00										k15	93k	15k	k35	939	9- 6						
18:00										956	1kk	1k9	3- .	166	1k1						
Volume										19,m- .	6,1. 1	6,336	15,161	5,5m4	4,3- 9	k,534	9,359	9,km			
A3 Peak Vol													1,939	613	614						
A3 Peak 9ct													- 74k	- 74m	- 743						
A3 Peak Hr													5:1m	5:1m	5:- -						
P3 Peak Vol										1,k31	666	. 4m	1,kk1	656	. 4.						
P3 Peak 9ct										- 74.	- 74.	- 74.	- 74m	- 749	- 75.						
P3 Peak Hr										16:km	16:3-	1. :- -	1. :1m	1. :km	1. :- -						
Seasonal 9ct										- 74km	- 74km	- 74km	- 74km	- 74km	- 74km	- 74km	- 74km	- 74km			
Daily 9ct										- 74k6	- 74k6	- 74k6	- 7414	- 7414	- 7414	- 75. 1	- 75. 1	- 75. 1			
Axle 9ct										- 7k41	- 7k41	- 7k41	- 7k41	- 7k41	- 7k41	- 7k41	- 7k41	- 7k41			
Pulse 9ct										97- -	97- -	97- -	97- -	97- -	97- -	97- -	97- -	97- -			

Collected I JD8 T
Created - 5/13/9- 1k 1- :k3:1mAb

ROAD AADT 27,2F0 **S AADT W,44F** **N AADT W,WW2**

Appendix D – Vehicular Crash Diagrams

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
1	06:42	THU	01-02-14	0	DRY	CLEAR	DARK
2	18:29	MON	01-06-14	1	DRY	CLEAR	DARK
8	17:43	TUE	02-11-14	0	DRY	CLEAR	DAY
13	19:03	SAT	03-08-14	0	DRY	CLEAR	DARK
22	15:48	MON	05-12-14	0	DRY	CLEAR	DAY
27	12:48	THU	05-29-14	0	DRY	CLEAR	DAY
35	17:41	TUE	07-15-14	0	WET	RAIN	DAY
39	07:46	MON	07-21-14	0	DRY	RAIN	DAY
56	08:59	MON	10-27-14	1	DRY	CLEAR	DAY
57	17:08	TUE	10-28-14	3	DRY	CLEAR	DAY
62	15:02	FRI	11-14-14	0	DRY	CLEAR	DAY
70	16:39	THU	12-18-14	0	DRY	CLEAR	DARK
71	17:15	THU	12-18-14	1	DRY	CLEAR	DARK
79	14:57	THU	01-15-15	1	DRY	CLEAR	DAY
81	17:21	FRI	02-06-15	0	DRY	CLEAR	DARK
90	18:15	MON	03-02-15	2	DRY	CLEAR	DARK
102	17:58	TUE	04-14-15	0	DRY	OVERCAST	DAY
107	17:39	THU	04-30-15	0	DRY	CLEAR	DAY
110	15:37	TUE	05-26-15	1	DRY	CLEAR	DAY
173	16:12	WED	03-09-16	0	DRY	CLEAR	DAY
174	18:39	WED	03-09-16	0	DRY	CLEAR	DARK
180	14:44	WED	03-30-16	0	DRY	CLEAR	DAY
190	18:17	WED	05-04-16	0	WET	RAIN	DAY
191	15:37	FRI	05-06-16	1	WET	RAIN	DAY
194	18:30	TUE	05-17-16	0	WET	RAIN	DAY
198	19:18	FRI	05-27-16	0	DRY	CLEAR	DAY
200	17:14	TUE	06-07-16	0	DRY	CLEAR	DAY
201	07:35	MON	06-20-16	0	DRY	CLEAR	DAY
218	17:19	FRI	09-02-16	0	DRY	CLEAR	DAY
222	17:13	TUE	10-04-16	0	DRY	CLEAR	DAY
224	07:46	THU	10-13-16	0	DRY	CLEAR	DAY
233	16:30	WED	11-16-16	0	DRY	CLEAR	DAY

1/9

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	24
INJURIES	8
FATALITIES	0
TOTAL NO. OF CRASHES	32

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

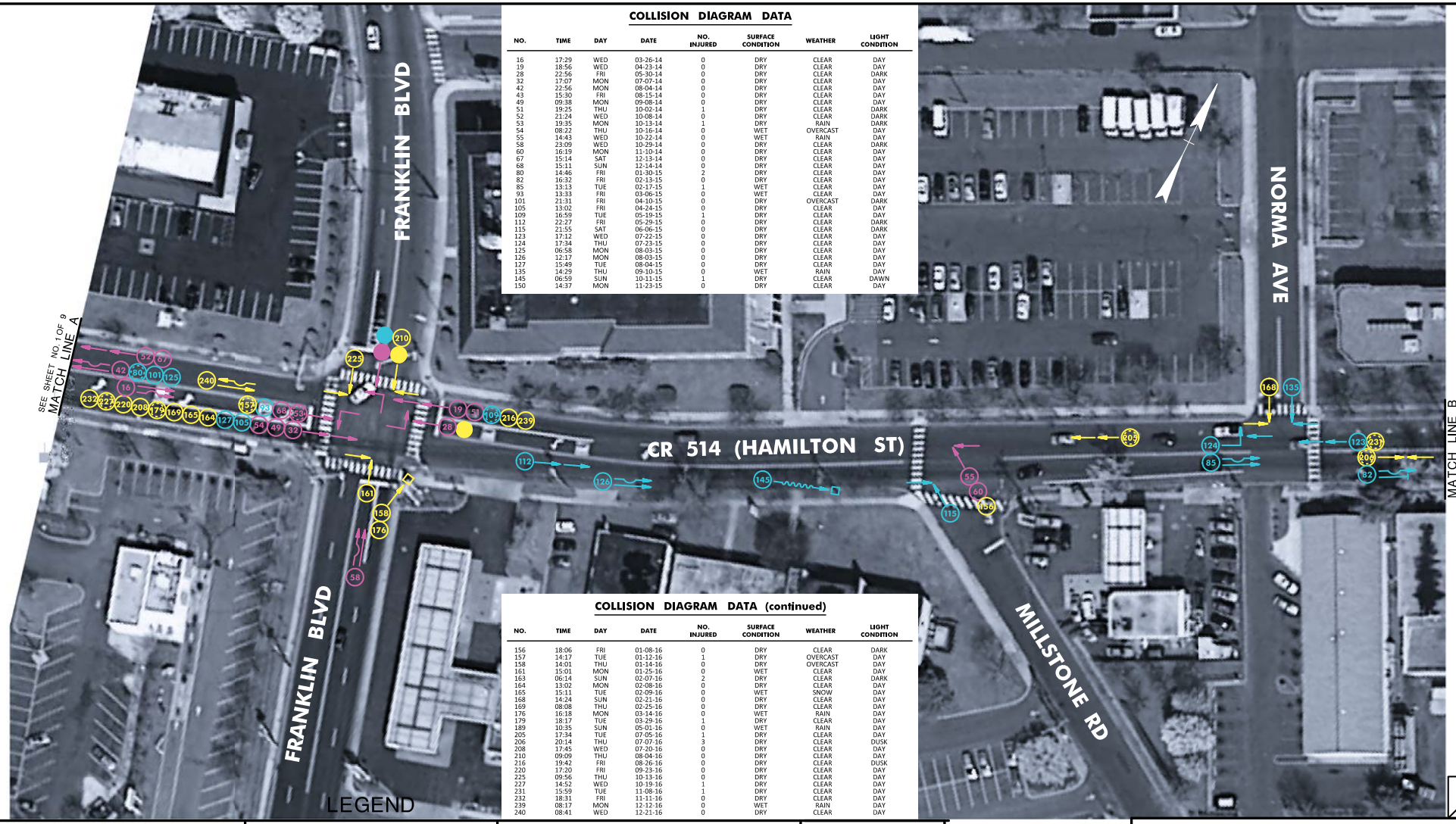
NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
between Berry Street and New Brunswick Border
Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE



COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
16	17:29	WED	03-26-14	0	DRY	CLEAR	DAY
19	18:56	WED	04-23-14	0	DRY	CLEAR	DAY
28	22:56	FRI	05-30-14	0	DRY	CLEAR	DARK
32	17:07	MON	07-07-14	0	DRY	CLEAR	DAY
42	22:56	MON	08-04-14	0	DRY	CLEAR	DAY
43	15:30	FRI	08-15-14	0	DRY	CLEAR	DAY
49	09:38	MON	09-08-14	0	DRY	CLEAR	DAY
51	19:25	THU	10-02-14	1	DRY	CLEAR	DARK
52	21:24	WED	10-08-14	0	DRY	CLEAR	DARK
53	19:35	MON	10-13-14	1	DRY	RAIN	DARK
54	08:22	THU	10-16-14	0	WET	OVERCAST	DAY
55	14:43	WED	10-22-14	0	WET	RAIN	DAY
58	23:09	WED	10-29-14	0	DRY	CLEAR	DARK
60	16:19	MON	11-10-14	0	DRY	CLEAR	DAY
67	15:14	SAT	12-13-14	0	DRY	CLEAR	DAY
68	15:11	SUN	12-14-14	0	DRY	CLEAR	DAY
80	14:46	FRI	01-30-15	2	DRY	CLEAR	DAY
82	16:32	FRI	02-13-15	0	DRY	CLEAR	DAY
85	13:13	TUE	02-17-15	1	WET	CLEAR	DAY
93	13:33	FRI	03-06-15	0	WET	CLEAR	DAY
101	21:31	FRI	04-10-15	0	DRY	OVERCAST	DARK
105	13:02	FRI	04-24-15	0	DRY	CLEAR	DAY
109	16:59	TUE	05-19-15	1	DRY	CLEAR	DAY
112	22:27	FRI	05-29-15	0	DRY	CLEAR	DARK
115	21:55	SAT	06-06-15	0	DRY	CLEAR	DARK
123	17:12	WED	07-22-15	0	DRY	CLEAR	DAY
124	17:34	THU	07-23-15	0	DRY	CLEAR	DAY
125	06:58	MON	08-03-15	0	DRY	CLEAR	DAY
126	12:17	MON	08-03-15	0	DRY	CLEAR	DAY
127	15:49	TUE	08-04-15	0	DRY	CLEAR	DAY
135	14:29	THU	09-10-15	0	WET	RAIN	DAY
145	06:59	SUN	10-11-15	1	DRY	CLEAR	DAWN
150	14:37	MON	11-23-15	0	DRY	CLEAR	DAY

COLLISION DIAGRAM DATA (continued)

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
156	18:06	FRI	01-08-16	0	DRY	CLEAR	DARK
157	14:17	TUE	01-12-16	1	DRY	OVERCAST	DAY
158	14:01	THU	01-14-16	0	DRY	OVERCAST	DAY
161	15:01	MON	01-25-16	0	WET	CLEAR	DAY
163	06:14	SUN	02-07-16	2	DRY	CLEAR	DARK
164	13:02	MON	02-08-16	0	DRY	CLEAR	DAY
165	15:11	TUE	02-09-16	0	WET	SNOW	DAY
168	14:24	SUN	02-21-16	0	DRY	CLEAR	DAY
169	08:08	THU	02-25-16	0	DRY	CLEAR	DAY
176	16:18	MON	03-14-16	0	WET	RAIN	DAY
179	18:17	TUE	03-29-16	1	DRY	CLEAR	DAY
189	10:35	SUN	05-01-16	0	WET	RAIN	DAY
205	17:34	TUE	07-05-16	1	DRY	CLEAR	DAY
206	20:14	THU	07-07-16	3	DRY	CLEAR	DUSK
208	17:45	WED	07-20-16	0	DRY	CLEAR	DAY
210	09:09	THU	08-04-16	0	DRY	CLEAR	DAY
216	19:42	FRI	08-26-16	0	DRY	CLEAR	DUSK
220	17:20	FRI	09-23-16	0	DRY	CLEAR	DAY
225	09:56	THU	10-13-16	0	DRY	CLEAR	DAY
227	14:52	WED	10-19-16	1	DRY	CLEAR	DAY
231	15:59	TUE	11-08-16	1	DRY	CLEAR	DAY
232	18:31	FRI	11-11-16	0	DRY	CLEAR	DAY
239	08:17	MON	12-12-16	0	WET	RAIN	DAY
240	08:41	WED	12-21-16	0	DRY	CLEAR	DAY

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	44
INJURIES	13
FATALITIES	0
TOTAL NO. OF CRASHES	57

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON–INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON–FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
between Berry Street and New Brunswick Border
Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
4	16:14	WED	01-15-14	0	DRY	CLEAR	DAY
31	03:25	SUN	06-29-14	3	DRY	CLEAR	DARK
34	13:49	WED	07-09-14	2	DRY	CLEAR	DAY
48	16:11	WED	09-03-14	0	DRY	CLEAR	DAY
106	13:16	TUE	04-28-15	0	DRY	CLEAR	DAY
133	11:08	TUE	09-01-15	1	DRY	CLEAR	DAY
136	15:03	THU	09-10-15	1	WET	RAIN	DAY
140	15:55	THU	10-01-15	1	DRY	OVERCAST	DAY
188	15:36	SAT	04-30-16	0	DRY	CLEAR	DAY
237	14:46	WED	11-23-16	0	DRY	CLEAR	DAY
238	08:08	THU	12-08-16	1	DRY	CLEAR	DAY

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	5
INJURIES	6
FATALITIES	0
TOTAL NO. OF CRASHES	11

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
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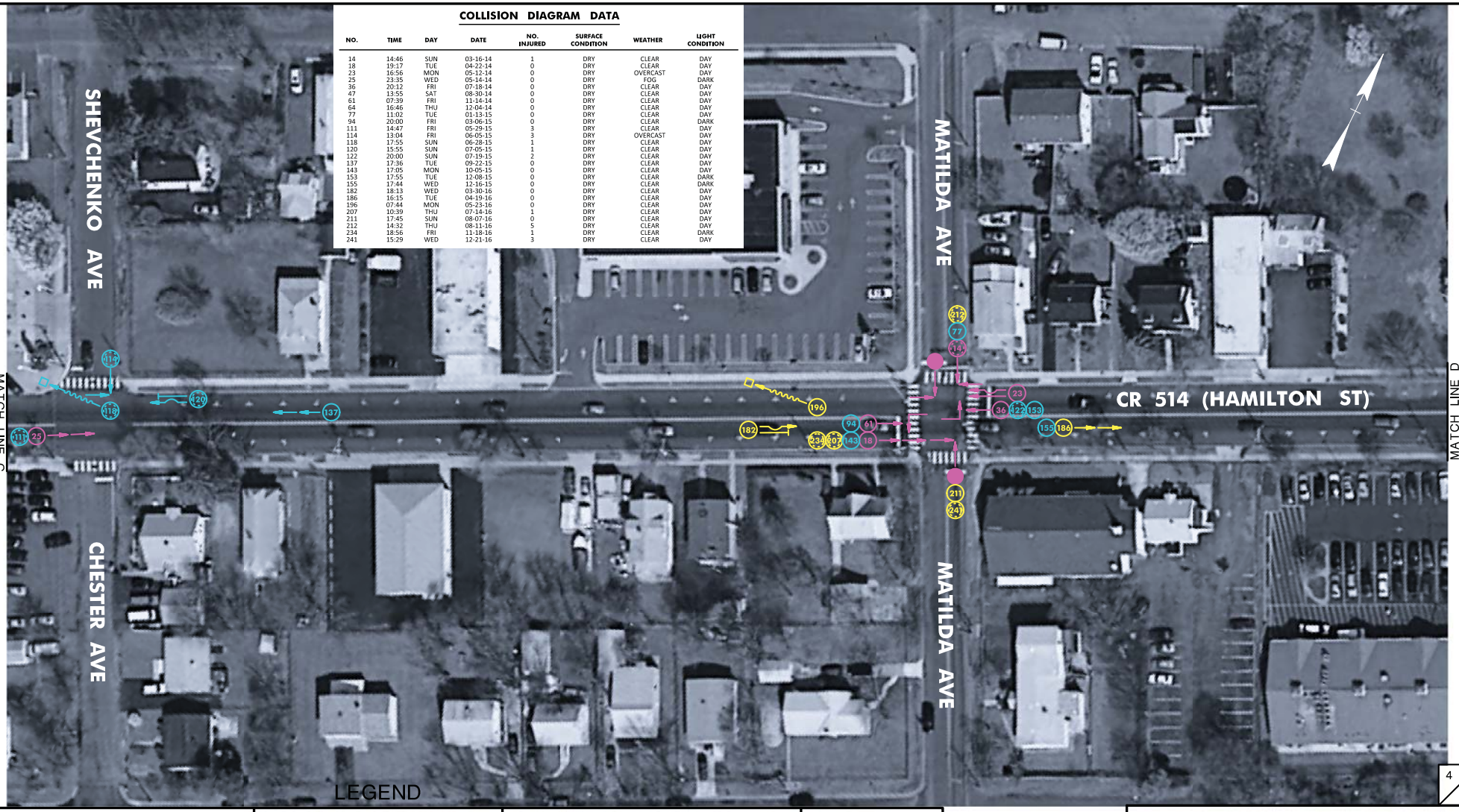
2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE



COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
14	14:46	SUN	03-16-14	1	DRY	CLEAR	DAY
18	19:17	TUE	04-22-14	0	DRY	CLEAR	DAY
23	16:56	MON	05-12-14	0	DRY	OVERCAST	DAY
25	23:35	WED	05-14-14	0	DRY	FOG	DARK
36	20:12	FRI	07-18-14	0	DRY	CLEAR	DAY
47	13:55	SAT	08-30-14	0	DRY	CLEAR	DAY
61	07:39	FRI	11-14-14	0	DRY	CLEAR	DAY
64	16:46	THU	12-04-14	0	DRY	CLEAR	DAY
77	11:02	TUE	01-13-15	0	DRY	CLEAR	DAY
94	20:00	FRI	03-06-15	0	DRY	CLEAR	DARK
111	14:47	FRI	05-29-15	3	DRY	CLEAR	DAY
114	13:04	FRI	06-05-15	3	DRY	OVERCAST	DAY
118	17:55	SUN	06-28-15	1	DRY	CLEAR	DAY
120	15:55	SUN	07-05-15	1	DRY	CLEAR	DAY
122	20:00	SUN	07-19-15	2	DRY	CLEAR	DAY
137	17:36	TUE	09-22-15	0	DRY	CLEAR	DAY
143	17:05	MON	10-05-15	0	DRY	CLEAR	DAY
153	17:55	TUE	12-08-15	0	DRY	CLEAR	DARK
155	17:44	WED	12-16-15	0	DRY	CLEAR	DARK
182	18:13	WED	03-30-16	0	DRY	CLEAR	DAY
186	16:15	TUE	04-19-16	0	DRY	CLEAR	DAY
196	07:44	MON	05-23-16	0	DRY	CLEAR	DAY
207	10:39	THU	07-14-16	1	DRY	CLEAR	DAY
211	17:45	SUN	08-07-16	0	DRY	CLEAR	DAY
212	14:32	THU	08-11-16	5	DRY	CLEAR	DAY
234	18:56	FRI	11-18-16	1	DRY	CLEAR	DARK
241	15:29	WED	12-21-16	3	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	17
INJURIES	10
FATALITIES	0
TOTAL NO. OF CRASHES	27

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

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NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
between Berry Street and New Brunswick Border
Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc. Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
6	17:19	WED	01-29-14	0	DRY	CLEAR	DARK
20	22:42	WED	05-07-14	0	DRY	CLEAR	DARK
33	11:48	WED	07-09-14	0	DRY	CLEAR	DAY
41	17:57	FRI	08-01-14	0	WET	RAIN	DAY
46	19:03	WED	08-27-14	0	DRY	CLEAR	DAY
59	14:06	TUE	11-04-14	1	DRY	CLEAR	DAY
63	16:06	THU	11-20-14	0	DRY	CLEAR	DAY
73	12:58	WED	12-24-14	0	WET	RAIN	DAY
75	19:18	SUN	12-28-14	0	DRY	CLEAR	DARK
92	13:55	THU	03-05-15	0	SNOWY	SNOW	DAY
99	08:42	THU	03-19-15	1	DRY	CLEAR	DAY
108	16:15	FRI	05-15-15	0	DRY	CLEAR	DAY
128	16:55	WED	08-05-15	0	DRY	CLEAR	DAY
151	16:24	TUE	11-24-15	0	DRY	CLEAR	DAY
162	14:34	THU	01-28-16	0	DRY	CLEAR	DAY
167	22:24	SAT	02-20-16	0	DRY	CLEAR	DARK
170	18:25	THU	02-25-16	0	DRY	CLEAR	DARK
172	15:36	TUE	03-08-16	0	DRY	CLEAR	DAY
175	15:20	FRI	03-11-16	0	DRY	CLEAR	DAY
178	05:11	SAT	03-19-16	0	DRY	CLEAR	DARK
202	15:39	WED	06-22-16	0	DRY	CLEAR	DAY
215	17:40	THU	08-25-16	0	DRY	CLEAR	DAY
219	13:33	FRI	09-16-16	0	DRY	CLEAR	DAY

DEWALD AVE

BAIER AVE

N DOVER AVE

CR 514 (HAMILTON ST)

MATCH LINE D
SEE SHEET NO. 4 OF 9

MATCH LINE E
SEE SHEET NO. 6 OF 9

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	21
INJURIES	2
FATALITIES	0
TOTAL NO. OF CRASHES	23

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

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NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
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Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
3	17:43	MON	01-13-14	0	DRY	CLEAR	DARK
10	17:07	MON	02-17-14	0	DRY	CLEAR	DUSK
17	13:03	FRI	04-04-14	0	WET	RAIN	DAY
29	10:00	FRI	06-13-14	0	WET	OVERCAST	DAY
40	08:14	WED	07-23-14	1	DRY	CLEAR	DAY
74	00:58	FRI	12-26-14	0	DRY	CLEAR	DARK
76	02:35	THU	01-01-15	0	DRY	CLEAR	DARK
83	13:26	SAT	02-14-15	0	DRY	OVERCAST	DAY
86	23:53	FRI	02-20-15	0	DRY	CLEAR	DARK
87	20:03	SUN	02-22-15	0	DRY	CLEAR	DARK
95	06:29	THU	03-12-15	0	DRY	CLEAR	DARK
100	17:10	THU	04-02-15	1	DRY	CLEAR	DAY
103	17:12	FRI	04-17-15	0	DRY	CLEAR	DAY
119	04:59	SAT	07-04-15	0	WET	RAIN	DARK
129	17:57	FRI	08-14-15	0	DRY	CLEAR	DAY
132	04:44	SAT	08-22-15	0	DRY	CLEAR	DARK
138	10:46	WED	09-23-15	3	DRY	CLEAR	DAY
139	08:55	THU	09-24-15	0	DRY	CLEAR	DAY
141	17:01	THU	10-01-15	0	WET	RAIN	DAY
152	13:12	WED	11-25-15	0	DRY	CLEAR	DAY
183	13:41	SUN	04-10-16	0	DRY	CLEAR	DAY
195	16:04	FRI	05-20-16	0	DRY	CLEAR	DAY
199	13:59	SUN	05-29-16	0	DRY	CLEAR	DAY
203	15:04	SAT	06-25-16	0	DRY	CLEAR	DAY
204	23:59	MON	07-04-16	0	WET	RAIN	DARK
209	21:29	SAT	07-30-16	3	DRY	CLEAR	DARK
213	16:20	THU	08-11-16	1	DRY	OVERCAST	DAY
235	11:15	SUN	11-20-16	0	SNOWY	SNOW	DARK

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	23
INJURIES	5
FATALITIES	0
TOTAL NO. OF CRASHES	28

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
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Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

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COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
7	03:08	SUN	02-02-14	0	DRY	CLEAR	DARK
9	10:55	WED	02-12-14	0	DRY	CLEAR	DAY
12	19:44	SAT	03-01-14	0	DRY	CLEAR	DARK
21	15:52	SAT	05-10-14	0	DRY	CLEAR	DAY
24	12:00	TUE	05-13-14	0	DRY	CLEAR	DAY
37	21:33	SAT	07-19-14	1	DRY	CLEAR	DARK
38	08:57	SUN	07-20-14	0	DRY	CLEAR	DAY
72	20:24	TUE	12-23-14	0	WET	RAIN	DARK
88	16:42	MON	02-23-15	0	DRY	CLEAR	DAY
89	08:24	TUE	02-24-15	0	DRY	CLEAR	DAY
96	03:41	SAT	03-14-15	0	WET	RAIN	DARK
113	06:31	MON	06-01-15	0	WET	OVERCAST	DAWN
144	07:39	TUE	10-06-15	0	DRY	CLEAR	DAY
146	11:56	MON	10-19-15	0	DRY	CLEAR	DAY
147	13:41	SUN	11-01-15	0	DRY	CLEAR	DAY
160	07:28	SUN	01-17-16	0	DRY	CLEAR	DAY
166	11:20	WED	02-17-16	0	DRY	CLEAR	DAY
171	22:33	TUE	03-01-16	0	DRY	CLEAR	DARK
193	21:09	TUE	05-10-16	0	DRY	CLEAR	DARK
229	11:53	SAT	10-22-16	0	DRY	OVERCAST	DAY
230	16:40	THU	11-03-16	1	DRY	CLEAR	DAY
242	17:31	THU	12-29-16	2	WET	OVERCAST	DARK

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	19
INJURIES	3
FATALITIES	0
TOTAL NO. OF CRASHES	22

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
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2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
11	18:21	SAT	03-01-14	0	DRY	CLEAR	DARK
15	15:32	MON	03-24-14	3	DRY	CLEAR	DAY
26	17:32	SAT	05-17-14	1	DRY	CLEAR	DAY
30	15:51	SAT	06-28-14	0	DRY	CLEAR	DAY
45	17:29	MON	08-25-14	0	DRY	CLEAR	DAY
50	12:37	MON	09-15-14	0	DRY	CLEAR	DAY
65	20:01	FRI	12-05-14	1	WET	OVERCAST	DARK
66	14:25	SAT	12-13-14	0	DRY	OVERCAST	DAY
69	06:49	TUE	12-16-14	2	DRY	CLEAR	DARK
78	06:54	WED	01-14-15	0	DRY	OVERCAST	DAY
84	15:17	MON	02-16-15	0	DRY	CLEAR	DAY
91	17:26	TUE	03-03-15	0	WET	SLEET	DARK
97	21:05	SAT	03-14-15	0	WET	OVERCAST	DARK
98	16:06	MON	03-16-15	0	DRY	CLEAR	DAY
116	21:35	SUN	06-14-15	0	WET	RAIN	DARK
121	21:35	WED	07-15-15	0	DRY	CLEAR	DARK
130	10:45	SAT	08-15-15	0	DRY	CLEAR	DAY
131	14:03	TUE	08-18-15	0	DRY	CLEAR	DAY
142	12:23	SUN	10-04-15	0	DRY	CLEAR	DAY
148	17:58	TUE	11-03-15	0	DRY	CLEAR	DARK
149	06:37	SAT	11-14-15	0	DRY	CLEAR	DAWN
159	14:02	SAT	01-16-16	0	DRY	CLEAR	DAY
177	17:36	WED	03-16-16	0	DRY	OVERCAST	DAY
181	14:50	WED	03-30-16	0	DRY	CLEAR	DAY
184	16:56	SAT	04-16-16	0	DRY	CLEAR	DAY
185	21:41	SAT	04-16-16	0	DRY	CLEAR	DARK
187	08:32	THU	04-28-16	0	DRY	CLEAR	DAY
197	14:47	WED	05-25-16	0	DRY	CLEAR	DAY
214	12:38	FRI	08-19-16	1	DRY	CLEAR	DAY
217	02:09	SUN	08-28-16	0	DRY	CLEAR	DARK
223	16:00	SAT	10-08-16	0	WET	RAIN	DAY
236	03:53	WED	11-23-16	0	DRY	CLEAR	DARK

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	27
INJURIES	5
FATALITIES	0
TOTAL NO. OF CRASHES	32

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
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Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
5	11:22	SUN	01-19-14	0	DRY	CLEAR	DAY
44	22:39	FRI	08-15-14	0	DRY	CLEAR	DARK
104	14:50	SUN	04-19-15	2	DRY	CLEAR	DAY
117	11:32	SUN	06-21-15	0	DRY	CLEAR	DARK
134	05:06	FRI	09-04-15	0	DRY	CLEAR	DARK
154	13:38	SUN	12-13-15	0	DRY	CLEAR	DAY
192	15:16	SUN	05-08-16	2	DRY	CLEAR	DAY
221	08:00	THU	09-29-16	1	WET	OVERCAST	DAY
226	03:10	SAT	10-15-16	1	DRY	CLEAR	DARK
228	11:01	SAT	10-22-16	0	WET	RAIN	DAY

HAWTHORNE DR

CR 514 (HAMILTON ST)

BROOKLINE AVE

ANNETTE CT

MATCH LINE H
SEE SHEET NO. 8 OF 9

9/9

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	6
INJURIES	4
FATALITIES	0
TOTAL NO. OF CRASHES	10

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

- 2014 CRASHES
- 2015 CRASHES
- 2016 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

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Franklin Township, Somerset County

2014 - 2016 COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

Appendix E – Pedestrian Crash Diagrams

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
8	15:12	THU	10-24-13	4	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	1
FATALITIES	0
TOTAL NO. OF CRASHES	1

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

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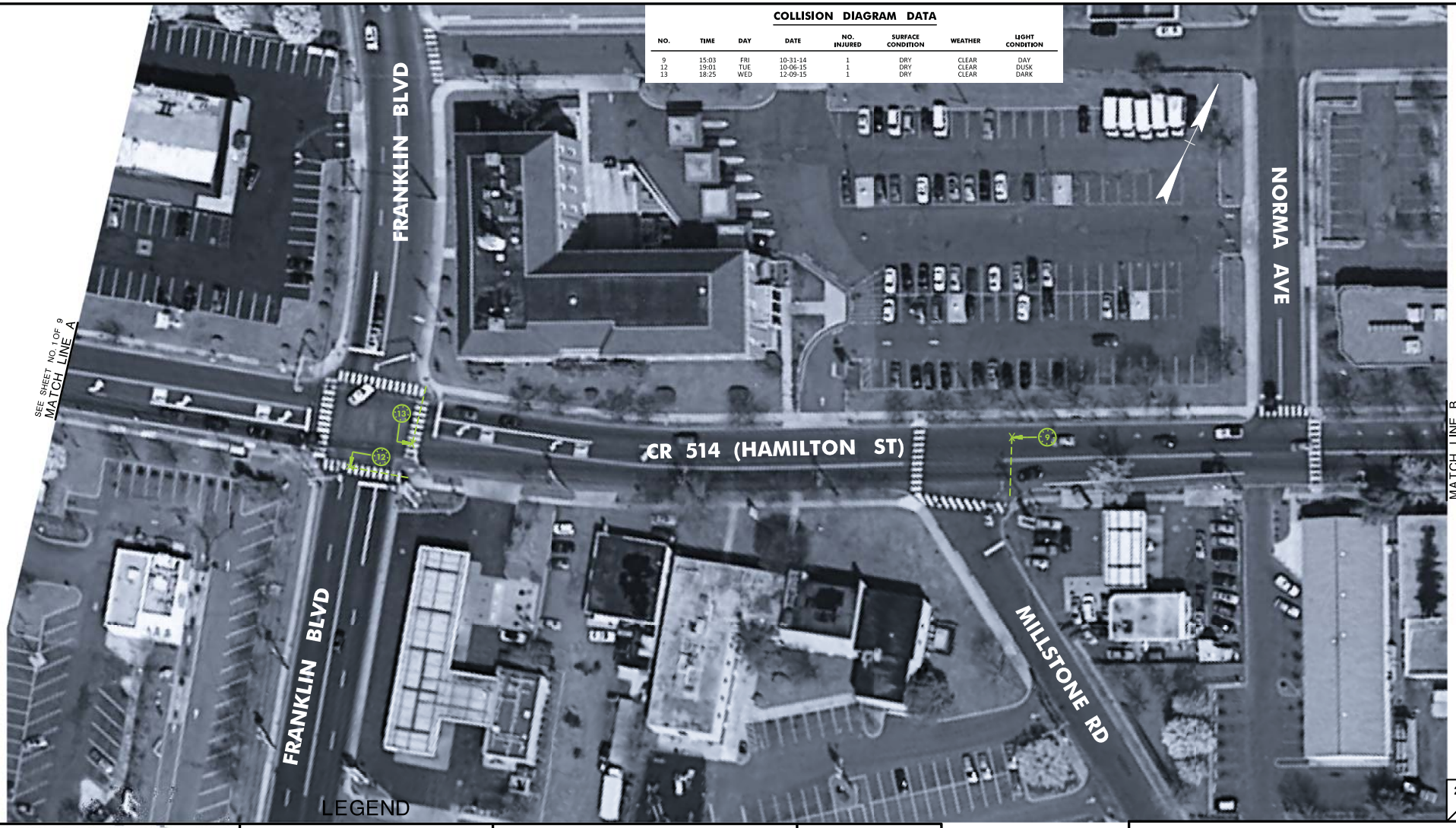
NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
between Berry Street and New Brunswick Border
Franklin Township, Somerset County

2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE



COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
9	15:03	FRI	10-31-14	1	DRY	CLEAR	DAY
12	19:01	TUE	10-06-15	1	DRY	CLEAR	DUSK
13	18:25	WED	12-09-15	1	DRY	CLEAR	DARK

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	3
FATALITIES	0
TOTAL NO. OF CRASHES	3

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

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2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
2	20:27	WED	05-02-12	1	DRY	CLEAR	DARK
4	15:10	WED	05-16-12	1 (1*)	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	1
FATALITIES	1
TOTAL NO. OF CRASHES	2

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

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NEW JERSEY DEPARTMENT OF TRANSPORTATION

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2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc. Engineering and Construction Services

NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
1	16:06	TUE	01-03-12	1	DRY	CLEAR	DAY
10	19:44	SAT	05-16-15	1	DRY	OVERCAST	DUSK
15	19:50	MON	10-24-16	1	DRY	CLEAR	DARK
16	17:00	WED	11-02-16	1	DRY	CLEAR	DAY

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LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	4
FATALITIES	0
TOTAL NO. OF CRASHES	4

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

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2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

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NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	0
FATALITIES	0
TOTAL NO. OF CRASHES	0

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

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GPI Greenman-Pedersen, Inc.
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NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
5	21:15	FRI	09-21-12	1	DRY	CLEAR	DARK
6	10:54	SAT	05-25-13	1	WET	OVERCAST	DAY
7	15:29	MON	06-24-13	1	DRY	OVERCAST	DAY

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	3
FATALITIES	0
TOTAL NO. OF CRASHES	3

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

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NEW JERSEY DEPARTMENT OF TRANSPORTATION

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2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

7
9

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	0
INJURIES	0
FATALITIES	0
TOTAL NO. OF CRASHES	0

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
between Berry Street and New Brunswick Border
Franklin Township, Somerset County

2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

8/9

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	3
FATALITIES	0
TOTAL NO. OF CRASHES	3

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
- FATAL CRASH
- FIXED OBJECT
- ANIMAL
- NON-FIXED OBJECT
- POTHOLE

TYPES OF CRASHES

- REAR END
- HEAD ON
- SIDE SWIPE
- OUT OF CONTROL
- OVERTURNED
- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

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2012-2016 PEDESTRIAN COLLISION DIAGRAMS

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NOT TO SCALE

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
-	-	-	-	-	-	-	-

9/9

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY	0
INJURIES	0
FATALITIES	0
TOTAL NO. OF CRASHES	0

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEHICLE
- PEDESTRIAN / BICYCLIST
- PROPERTY DAMAGE ONLY CRASH
- INJURY IN CRASH
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- LEFT TURN
- RIGHT ANGLE

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

CR 514 (Hamilton Street)
between Berry Street and New Brunswick Border
Franklin Township, Somerset County

2012-2016 PEDESTRIAN COLLISION DIAGRAMS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

NOT TO SCALE

Appendix F – Existing Site Photographs

School sign (S1-1) on Hamilton St WB to warning of school area, not a crossing

Berry St NB towards school lacks sidewalks for walking students

Broken sidewalk in NW corner of Hamilton St and Franklin Blvd due to truck turns

Vehicle parked on sidewalk to load and unload into businesses

Concrete sidewalk settlement filled and patched with asphalt

Signal has 8" heads, lacks countdown pedestrian signal heads and ramps are not ADA compliant

Bus shelter along Hamilton St EB for county bus routes

Approach skewed with long crosswalk and ponding at curb ramp

Reconstruction of business driveway and sidewalk (preferred design for continuous/level pedestrian access).

Wide driveway openings and worn out crosswalk striping at Chester Ave

1/3

NJDOT HSIP
ROAD SAFETY AUDIT
CR 514 (HAMILTON ST)

FRANKLIN TOWNSHIP
SOMERSET COUNTY

SITE PHOTOGRAPHS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

N.T.S.

Bicyclist using sidewalk near Dewald Ave

Signal has 8" heads, Baler has left turn arrows, may require preemption update and lacks ADA compliant ramps

Existing solid fence obstructs intersection sight distance for left turn movements

Exposed Nora Shopping Center driveway slab may be tripping hazard

Nora Shopping Center has multiple access points outside marked crosswalks

Signal has 8" heads, lacks school crossing signs for designated crossing and ramps are not ADA compliant

Pedestrians crossing Hamilton St outside of marked crosswalk

Parked vehicle at corner obstructs sight distance for turning vehicles

Buildings block view of oncoming traffic; offset intersections with crosswalk in between

Utility pole within curb ramp at Kossuth St

2/3

NJDOT HSIP
ROAD SAFETY AUDIT
CR 514 (HAMILTON ST)

FRANKLIN TOWNSHIP
SOMERSET COUNTY

SITE PHOTOGRAPHS

GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

N.T.S.

Ponding at curb ramp and road junction (typical throughout)

Existing speed feedback sign along Hamilton St WB

Parked buses restrict visibility and sight distance for Annette Ct

Hamilton St WB near Annette Ct; pedestrian crossing warning sign, next 1.5 miles

Signs near New Brunswick border do not have 7' clearance; vegetation over-grown into sidewalk (top and bottom photos)

Mixed-used construction near Ambrose St and Home St (includes underground parking)

New mixed-use building in NE corner of Home St

Sight distance obstructed by parked vehicles

3/3

NJDOT HSIP
ROAD SAFETY AUDIT
CR 514 (HAMILTON ST)

FRANKLIN TOWNSHIP
SOMERSET COUNTY

SITE PHOTOGRAPHS

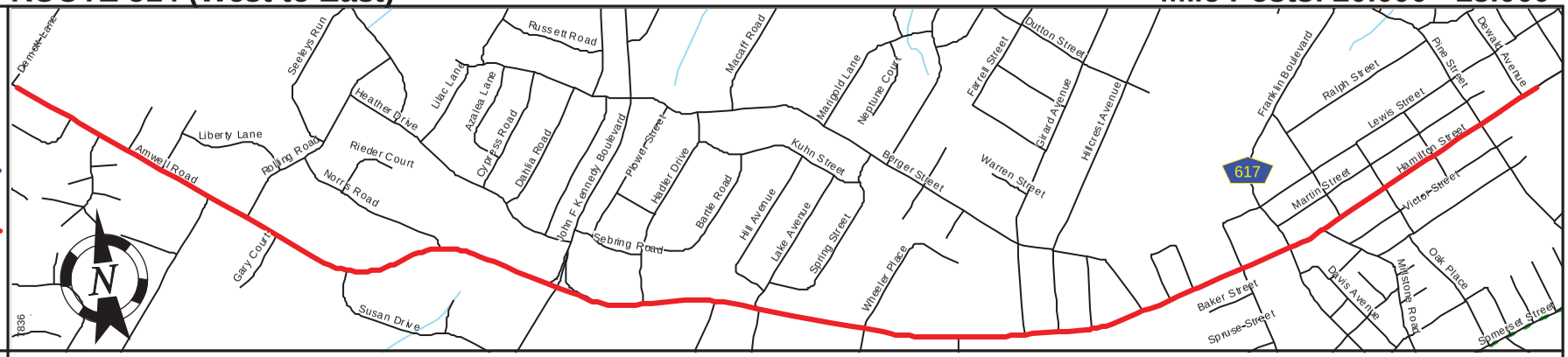
GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

N.T.S.

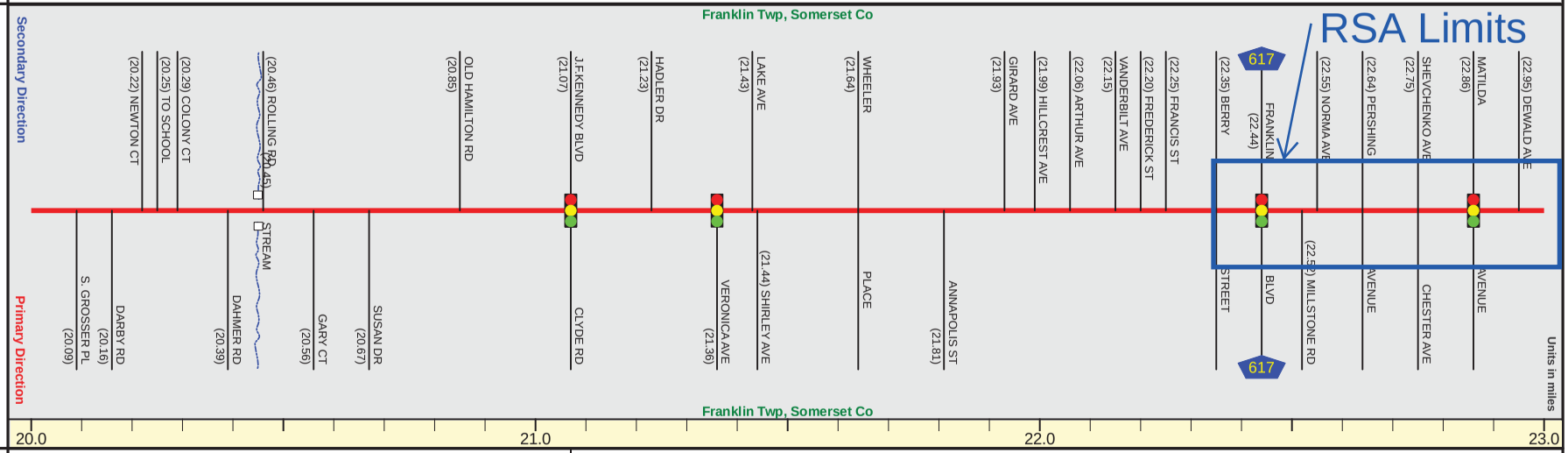
Appendix G – Straight Line Diagrams

ROUTE 514 (West to East)

Mile Posts: 20.000 - 23.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Amwell Road | Hamilton Street
Jurisdiction	County
Functional Class	Urban Minor Arterial
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	45 | 35 | 25
Number of Lanes	4 | 2
Med. Type	None
Med. Width	0
Pavement	48 | 40
Shoulder	1 | 2 | 0
Traffic Volume	17,324 (2012)
Traffic Sta. ID	4-4-422
Structure No.	N/A
Enlarged Views	

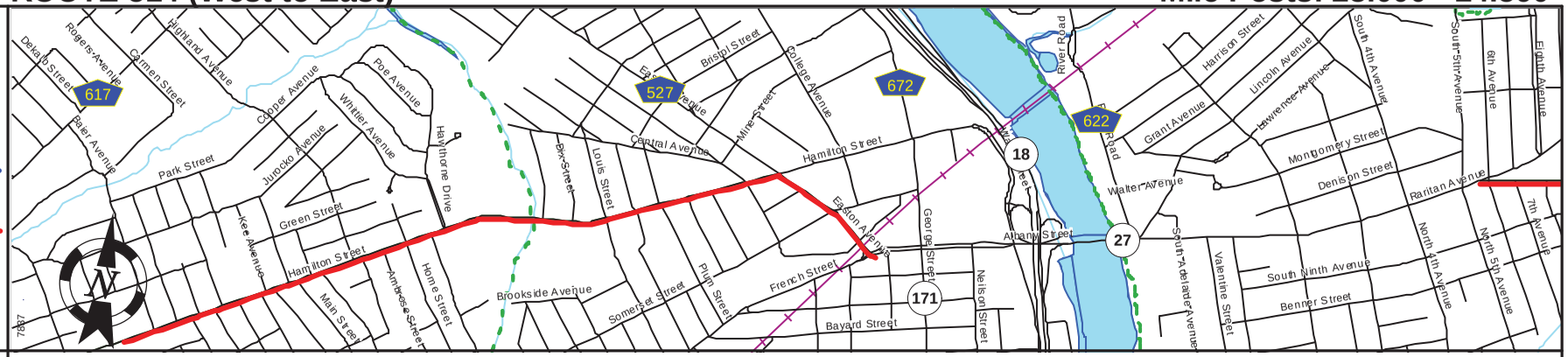
SRI = 00000514__

Date last inventoried: October 2012

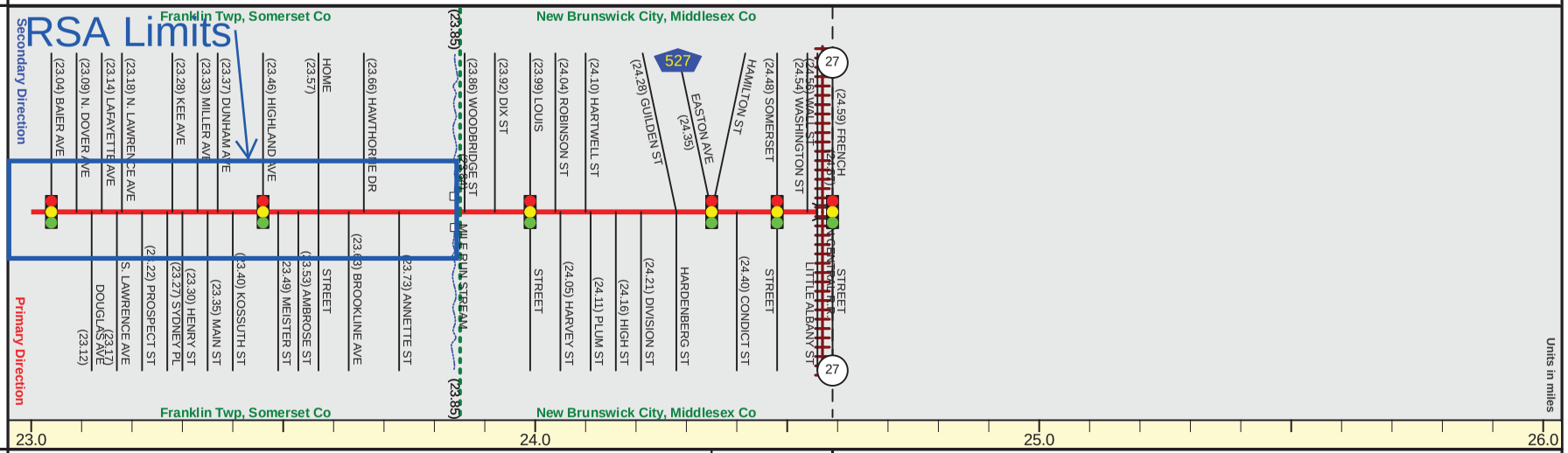
Page Created: June, 2015

ROUTE 514 (West to East)

Mile Posts: 23.000 - 24.590



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Hamilton Street	Easton Avenue	
Jurisdiction	County		
Functional Class	Urban Minor Arterial	Urban Principal Arterial	
Federal Aid - NHS Sy	STP	NHS	
Control Section			
Speed Limit	25		
Number of Lanes	2		
Med. Type	None		
Med. Width	0		
Pavement	40	36	
Shoulder	0		
Traffic Volume	11,235 (2011)		
Traffic Sta. ID	4-4-423		
Structure No.	N/A	N/A	
Enlarged Views			

MP 24.59 = Begin Coinc. With NJ 27 MP 17.48
MP 24.59-25.93 See NJ 27 MP 17.48-16.23

Page Created: June, 2015

SRI = 00000514__

Date last inventoried: October 2012

Appendix H – Pre-Audit Presentation

Road Safety Audit:

CR 514 (Hamilton Street), Lewis/Berry Street to New Brunswick Border

Franklin Township, Somerset County

October 19, 2017

Audit Team Introductions

- *Funded by Federal Highway Administration and NJDOT*
- NJDOT, Bureau of Transportation Data & Safety
  - Safety Programs
- NJTPA
- Somerset County
  - Engineering and Planning
  - Board of Chosen Freeholders
- Franklin Township
  - Engineering and Planning
  - Police and Fire Prevention
- Greenman-Pedersen, Inc., NJDOT Consultant

NJTPA

GPI

2

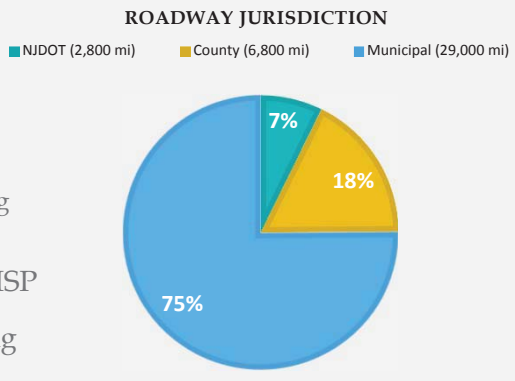
Today's Schedule

9:00a	• **Welcome and Introductions** • **Project Overview Presentation**
10:30a	• Field Visit and Observations
12:30p	• Lunch and Regroup at Presentation Location
2:00p	• Discuss Observations • Make Recommendations
3:30p	• Adjourn

3

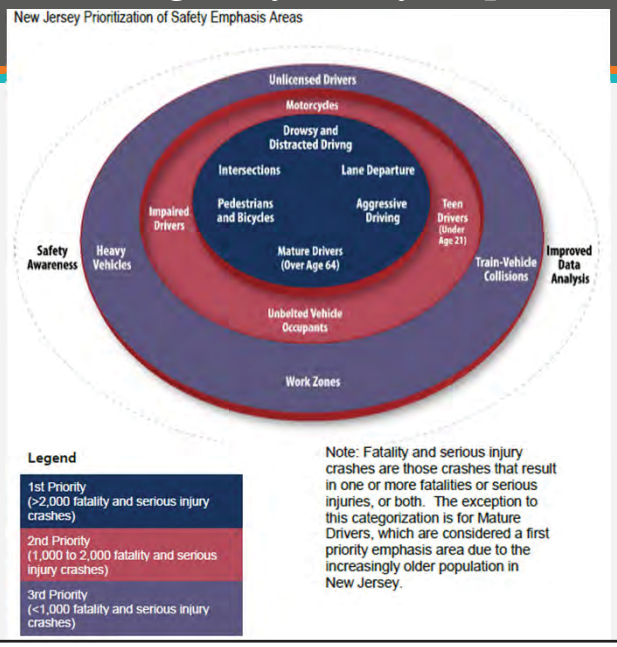
Highway Safety Improvement Program/ Local Safety Program

- GOAL: Reduce serious injury and fatality (K+A) crashes on all of NJ's public roads
  - 40,000 centerline miles of public roads
  - 33% K+A crashes occur on state highways
  - 57% K+A crashes occur on local roads
- Achieve zero deaths on all public roads
  - Established 2.5%/year reduction in 5-year rolling average
- Performance-based goals consistent with SHSP
- Data-driven, strategic approach to improving highway safety



4

Highway Safety Improvement Program (HSIP)

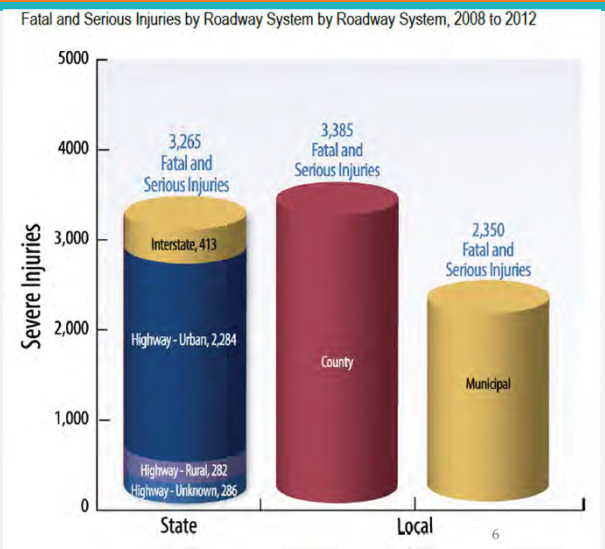


- 14 Emphasis Areas
- Pedestrian Safety and Intersection Focus State
- Top priority: lane departure, intersections, and pedestrians
- 7 sub-programs including Local Safety Program
- Core Federal Aid Program, NJ receives ~$57M

5

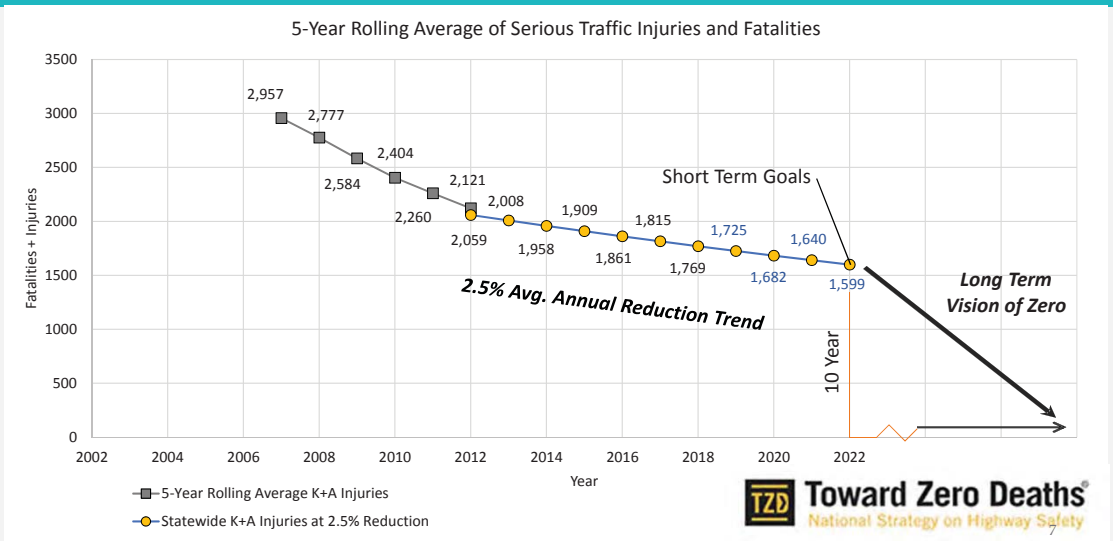
Local Safety Program (LSP)

- NJDOT supports LSP:
  - Dedication of HSIP funds
  - Technical assistance
  - Screening lists for MPOs
  - **Road Safety Audits**
- MPOs support LSP:
  - Local Road Safety/High Risk Rural Roads
  - PE/FD Assistance Program
- Focus annual HSIP funding:
  - 40% on state highways
  - 60% percent on county and municipal network



6

National Strategy – Toward Zero Deaths

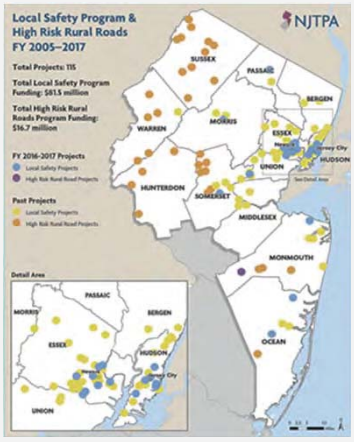


Federal Transportation Funding

through the

North Jersey Transportation Planning Authority

The Metropolitan Planning Organization for Northern New Jersey



Local Safety and High Risk Rural Roads Programs

Over $98 million in funding since 2005 on County and Local Roadways

Relatively quick-fix safety improvements

Highway Safety Improvement Program (HSIP) funds

Emphasizes a data-driven, strategic approach to improving highway safety

Network Screening

Identifies locations experiencing:

High crash frequencies

Severe crash injuries

Specific crash types such as right-angle or roadway departures

Community Outreach

Provides the public, local stakeholders and officials with an opportunities for provide comments and ask questions

Defining the Vision. Shaping the Future.

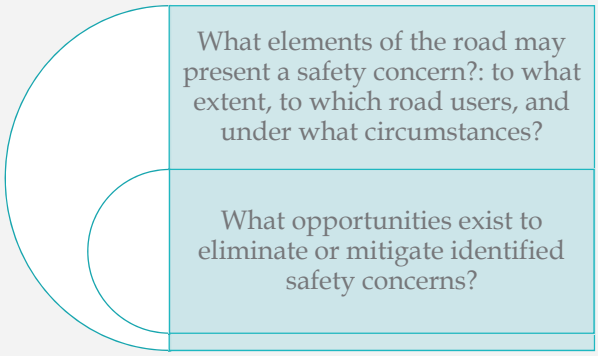
NJTPA

NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

RSA Purpose

- Formal safety performance examination
- Qualitatively estimates and reports on potential road safety issues
- Identifies safety improvement opportunities for all road users.
- Independent, multidisciplinary audit team

- Goals:



9

RSA Benefits

- Pro-actively address safety
- Audited designs should produce fewer, less severe crashes
- Identify low-cost/high-value improvements
- Enhance consistency in how safety is considered and promote a "safety culture"
- Provide continuous advancement of safety skills and knowledge
- Contribute feedback on safety issues for future projects
- Support optimized savings of **lives**, money and time

- Not a replacement for:
  - Design quality control
  - Standard compliance
  - Traffic or safety impact studies
  - Safety conscious planning
  - Road safety inventory programs
  - Traffic safety modeling efforts

10

RSA Process

Responsibilities:

- RSA Team
- Design Team/Project Owner

FHWA Proven Safety Countermeasures

Descriptions provided in your handouts

12

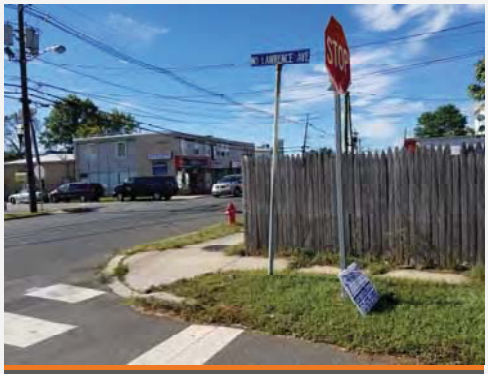
FHWA Proven Safety Countermeasures

Longitudinal Rumble Stripes/
Center Line Rumble Stripes (CLRS)

Roundabout
Chesterfield Township, Burlington County

13

Additional Considerations



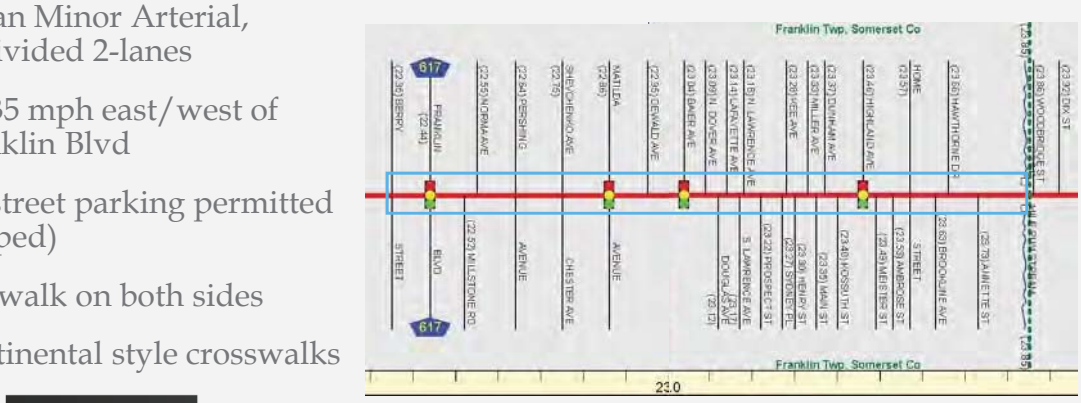
Clearing for sight distance

Enhanced signing / pedestrian crossings

14

Project Area

- Urban Minor Arterial, undivided 2-lanes
- 25/35 mph east/west of Franklin Blvd
- On street parking permitted (striped)
- Sidewalk on both sides
- Continental style crosswalks



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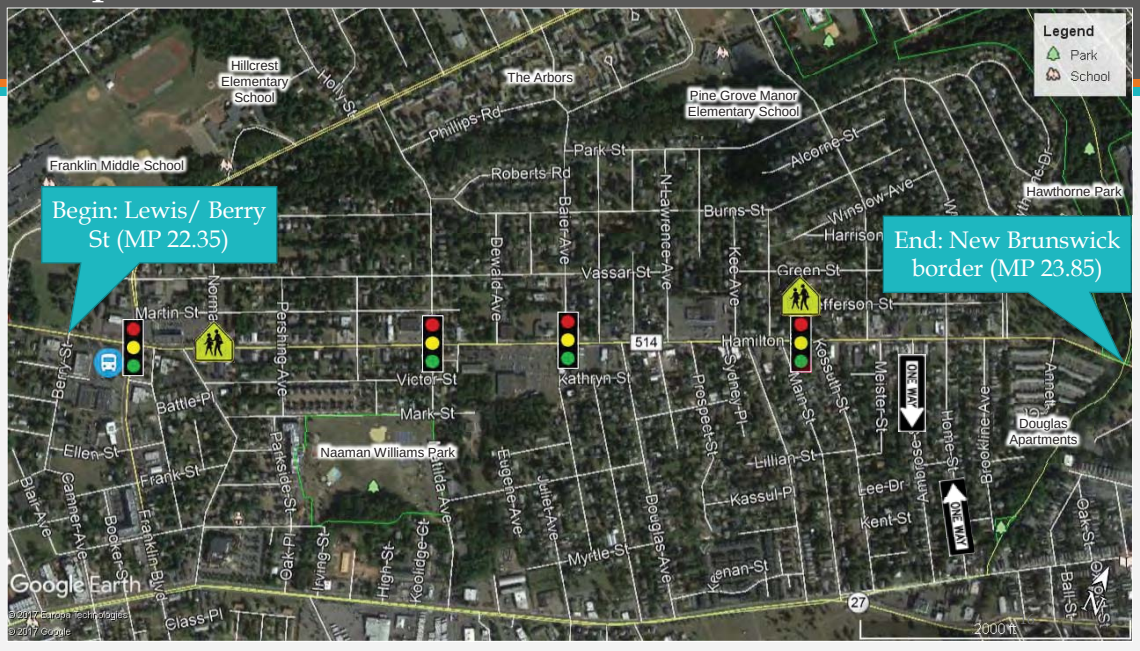
Area Map

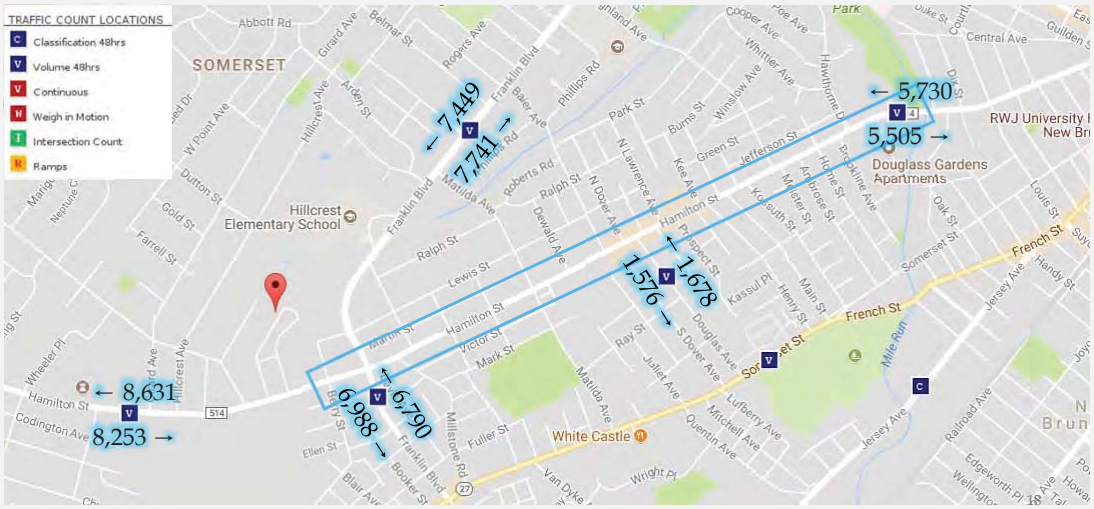


Project Area

- Land Use
  - Commercial/residential
  - Medium density
  - Detached single family
  - Apartments near eastern project limits
- Demographics
  - 41% Black or African American
  - 30% Hispanic/Latino
  - 2.9% below poverty level
  - 2.4% use public transportation

17

Traffic Data (2011-2015)



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Crash Data

All Crashes 2014-2016

- Total=257
- Overrepresentations:
  - Injury
  - Right Angle & Left Turn
  - Parked Vehicle
  - Pedestrian
  - At Unsignalized Intersections
  - Dry
  - Night

Pedestrian Crashes 2012-2016

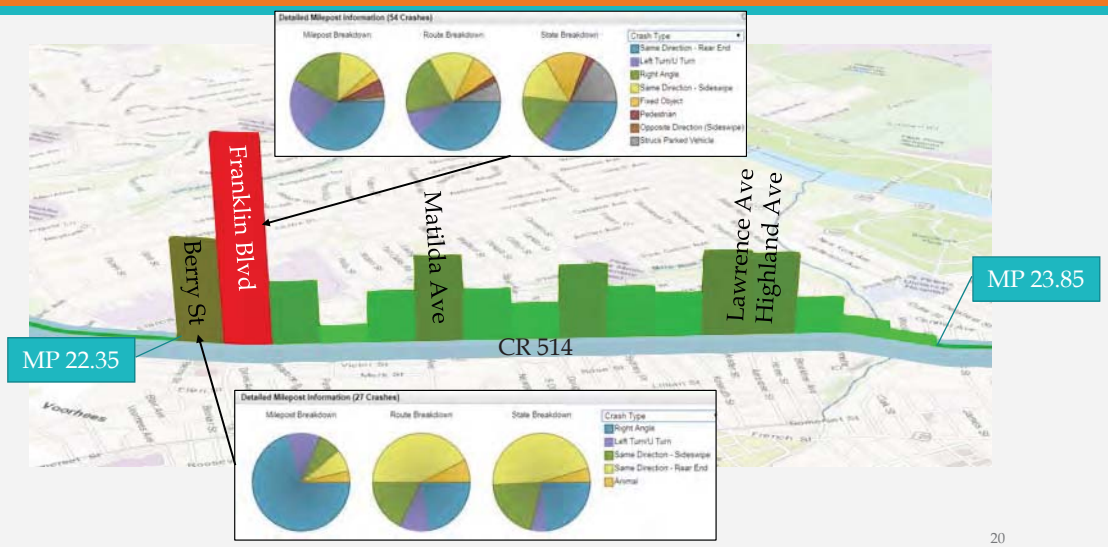
- Total=16
- Overrepresentations:
  - Minor Injury
  - Dawn/Dusk
  - Wednesdays
  - May & October

NJTPA's FY 2017-2018 Local Safety Program Network Screening List Ranking

Regional Corridors	Ped Corridors	Intersections	Pedestrian Intersections
#2 County	#5 County	#3 Lewis/Berry St	#18 County: Lafayette Ave
#45 NJTPA Region	#233 NJTPA Region	#38 Franklin Blvd	#20 County: Sydney Pl
			#28 County: Home St

Crash Data (2014-2016)

Histogram & Pie Charts by 0.1 Mile



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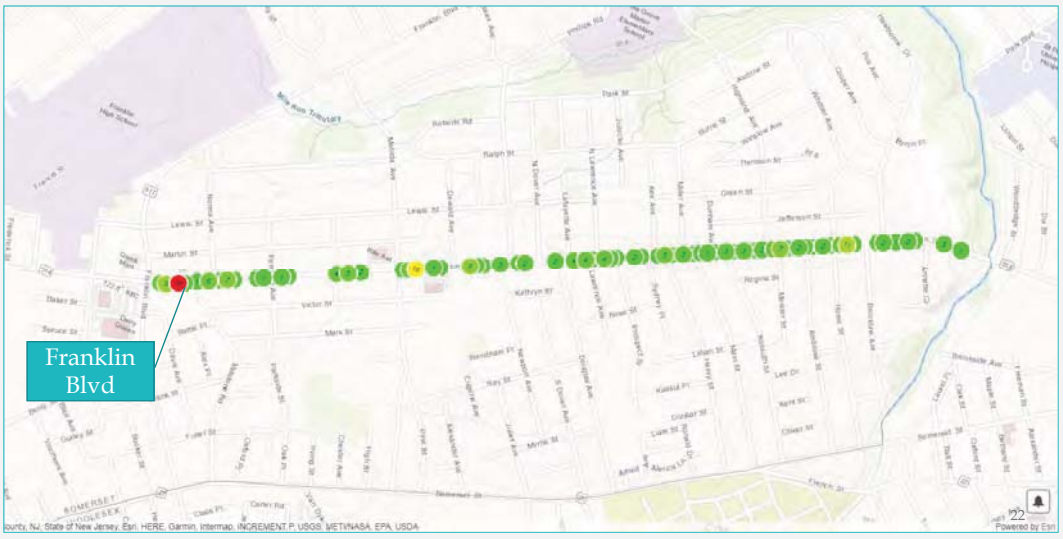
Crash Data (2014-2016)

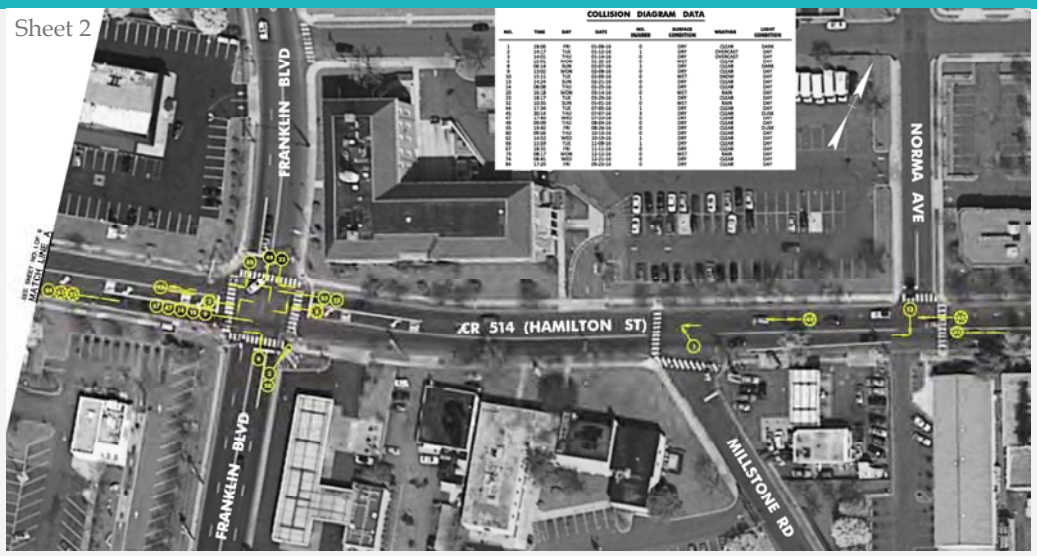
Histogram & Pie Charts by 0.1 Mile

Crash Data (2014-2016)

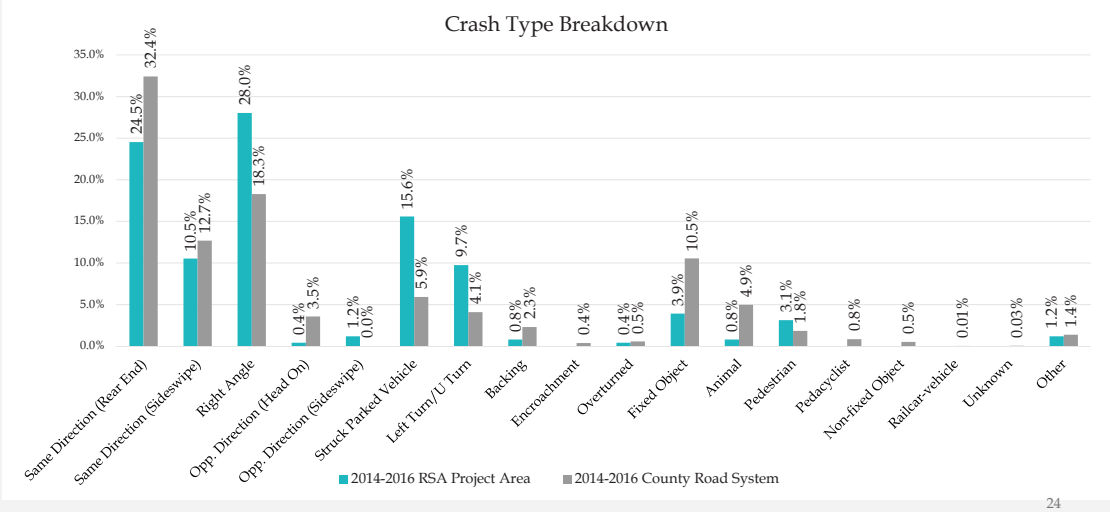
Plan View by 0.01 Mile



Crash Diagrams (2016)



Crashes: RSA Project Area v. County Road System



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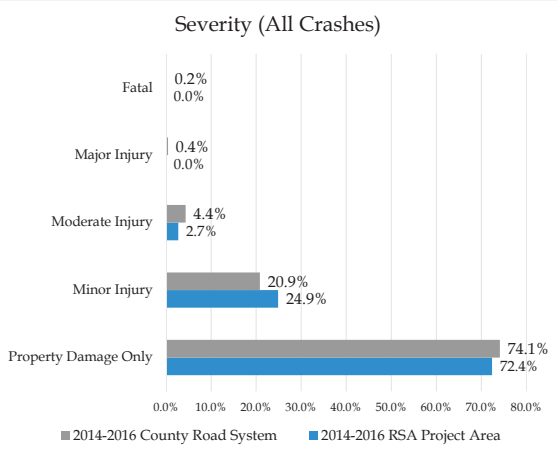
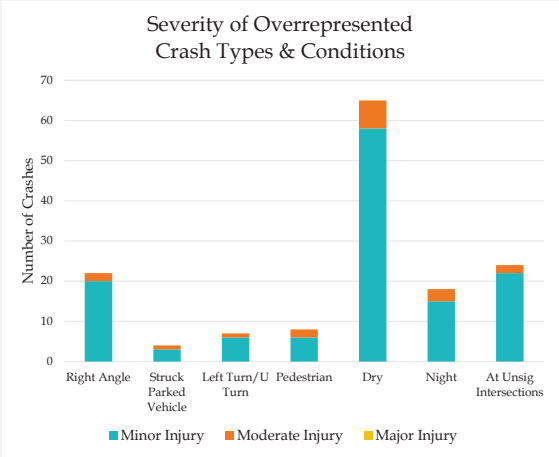
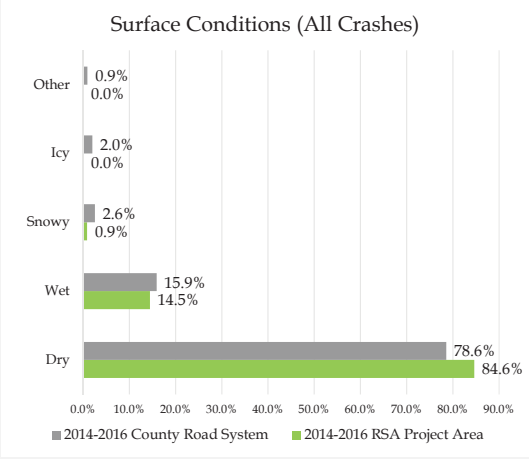
Crashes: Severity

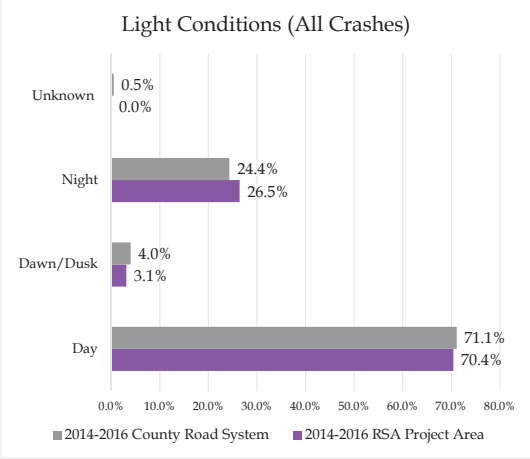




25

Crashes: Light & Surface Conditions





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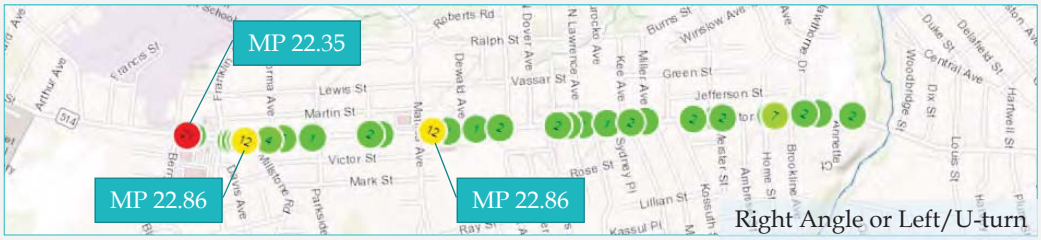
Crash Data (2014-2016)

Plan View by 0.01 Mile



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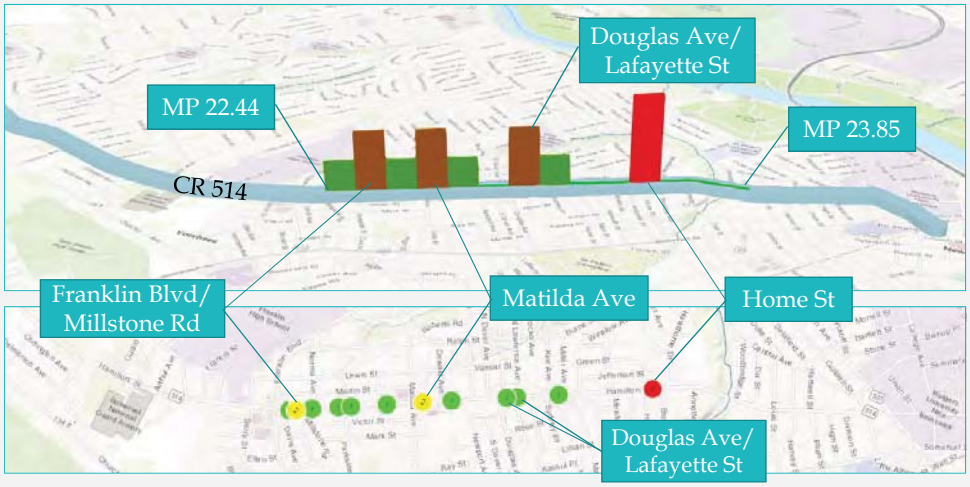
Pedestrian Crash Data (2012-2016)

Histogram by 0.1 Mile
Plan View by 0.01 Mile



5 of 16 ped. crashes at midblock/unmarked x-walk

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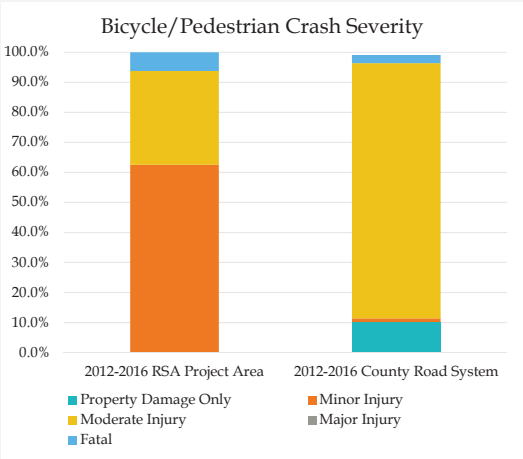
Pedestrian Crash Diagrams (2012-2016)

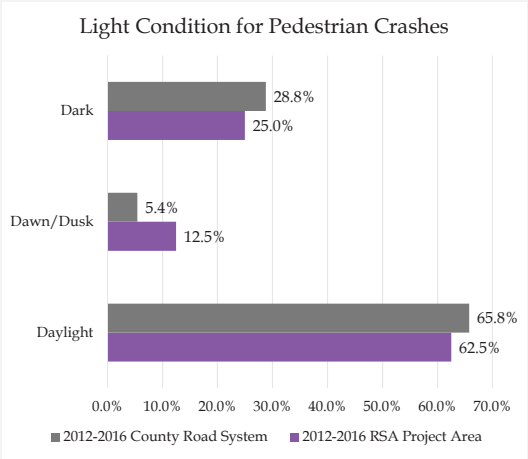
Sheet 4

Sheet 8

29

Pedestrian Crashes





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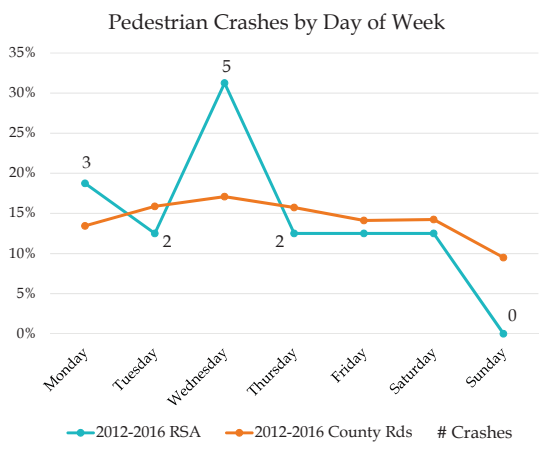
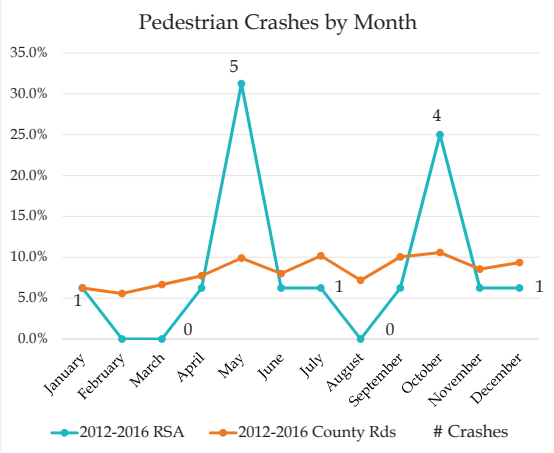
Pedestrian Crashes: Temporal Data





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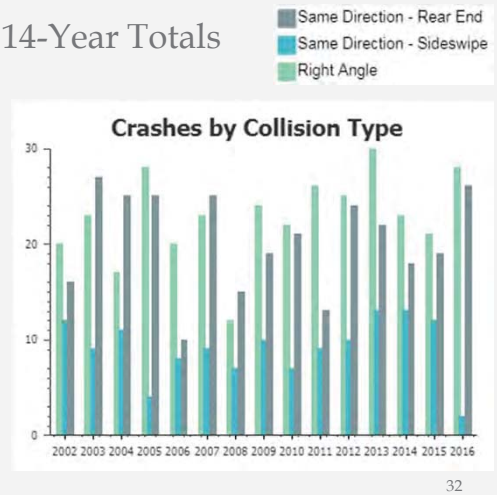
Crash Statistics

5-Year Temporal

14-Year Totals



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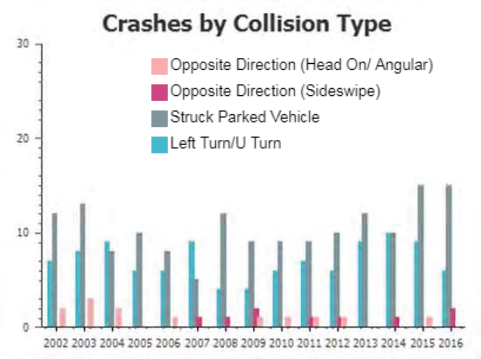
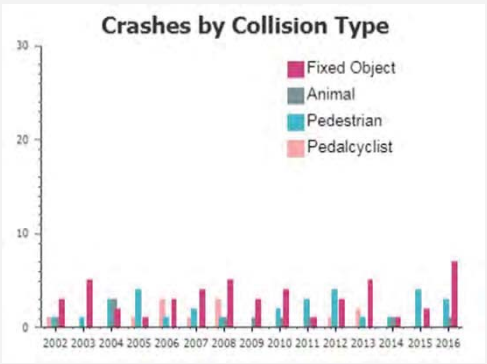
Crash Statistics (continued)

14-Year Totals



14-Year Totals



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Field Visit Itinerary

9:00a	• Welcome and Introductions • Project Overview Presentation
10:30a	• **Field Visit and Observations**
12:30p	• Lunch and Regroup at Presentation Location
2:00p	• Discuss Observations • Make Recommendations
3:30p	• Adjourn

- ✓ Verify Identified Issues
- ✓ Observe Operations
- ✓ Note Other Safety Concerns
- ✓ Document Findings
  - Photographs
  - Checklist
- ✓ Safety First!
  - Use proper safety equipment
  - Stay alert to your surroundings

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Field Visit & Observations

(pause presentation)

Post Audit Analysis

(resume presentation)

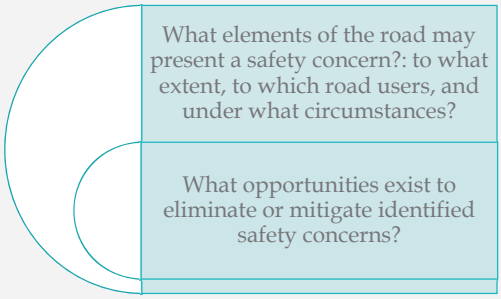
RSA Schedule

- 9:00a
  - Welcome and Introductions
  - Project Overview Presentation
- 10:30a
  - Field Visit and Observations
- 12:30p
  - Lunch and Regroup at Presentation Location
- 2:00p
  - **Discuss Observations**
  - **Make Recommendations**
- 3:30p
  - Adjourn

37

Post Audit Analysis

Observations



Recommendations

- What corridor safety issues did you observe?
- What localized safety issues did you observe?
- What improvements would you make?
- Are any of the FHWA countermeasures beneficial?

38

Next Steps

- Preparation of RSA Report
- Review/comments from RSA Team
- Preparation of Preliminary Final Report
- NJDOT review
- Preparation of Final Report
- Approximate timeframe: 10 weeks

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Thank you!
Questions/Comments

Appendix I – Excerpts from the *Supporting Priority Investment in Somerset County Phase III Study & Access and Mobility Study*

PGIA Evaluation and Recommendations

RENAISSANCE REDEVELOPMENT

HAMILTON ST

Description

Location / Franklin Township, NJ

Principal Roadways / NJ 27, CR-617, CR-514

Acreage / 320

Existing Uses / Residential, Commercial Corridor, Warehousing

Complete Streets Policy / No

PGIA Summary

The Hamilton Street (CR 514) corridor was chosen as the focus area of this PGIA. This corridor includes a mix of commercial and residential uses, including traditional commercial adjacent to the road frontage, strip commercial plazas designed with significant front-yard parking, single-family and multi-family housing, and mixed-use buildings with first floor commercial and upper floor residential. Dense neighborhoods of single-family, detached homes are located to the north and south of the corridor. The Hamilton Street corridor provides convenient access to downtown New Brunswick approximately 0.8 miles to the east, including the Rutgers University campus, Robert Wood Johnson University Hospital, and the New Brunswick train station on the Northeast Corridor.

PGIA Map

Multi-Modal Access Metrics

Transit Access

0.34

MODERATE TRANSIT SERVICE

Network Walking Reach

0.45

SLIGHTLY WALKABLE

Access Summary

Multi-modal access metrics indicate an autocentric environment across the broader PGIA. Although there are no NJ TRANSIT services in the PGIA, the PGIA is served by Somerset County's CAT and DASH bus routes and Middlesex County's MCAT route. NJ TRANSIT's New Brunswick and Jersey Avenue train stations are within one mile of the PGIA. While the corridor is relatively dense, it scores as slightly walkable due to gaps and fragmentation of the roadway network, which limit connectivity. A detailed analysis of the transportation infrastructure can be found in the Existing Conditions Technical Memorandum.

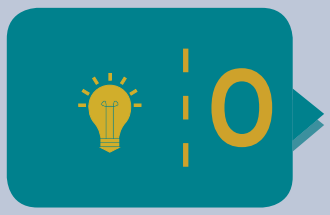
Investment Area Overview

Strengths

- Proximity to New Brunswick, Rutgers University, hospitals, and Northeast Corridor rail services
- Access to New Jersey Route 27
- Compact development, which facilitates bicycle and pedestrian improvements

Weaknesses

- Pedestrian crash history along Hamilton Street (6 pedestrian and 3 bicyclist crashes during 3-year period 2012-2014; identified by NJTPA Local Safety Program Network Screening)
- Narrow right of way on Hamilton Street constrains widening for multimodal improvements
- Lack of parallel street network alternatives to Hamilton Street
- Many cul-de-sacs and short street links limit overall street network connectivity
- Lacks municipal Complete Streets policy



Opportunities

- Enhance multimodal access through bicycle and pedestrian-only linkages and development of a bicycle boulevard network
- Support local business and neighborhood commercial corridor
- Use corridor to better connect New Brunswick and Franklin
- Leverage proximity to New Brunswick employment hubs, transportation links, and Rutgers University
- Seek funding for Road Safety Audit (RSA) on Hamilton Street
- Utilize the Mile Run Brook as a greenway
- Promote findings of the Strategic Zoning and Economic Development Recommendations Study

Constraints

- There are 14 known contaminated sites within the PGIA
- Mile Run Brook limits roadway connectivity to the east of the PGIA
- Hamilton Street roadway width limits on-street bicycle facility options

Multimodal Transportation Improvements

The proposed transportation improvements focus on enhancing multimodal mobility. These strategies seek to strengthen Hamilton Street as a neighborhood commercial corridor, improve linkages to major destinations and employment hubs in New Brunswick, and enhance safety for all roadway users. Improvement strategies are outlined below and illustrated on the map on the following page. Adoption of a Complete Streets policy would also support these efforts.

Hamilton Street Corridor

- Investigate shared-lane markings, connecting to existing markings in New Brunswick and emphasizing use of the roadway by bicyclists
- Repair deteriorating and/or heaved sidewalk sections
- Widen sidewalk (min. 10 feet) in front of commercial properties (e.g. Nora Shopping Center) to encourage pedestrian activity and accommodate street furniture, kiosks, and other amenities
- Enhance pedestrian crossings with curb extensions to improve visibility, shorten crossings, and slow traffic. Integrate green stormwater features into curb extensions, when feasible
- Upgrade traffic signal equipment to include pedestrian signal heads with countdown timers
- Build upon recent streetscape improvements by installing high-visibility, continental crosswalks and ADA-compliant curb ramps at unmarked crossings along the corridor
- Incorporate bicycle parking into streetscape
- Require bicycle parking with new development activity
- Replace improperly sited street trees and install additional street trees along the corridor, particularly along the westbound side where there are fewer conflicts with utilities
- Investigate opportunities to expand transit access along the corridor, such as NJ TRANSIT and/or Rutgers University bus service. Prioritize locations for potential stops and develop a design concept for integrating bus pull-outs
- Install bus stop signage

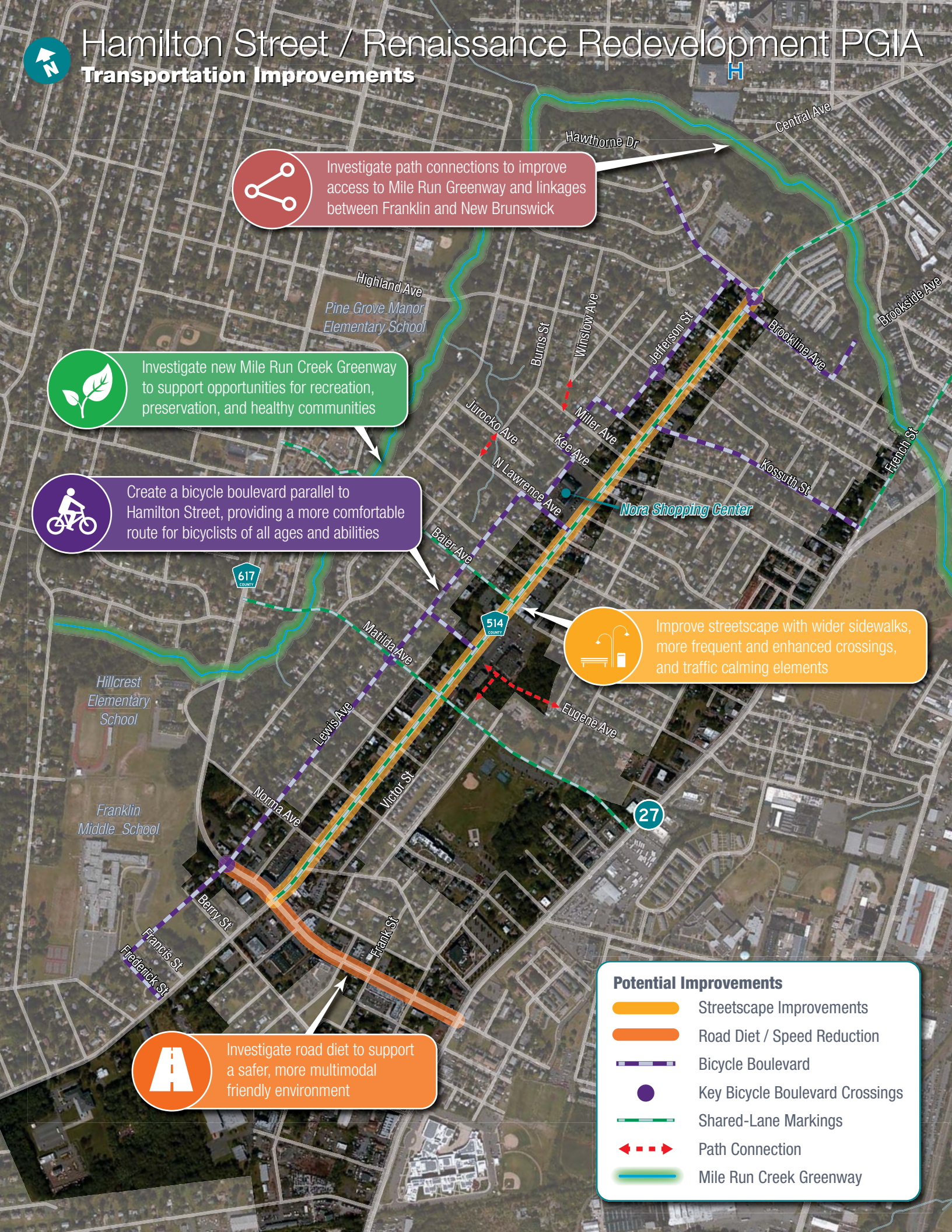
Lewis Street Bicycle Boulevard

Lewis Street provides a relatively continuous, parallel route one to two blocks north of Hamilton Street along the majority of the corridor. Designating and designing the route as a bicycle boulevard will prioritize bicycle movement, create a bicycle route comfortable for most bicyclists, and provide convenient access to commercial destinations along Hamilton Street, the Franklin Middle School, and connections into New Brunswick.

Hamilton Street / Renaissance Redevelopment PGIA

Transportation Improvements

H



Design considerations include:

- Consider 20 mph speed limit
- Install wayfinding signage and bicycle boulevard pavement markings
- Introduce traffic calming elements to reinforce low traffic speeds
- Provide crossing improvements of Franklin Boulevard, such as marked crossings, Rectangular Rapid Flashing Beacons (RRFBs), and median island to slow traffic speeds
- Install a multi-use path between Frederick Street and Berry Street, creating more direct access to the Middle School, and extending the bicycle boulevard concept for a greater distance
- Install contraflow bicycle lane on Lewis Street between Franklin Boulevard and Norma Avenue, connecting the bicycle boulevard through a one-block, one-way segment
- Mark and sign the crossings of Matilda, Baier, and Highland Avenues
- Leverage redevelopment of the Nora Shopping Center as an opportunity to route the bicycle boulevard across the rear of the property. This would provide the most direct connection between the current network gap between North Lawrence Avenue and Kee Avenue, route bicyclists more directly and conveniently to commercial destinations, and extend the bicycle boulevard farther via Green and/or Jefferson Streets

Enhance Multimodal Connectivity

- Provide bike/ped-only linkages to enhance network connectivity:
  - » Burns Street between Jurocko Avenue and North Lawrence Avenue
  - » Between Winslow Avenue and Miller Avenue
- Provide bike/ped connection from Eugene Avenue and Victor Street to the rear and side, respectively, of the Hamilton Street Center shopping plaza. These connections would require cooperation from the property owner and/or could be incorporated into future development activity to provide more direct bike/ped access from the surrounding neighborhoods.
- Fill gaps in sidewalk network in the surrounding residential neighborhoods
- Investigate opportunities to utilize the Mile Run Creek as a greenway to support recreation, mobility, and conservation. The corridor links New Brunswick, residential neighborhoods, and several schools
- Investigate opportunities to enhance bike/ped connectivity between Franklin and New Brunswick with bike/ped-only, prefabricated structures crossing over Mile Run Creek

Franklin Boulevard

- Investigate lowering the speed limit between NJ 27 and Lewis Avenue (currently 40 mph). This section has denser development patterns and development closer to the roadway than the section north of Lewis Avenue
- Investigate a road diet between Hamilton Street and NJ 27, as discussed in the following section
- Fill sidewalk gaps between Ellen and Frank Streets, south of Field Street, and between Fuller Street and NJ 27

Bicycle Boulevard Design

Bicycle boulevards are linear corridors of interconnected, traffic-calmed streets where bicyclists are afforded a high level of safety and comfort. Many local streets have existing low motor vehicle travel speeds and volumes that form the basic components of a comfortable bicycling environment. These streets can be enhanced to create a bicycle boulevard. Many of these treatments benefit not only bicyclists, but all users of the street by supporting a safe and quiet environment.

Bicycle boulevard treatments prioritize travel for bicyclists by simplifying navigation and discouraging high vehicle speeds and volumes while still accommodating local access. Some bicycle boulevards also include links for bicyclists that are not open to vehicular traffic. Intersection crossing treatments are also crucial to creating more comfortable streets for users of all ages and abilities.

The following design treatments, where applicable, are the primary strategies to support a bicycle boulevard.

Reduced Speed Limits

The maximum speed limit for a bicycle boulevard is 25 mph; however, a speed limit of 20 mph or lower is preferred.

Signage and Markings

Signage, pavement markings, and wayfinding convey that the corridor is intended as a shared, slow street, prioritize bicycle movement, and help cyclists navigate the corridor.

Speed Management

Traffic calming elements reinforce slow travel speeds along the corridor and create a more comfortable cycling environment consistent with local context.

Volume Management

Volume management techniques discourage motor vehicle through traffic on designated bicycle boulevards. Bicycle boulevards should be designed for traffic volumes under 1,500 vehicles per day.

(left) Photo simulation of a bicycle boulevard in Princeton, NJ, includes pavement markings, wayfinding, and traffic calming; (right) Bicycle boulevard on Haven Avenue in Ocean City, NJ, has a 15 mph speed limit and uses curb extensions and a raised median to slow traffic and reduce cut-through traffic along this local residential street.

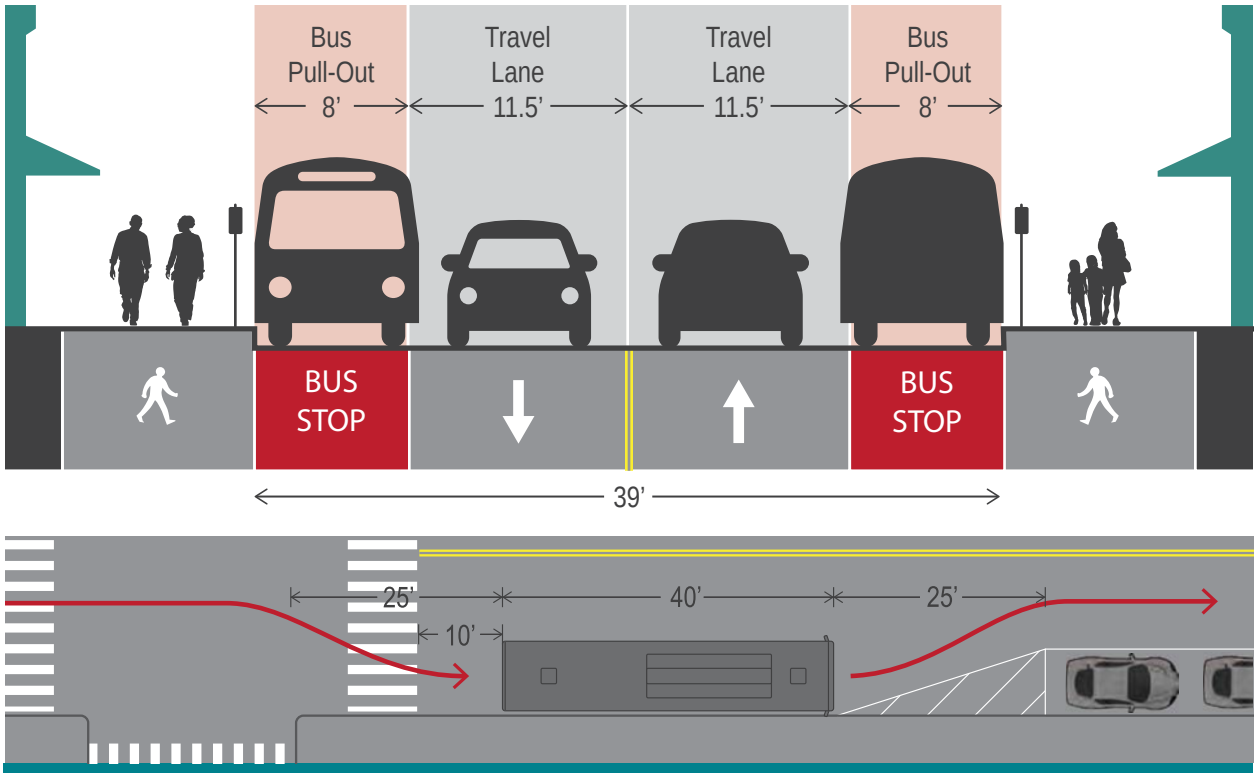
Transit Stop Design

As Hamilton Street continues to undergo redevelopment and increase in density, the Township should continue to coordinate with NJ TRANSIT, Somerset County, and Rutgers University to explore opportunities for bus transit services along the corridor. Bus service would enhance the multimodal aspect of the corridor and increase transportation options for accessing Rutgers University, employment hubs, nearby train stations, and downtown New Brunswick.

Provision of bus services would require minor alterations to the roadway and streetscape to better accommodate bus stops and transit passengers at key destinations along the corridor.

At each stop, on-street parking would be prohibited in order to provide bus pull-outs. Bus pull-outs facilitate convenient, curbside boarding/alighting for passengers while still enabling through traffic to pass relatively unimpeded. Depending on the unique characteristics of a stop location, bus stops may be sited midblock or on the near-side or far-side of an intersection. Stops at intersections would require removal of approximately three parking spaces, while midblock stops may require removal of approximately five spaces.

Each stop should include signage and lighting. Additional passenger amenities, such as seating, a transit shelter, and traveler information are also preferred. The sidewalk should be wider at bus stop locations in order to accommodate transit passenger activity and amenities while maintaining a minimum 5-foot wide through travel zone for pedestrians.



(top) Typical cross-section for a transit stop along Hamilton Street (bottom) Example layout of a far-side bus pull-out stop (NACTO Transit Street Design Guide)

Franklin Boulevard Road Diet Analysis and Conceptual Design

A road diet, or right sizing, is a low cost method of reconfiguring the existing roadway space to improve safety, enhance multimodal mobility, and support local community needs while still efficiently moving traffic. Road diets typically involve reducing the number of vehicle lanes from four to three and reallocating the remaining space to on-street parking, pedestrian and streetscape improvements, bicycle lanes, transit accommodations, or shoulders.

The Federal Highway Administration (FHWA) endorses road diets as a proven safety countermeasure and they are becoming standard practice in New Jersey. Forty-seven road diet projects have been implemented in New Jersey in the last five years, including Washington Avenue (CR 529) in Green Brook in 2016.

The benefits associated with road diets include:

- Improved safety for all roadway users
  - » Fewer conflict points
  - » Reduced crash frequency by 19 percent to 43 percent (FHWA)
  - » Reduced crash severity
- Provide space for improved accommodations for bicyclists, pedestrians, and/or transit passengers
- Reduced and more consistent vehicle speeds
- Provides a pedestrian-friendly streetscape, supporting the local economy and quality of life

Analysis

Franklin Boulevard has an annual average daily traffic (AADT) of 13,748 vehicles (2015) and approximately 665 vehicles per hour per direction (VPHPD) during the peak hour (2016 analysis). Both metrics are within general feasibility guidelines for identifying and advancing road diet candidates. To further investigate potential impacts on traffic flow, the project team collected peak hour turning movement traffic counts and conducted a microsimulation analysis for the signalized intersections at Hamilton Street and NJ Route 27.

The analysis compared the level-of-service (LOS) and delay for each intersection approach in the existing condition and the proposed road diet scenario. As shown in the table below, the analysis indicates essentially no negative impact to the operation of the intersections, as the existing LOS is maintained with the road diet in place.

Capacity Analysis for Road Diet Concept

	Existing LOS		Road Diet LOS	
	AM	PM	AM	PM
Franklin Blvd at Hamilton Street				
Franklin Blvd NB	F	F	F	F
Franklin Blvd SB	F	F	F	F
Hamilton St EB	F	F	F	F
Hamilton St WB	E	F	E	F
Franklin Blvd at NJ Route 27				
Oliver Ave NB	C	C	C	C
Franklin Blvd SB	D	C	D	C
NJ 27 EB	C	C	C	C
NJ 27 WB	C	C	C	C

The analysis also indicates that the Hamilton Street intersection currently operates at a peak hour LOS F. Reevaluating and optimizing the signal timing may be considered as a part of the road diet implementation for this intersection.

Conceptual Design

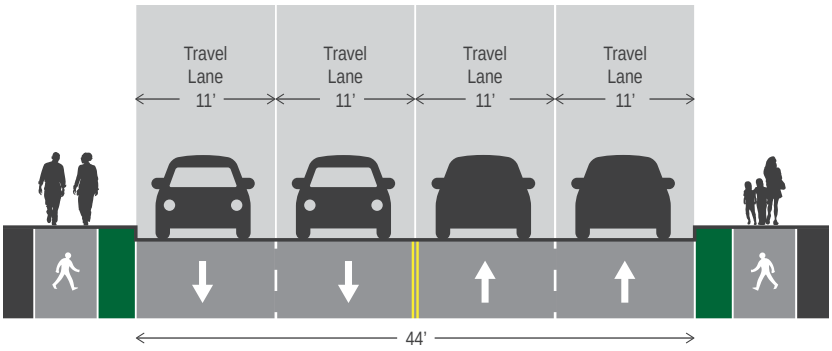
The road diet concept proposes reconfiguring the existing roadway from four travel lanes to two travel lanes, along with a two-way center turn lane. The remaining space could be allocated to bicycle lanes or striped shoulders. The figures below illustrate the current and potential cross sections, as well as the extent of the road diet. Road diets tend to facilitate lower operating speeds, and the implementation of the road diet should also investigate lowering the existing 40 mph speed limit. The roadway reconfiguration and reduced speed limit would improve safety and better support the local context and development patterns.

Based on the intersection analysis and typical queue lengths, turn lanes are required to provide adequate stacking capacity and maintain existing intersection performance. The intersection at Hamilton Street would maintain the existing configuration with a northbound left-turn lane extending approximately to Field Street. At NJ Route 27, the southbound left-turn lane should extend at least 150 feet in order to accommodate typical vehicle queues.

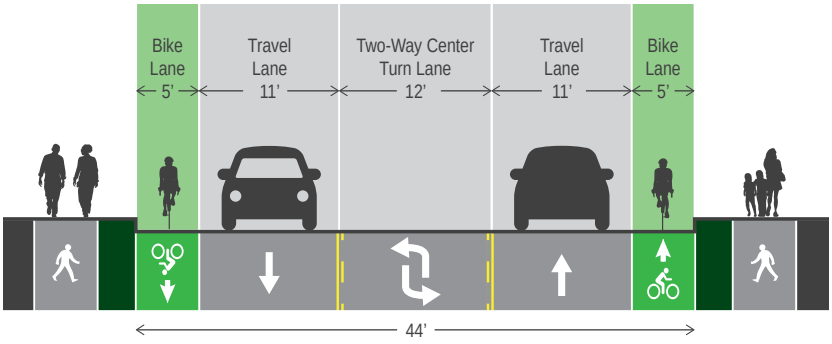
This concept provides an initial design alternative for further evaluation. The concept should be explored in greater detail with local, county, and NJDOT stakeholders.

Proposed Road Diet Extent

Existing Cross Section



Potential Road Diet Cross Section



Improvement	Order of Magnitude Cost (Est.)	Time Frame	Potential Partners
Hamilton Street / Renaissance Redevelopment PGIA			
Hamilton Street Corridor			
Install bus stop signage	Low	Short	County
Promote findings of the Strategic Zoning and Economic Development Recommendations Study	Low	Short	Town / County
Investigate shared-lane markings connecting to existing markings in New Brunswick	Low	Med	Town / County
Repair deteriorating and / or heaved sidewalk sections	Low	Med	Town / County
Widen sidewalk (min. 10 ft) in front of commercial properties	Low	Long	Town / Developer
Enhance pedestrian crossings with curb extensions and integrate green stormwater features into curb extensions	Low	Long	Town / County / Developer
Upgrade traffic signal equipment to include pedestrian signal heads and countdown timers	Low	Long	County
Install high-visibility crosswalks and ADA compliant curb ramps at unmarked crossings	Low	Long	County / Developer
Investigate opportunities to incorporate bicycle parking into streetscape and require bicycle parking for new developments	Low	Long	Town / County / Developer
Investigate opportunities to expand transit access along the corridor, such as NJ TRANSIT and/or Rutgers University bus service	Low	Long	County / NJ TRANSIT / Rutgers / Town
Lewis Street Bicycle Boulevard			
Install wayfinding signage and bicycle boulevard pavement markings	Low	Med	Town
Install a multi-use path between Francis Street and Berry Street	Low	Long	Town
Provide marked crossings and median islands on Franklin Boulevard	Low	Long	County / Town

Improvement	Order of Magnitude Cost (Est.)	Time Frame	Potential Partners
Install contraflow bicycle lane on Lewis Street between Franklin Boulevard and Norma Avenue	Low	Long	Town
Investigate opportunity to install bicycle boulevard behind the Nora Shopping Center	Low	Long	Town / Developer
Enhanced Multimodal Connectivity			
Adopt Complete Streets policy	Low	Short	Town
Investigate opportunities to enhance bike/ped connectivity between Franklin and New Brunswick with bike/ped-only, prefabricated structures crossing over Mile Run Creek	Low	Long	Towns
Provide bike/ped connections on Burns Street between Jurocko Avenue and North Lawrence Avenue and Winslow Avenue and Miller Avenue	Low	Long	Town
Provide bike/ped connection from Eugene Avenue and Victor Street to the rear and side, respectively, of the Hamilton Street Center shopping plaza	Low	Long	Town / Property Owner / Developer
Investigate opportunities to utilize the Mile Run Creek as a greenway	Low	Long	Town
Franklin Boulevard			
Investigate lowering the speed limit between NJ 27 and Lewis Avenue (currently 40 mph)	Low	Med	County / Town
Fill sidewalk gaps between Ellen Street and Frank Street, and between Fuller Street and NJ 27	Low	Long	Town
Investigate a road diet between Hamilton Street and NJ 27	Low	Long	County / Town / NJDOT

NOTE:

Order of Magnitude Cost tiers:
- Low: <$5M
- Medium: $5M - $25M
- High: >$25M

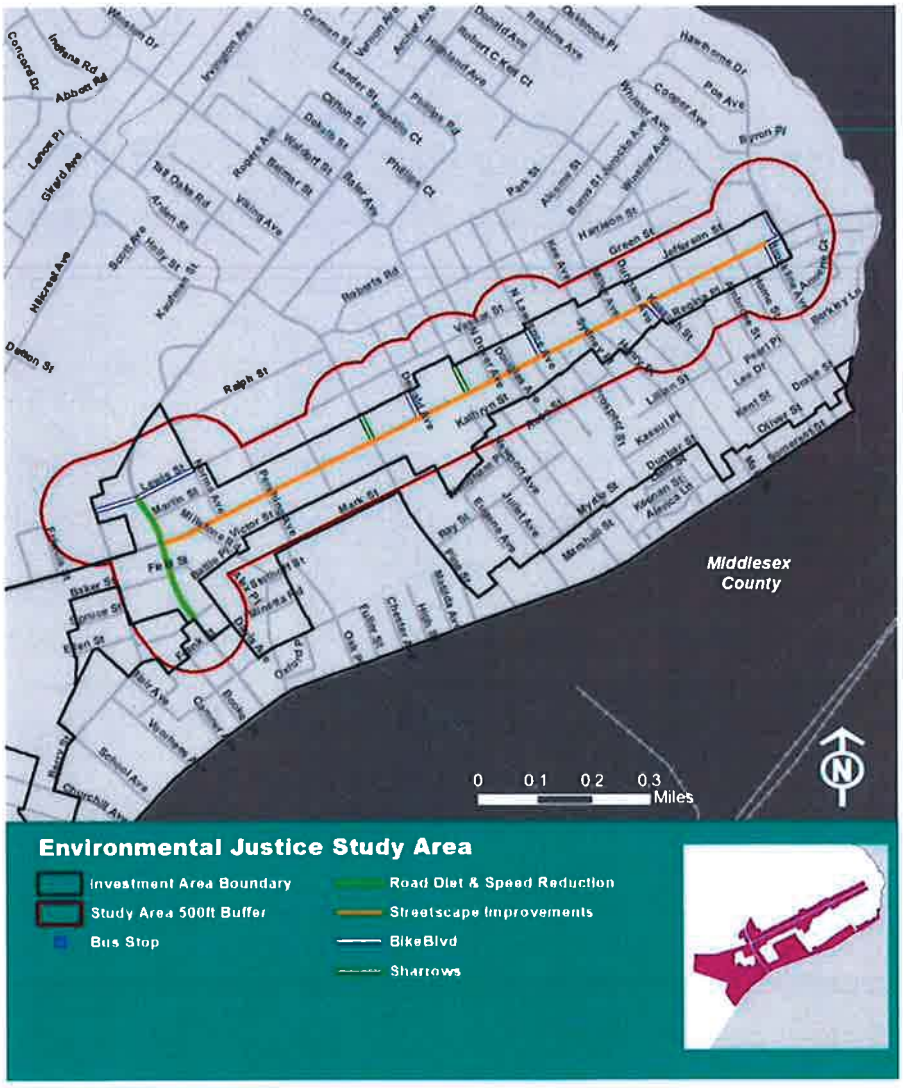
Time Frame tiers:
- Short: <3 year
- Med: 3-8 years
- Long: >8 years

HAMILTON ST/RENAISSANCE DEVELOPMENT PGIA

The study area for the EJ analysis was determined based on a 500 foot buffer around the segments where improvements have been proposed, as shown in (Figure 17). The EJ analysis for the study area included all block groups the overlapped the 500 foot buffer.

According to 2010 Census Data, the Investment Area contains an estimated 13,302 individuals accounting for 4.1% of Somerset County's overall population. Meanwhile, the block groups that overlap the study area contain approximately 11,279 individuals, accounting for 3.49% of Somerset County's overall population.

Figure 17 Study Area



Poverty

Poverty within PGIA

Census data on poverty populations in the Hamilton St/Renaissance Development PGIA boundary and Somerset County as a whole was obtained from the 2014 ACS for block groups. The data collected provides information about poverty status in the past 12 months by household type.

An analysis of the data reveals that the percentage of those living below poverty level in the Investment Area (7.9%) is significantly higher than the Somerset County average percentage of population living below poverty level of 4.9%. Approximately 5.5% of Somerset County's population living below poverty level resides within the PGIA, as displayed in Figure 18.

A complete breakdown by block group is displayed in Table 4 below. The map (Figure 19) also displays each block group's share of the County's below poverty level population.

Poverty within Study Area

The data show that 5.3% (303) of Somerset County's living below poverty level households are located in the study area. Of the households located within the block groups in the study area, approximately 9.1% live below poverty level. Figure 20 displays the households living below poverty level within the study area.

Figure 18 Comparison of Households Living Below Poverty Level

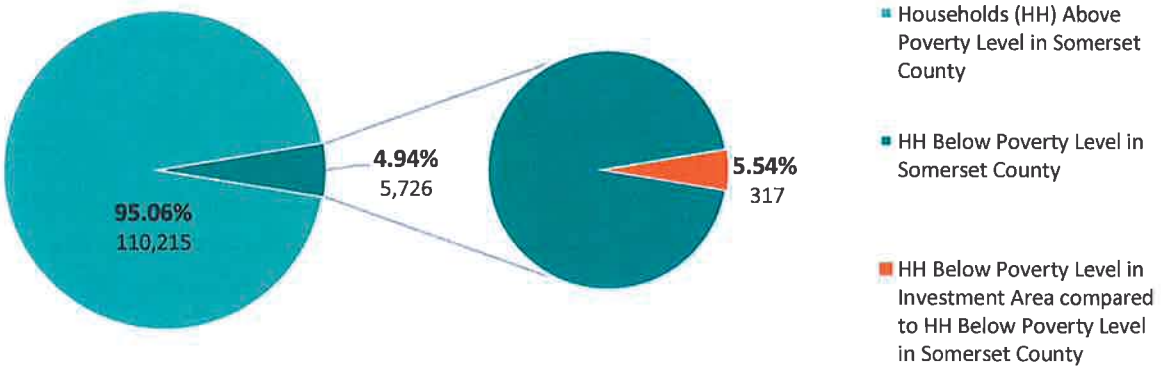


Table 4 Households Living Below Poverty Level by Block Group

Tract	Block Group	Household Population	Households below Poverty Level	% Households in PGIA below Poverty Level	Share of County's Population below Poverty Level
532	3	464	27	5.82%	0.47%
532	2	481	81	16.84%	1.41%
532	4	653	17	2.60%	0.30%
532	1	402	27	6.72%	0.47%
533	2	557	122	21.90%	2.13%
533	1	769	29	3.77%	0.51%
534.04	1	683	14	2.05%	0.24%
	Total	4,009	317	7.91%	5.54%

XX = Block groups overlapping the study area

Figure 19 Households Living Below Poverty Level

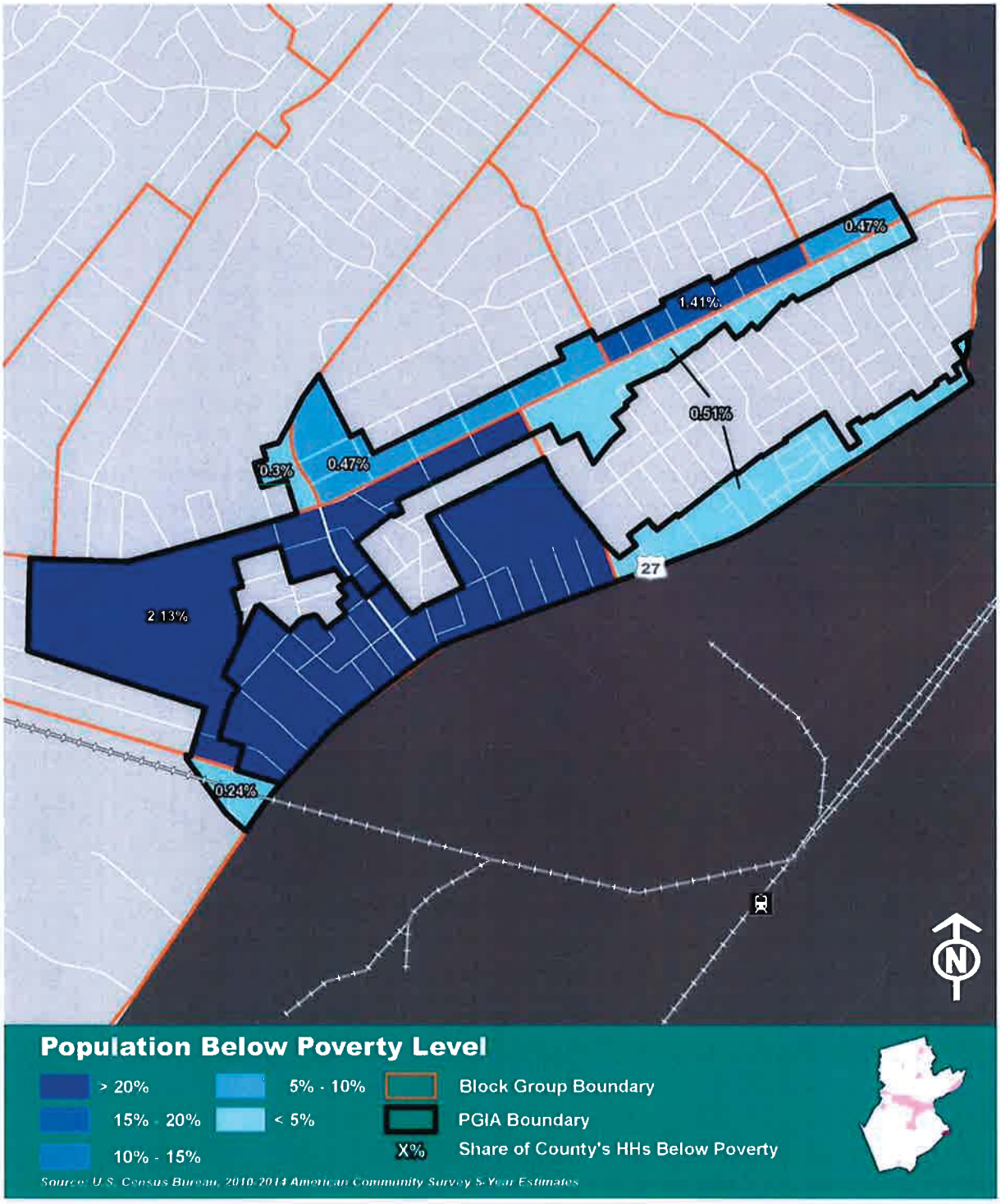
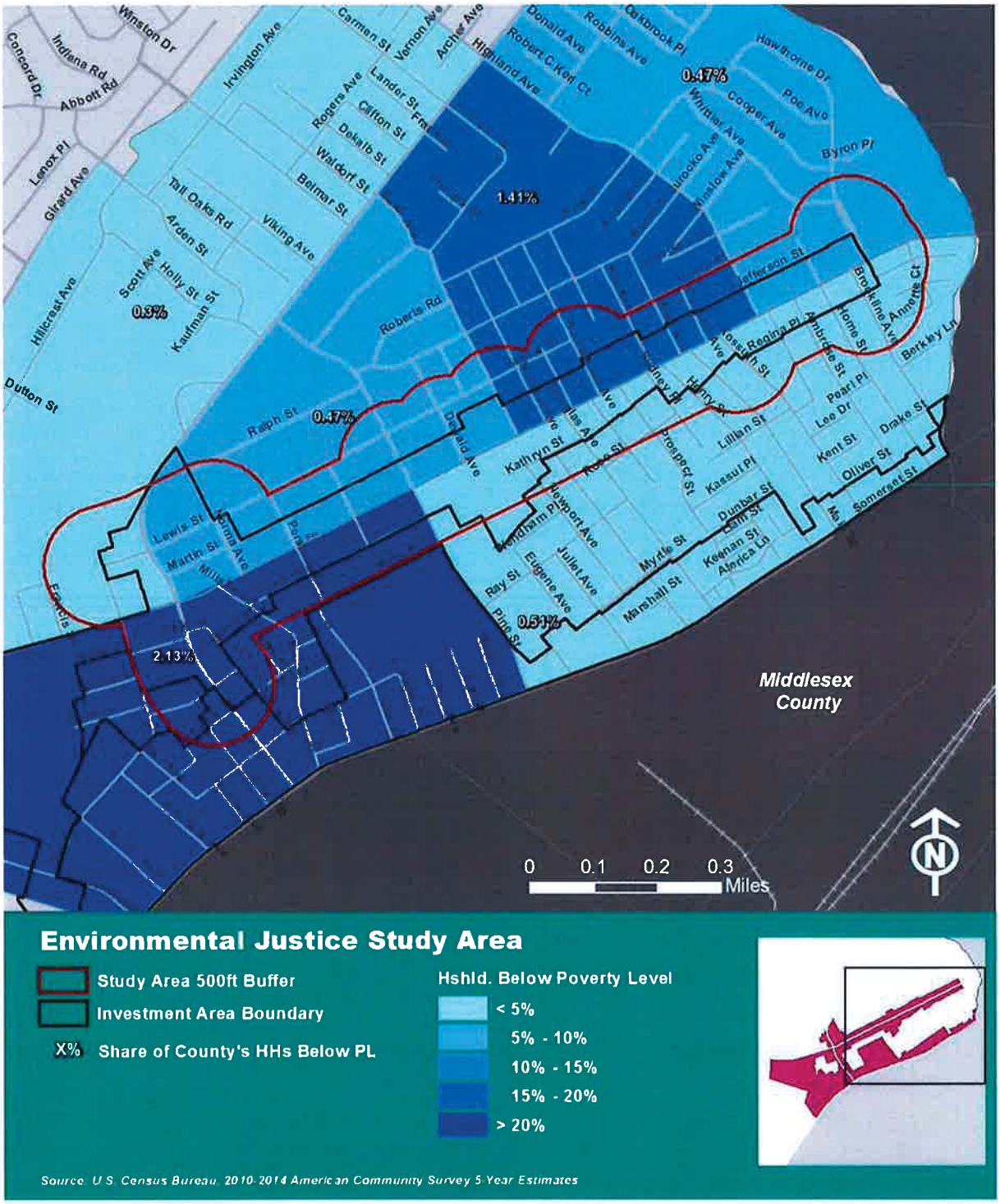


Figure 20 Households Living Below Poverty Level within Study Area



Minority

Data on minority populations in the Hamilton Street PGIA boundary and Somerset County as a whole was obtained from the 2010 Census for block groups.

Minority within PGIA

A comparison of racial composition in the PGIA and Somerset County is displayed in Figure 21. The comparison shows that the percentage of minority populations in the PGIA surpass that of Somerset County across every category, with the exception of the Asian population – 6.7% percent within the PGIA, in comparison to Somerset County with an Asian population average of 14.1%.

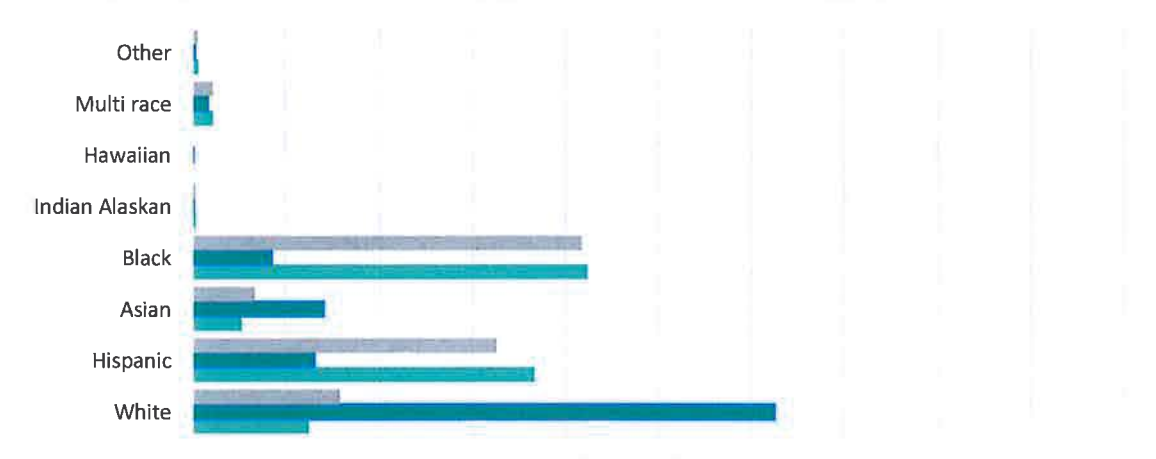
An analysis of the data reveals that the total minority population within the Investment Area (84.2%) greatly exceeds the Somerset County minority population average of 37.6%. This indicates that the overwhelming majority of the population within the PGIA is considered minority. A complete breakdown by Block Group is displayed in Table 5.

The Minority Population map (Figure 22) displays the total percentage of minority population within each block group, denoted by the color. Additionally, the map displays the share of the County's overall Minority population located within each individual block group. Approximately 9.2% of Somerset County's minority population lives within the PGIA.

Minority within Study Area

The data show that the concentration of minority populations within the study area (57.6%) is marginally higher compared to the PGIA (54.1%). Figure 23 displays the minority population located within the study area.

Figure 21 Comparison of Racial Composition



	White	Hispanic	Asian	Black	Indian Alaskan	Hawaiian	Multi race	Other
Investment Area	15.84%	32.60%	6.73%	41.75%	0.29%	0.03%	2.20%	0.57%
Somerset County	62.41%	13.01%	14.06%	8.50%	0.09%	0.02%	1.67%	0.24%
Study Area	12.49%	36.71%	5.21%	42.38%	0.33%	0.04%	2.21%	0.64%

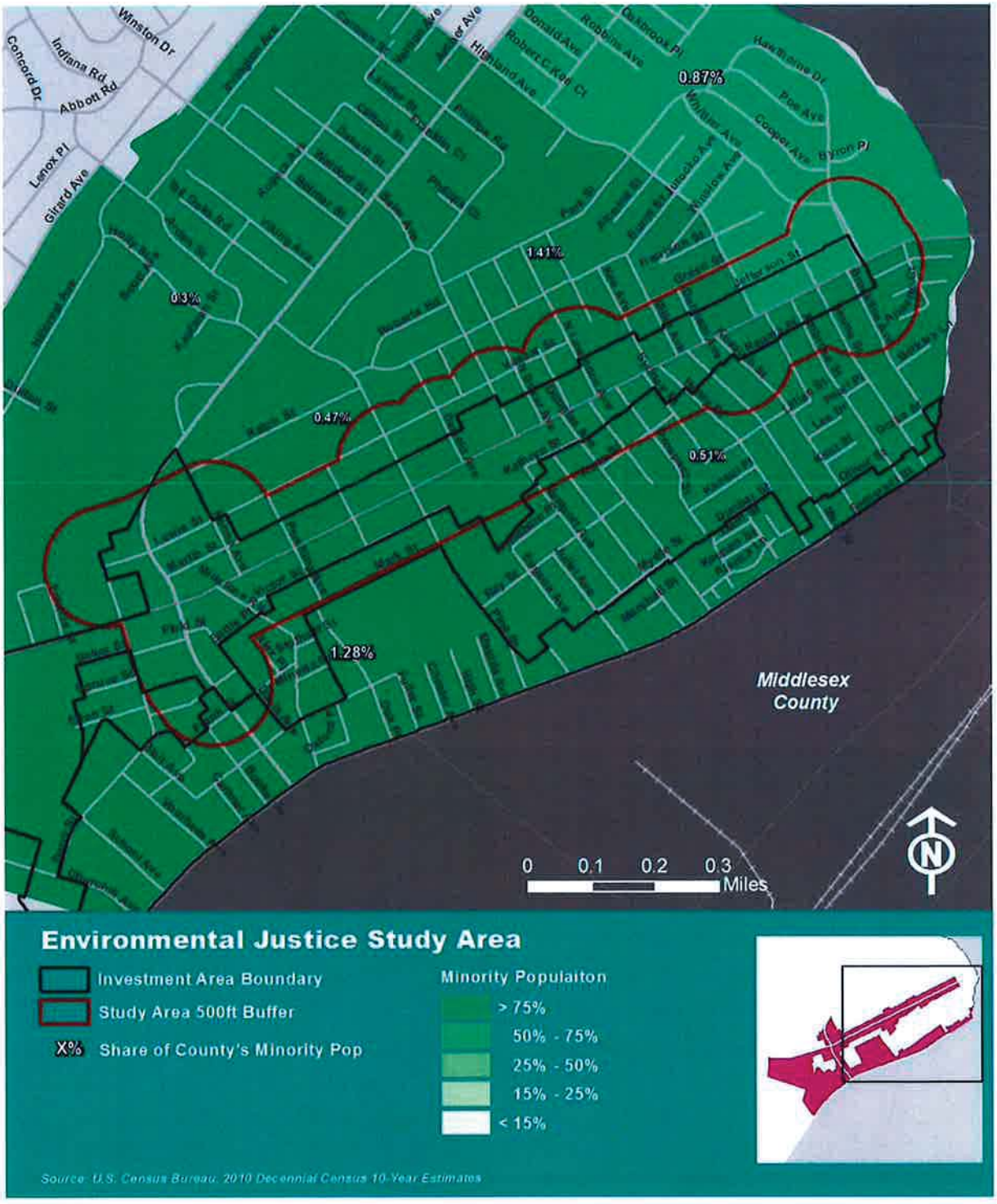
Table 5 Population Breakdown by Block Group

Tract	Block Group	Total Pop.	Minority Pop.	White	Hispanic	Asian	Black	Indian Alaskan	Hawaiian Islander	Multi Race	Other	% Minority Pop.	Share of County's Minority Population
532	**3**	**1,658**	**1,604**	**54**	**615**	**19**	**911**	**13**	**-**	**39**	**7**	**96.74%**	**1.32%**
532	**2**	**1,751**	**1,601**	**150**	**826**	**73**	**648**	**9**	**-**	**33**	**12**	**91.43%**	**1.32%**
532	**4**	**1,635**	**1,506**	**129**	**341**	**84**	**1,032**	**2**	**1**	**32**	**14**	**92.11%**	**1.24%**
532	**1**	**1,532**	**1,058**	**474**	**471**	**97**	**441**	**1**	**3**	**38**	**7**	**69.06%**	**0.87%**
533	**2**	**1,663**	**1,559**	**104**	**411**	**72**	**1,021**	**-**	**-**	**48**	**7**	**93.75%**	**1.28%**
533	**1**	**3,040**	**2,542**	**498**	**1,476**	**243**	**727**	**12**	**-**	**59**	**25**	**83.62%**	**2.09%**
534.04	1	2,023	1,325	698	196	307	773	2	-	43	4	65.50%	1.09%
	Total	**13,302**	**11,195**	**2,107**	**4,336**	**895**	**5,553**	**39**	**4**	**292**	**76**	**84.16%**	**9.21%**

XX = Block groups overlapping the study area

Figure 22 Minority Population

Figure 23 Minority Population within Study Area



Limited English Proficiency

Census data on Limited English Proficiency (LEP) population within the Hamilton Street PGIA boundary and Somerset County as a whole was obtained from the 2014 ACS for block groups. Limited English Proficiency households were identified as one where all members 14 years old and over speak English less than "very well."

LEP within PGIA

A comparison of the LEP households in the PGIA and Somerset County is displayed below (Figure 24). The graphic displays percentages of LEP households according to household language – this includes Spanish, Indo-European, Asian and Pacific Island, and other languages. The percentages show that the LEP population within the PGIA is fairly similar in composition to that of Somerset County, however the PGIA contains a significantly higher percentage of Spanish-speaking LEP population (7.8%) than the County with 2.6%.

The census data reveals that the LEP population in the PGIA (11.1%) far exceeds the average percentage of LEP population in Somerset County of 5.3%. Approximately 7.3% of Somerset County's LEP population lives within the PGIA. A complete breakdown by Block Group is displayed in Table 6.

The Limited English Proficiency map (Figure 25) displays the percentage of LEP population located within each of the Block groups. The map also displays the share of the County's LEP population located within each block group.

LEP within Study Area

The data show that the LEP households approximately 6.7% (406) of Somerset County's LEP households reside within the study area, displayed in Figure 26.

Figure 24 Comparison of Limited English Proficiency Households

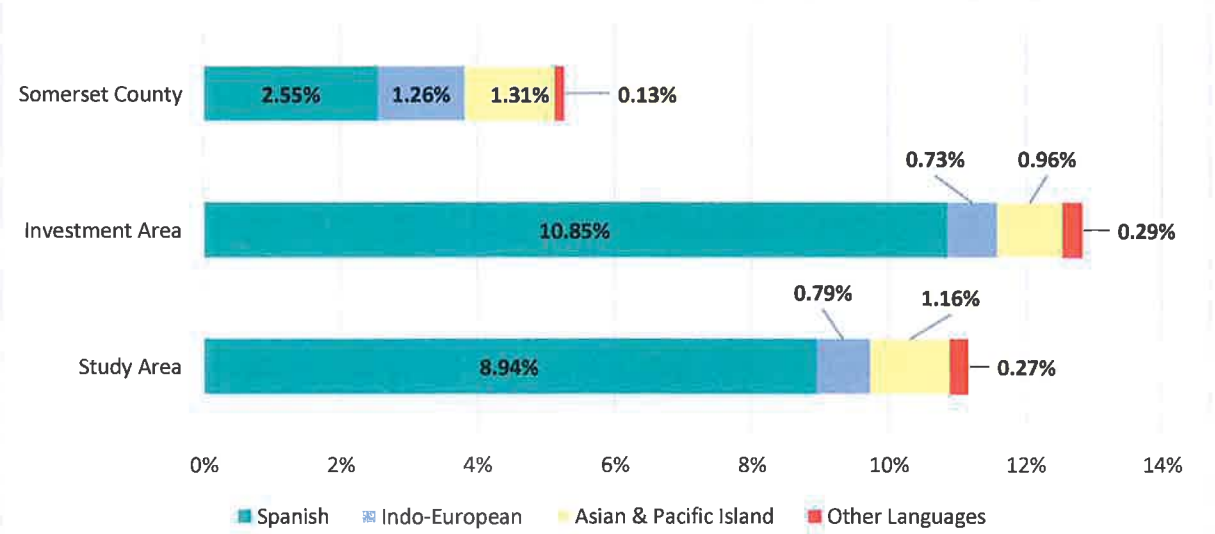


Table 6 Limited English Proficiency by Block Group

Tract	Block Group	Household Population	LEP Households	% LEP Households in PGIA	Share of County's LEP Households
532	1	402	67	16.67%	1.10%
532	4	653	52	7.96%	0.85%
532	2	481	111	23.08%	1.82%
532	3	464	27	5.82%	0.44%
533	1	769	116	15.08%	1.90%
533	2	557	33	5.92%	0.54%
534.04	1	683	38	5.56%	0.62%
	Total	4,009	444	11.08%	7.27%

XX = Block groups overlapping the study area

Figure 25 Limited English Proficiency

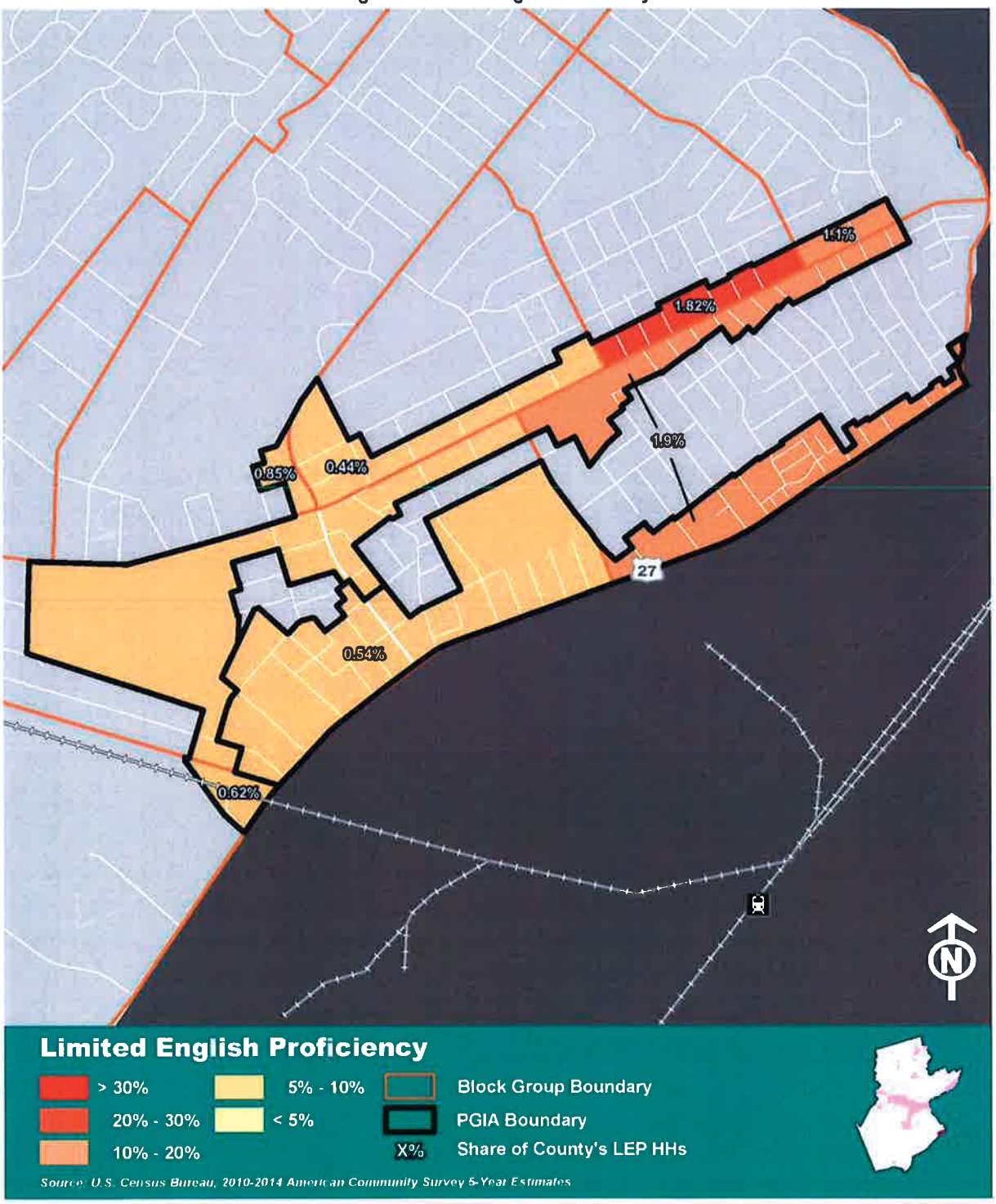
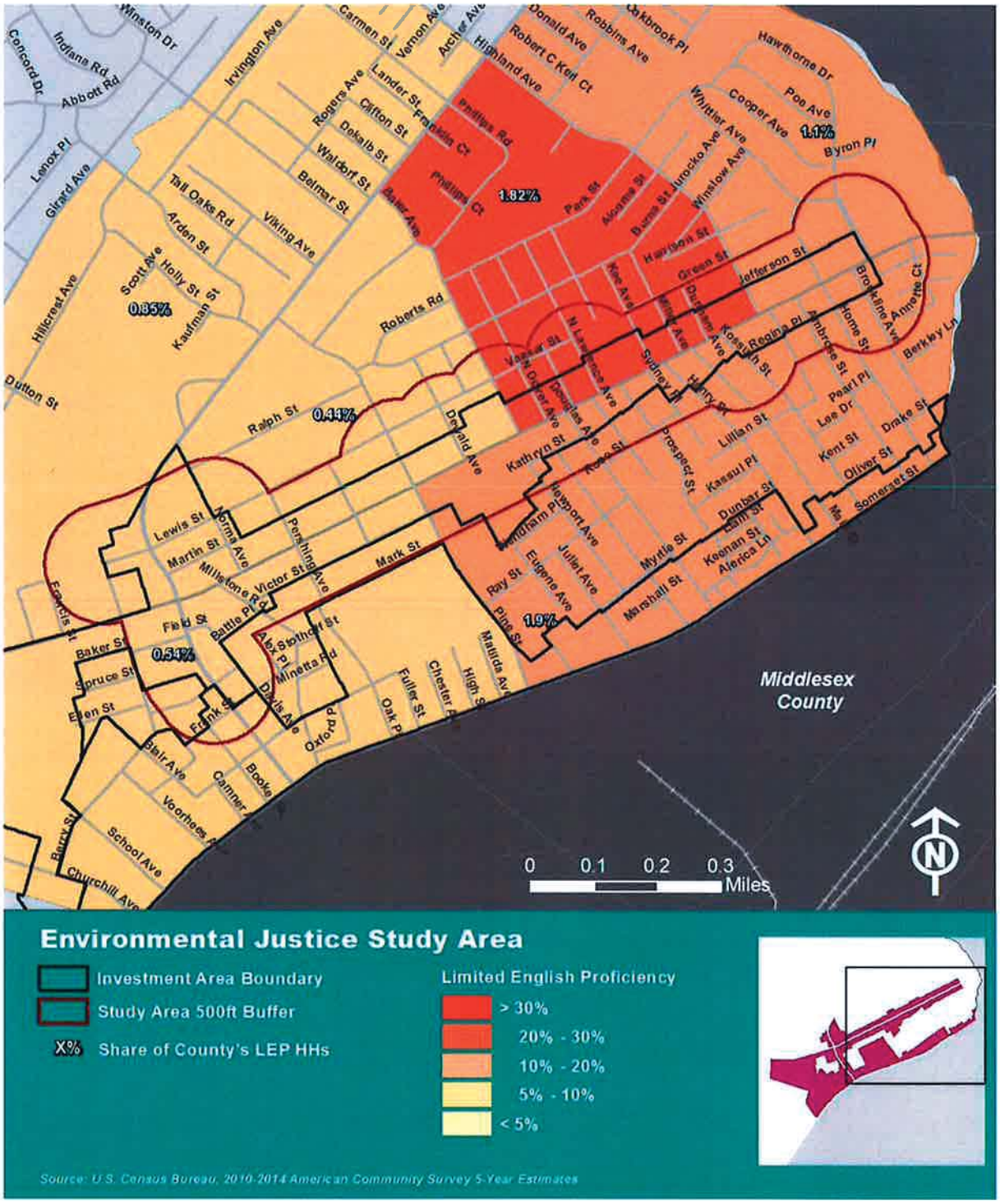


Figure 26 Limited English Proficiency within Study Area



Appendix J – Road Owner Response: *Somerset County*

Somerset County Response to Hamilton Street Road Safety Audit (owner's response)

Somerset County agrees with the recommendations of the Hamilton Street Road Safety Audit. The County strives to make our roads safer for all users and is willing to investigate any recommendations that can assist in achieving that goal. Our agreement with the assessment should in no way be perceived as a commitment to the implementation of such suggestions.

The following general points should be noted:

- Somerset County does not maintain or inspect sidewalks along county roadways. That responsibility lies with the municipality or property owner.
- Traffic impacts of land development projects are analyzed when these developments are submitted for review. Approval of land development projects is contingent on implementation of measures that ameliorate those impacts. Review of the traffic impacts of new developments would therefore be redundant.
- Some recommendations may not be warranted or feasible due to engineering or fiscal constraints. Additional analysis is necessary.