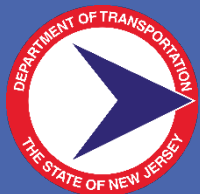




Road Safety Audit:

ASBURY AVE (CR 16),
RIDGE AVENUE TO MEMORIAL DRIVE
(MP 5.50-6.15)



March 2023
Issued December 2023

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Executive Summary

This document is the draft report of the Road Safety Audit (RSA) conducted along Asbury Ave (CR 16), Ridge Avenue to Memorial Drive, in Asbury Park City, Monmouth 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.

The aforementioned roadway section was identified on NJDOT's Network Screening list. According to the NJDOT crash database, there were 124 crashes from 2018 to 2020 along the studied section of Asbury Avenue. There were 6 pedestrian crashes from 2016 to 2020; one was fatal.

This RSA was conducted on Wednesday, October 26, 2022. The pre- and post-audit meetings were conducted at the Asbury Park council chambers. Representatives from Monmouth County, Asbury Park City, NJDOT, NJTPA, NJ Transit, Asbury Park Complete Streets Coalition, and EZRide were in attendance.

The RSA site and crash history are described in Sections II and III of this report, respectively. Section II also identifies previous and on-going studies conducted by the agency representatives. Corridor-wide and site-specific issues and recommendations, organized by location, are discussed in Section V. These recommendations addressed pedestrian safety by investigating curb extensions at intersections, repairing sidewalks, and ensuring ADA compliance. Additionally, many suggestions were made to upgrade traffic signals, improve, and simplify signage, and improve lighting.

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

This section of Asbury Avenue was identified on NJDOT’s Network Screening lists, as shown below. The current Network Screening list rankings are based on 2014-2016 vehicular and 2012-2016 pedestrian crash data, unless noted otherwise. Rankings shown are within Monmouth County only.

Table 1 – County Ranking (Corridor)

Location	Ped Corridor	Regional Corridor
Asbury Ave	-	#9 (MP 5.22-6.22)

Table 2 – County Ranking (Intersection)

Location	Intersections	Pedestrian Intersections
Memorial Dr (MP 6.15)	#23	#5
Prospect Ave (MP 5.65)	-	#5

B. What is a Road Safety Audit (RSA)?

An 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, as well as 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. RSAs focus on evaluating the safety of both pedestrians and bicyclists, which may include looking beyond the roadway to include other paths, connections, and generators.

RSAs are 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 FHWA’s proven safety countermeasures, is shown below.



C. The RSA Event

This RSA was conducted on Wednesday, October 26, 2022. The pre- and post-audit meetings were conducted at the Asbury Park council chambers. Representatives from Monmouth County, Asbury Park City, NJDOT, NJTPA, NJ Transit, Asbury Park Complete Streets Coalition, and EZRide were in attendance. A list of team members can be found in Appendix A.

II. Corridor Description and Analysis

A. Study Location and Other Studies

The study area consists of a 0.65-mile segment of Asbury Avenue (MP 5.50-6.15). The adjacent land use along the corridor is a mix of commercial and residential properties. The intersection of Ridge Avenue was recently upgraded. The following sections provide additional information.

B. Roadway and Intersection Characteristics

Asbury Avenue is an undivided urban minor arterial, with 2 travel lanes and on-street parking. The posted speed is 25 mph. There are 7 signalized and 3 unsignalized intersections. There is also an at-grade rail crossing at the intersection of Asbury Avenue with Memorial Drive for the NJ Transit North Jersey Coast Rail Line.

C. Existing Bicycle/Pedestrian Accommodations

Sidewalk is provided along both sides of Asbury Avenue. Some locations also do not have a minimum of three (3) feet around an obstruction. Marked crosswalks are continental style. Sidewalk and crosswalk conditions vary from newly installed to needing maintenance. There are no bicycle lanes or other bicycling infrastructure identified along the study corridor.

D. Traffic Volumes

The 2018 Annual Daily Traffic (ADT) along Asbury Avenue in the vicinity of Comstock Street is approximately 7,800 vehicles per day. A copy of the available data can be found in Appendix E.

E. Transit Service

NJ Transit bus service is provided along Asbury Avenue via route 832. Stops are located at or near Ridge Avenue, Central Avenue, Pine Street, Comstock Street, and Langford Street. The North Jersey Coast Rail Line services the Asbury Park station to the south.

F. Community Profile

The American Community Survey (ACS) estimate, which updates the 2010 Census population and income characteristics, was used to identify minority and low-income populations surrounding the project limits. The latest ACS for this study area is a five-year estimate from 2016 through 2020. A summary of the demographics is listed below. Bold denotes that the percentage is above the Monmouth County average.

Table 3 – Study Area Demographics

Characteristic	Study Area	County Average
Demographic Index	83%	-
Race/Ethnicity	-	-
<i>White</i>	<i>14%</i>	<i>75%</i>

<i>Hispanic/Latino</i>	20%	11%
<i>Black or African American</i>	59%	7%
<i>Asian American</i>	0%	5%
<i>American Indian/Alaskan</i>	1%	0.1%
<i>Other¹</i>	7%	2%
People over age 64	10%	18%
People under age 18	28%	21%
Low Income	23%	7%
Limited English Proficiency	10%	6%
Persons with a Disability	17%	10%
Use Public Transportation	3%	4%
Walk/Bike to Work	2%	1%
Homes with No Vehicle Available	25%	7%

The Demographic Index in the study area is above 50%, which is the underserved community cutoff. Therefore, this area may be considered to fall within a historically underserved community.

G. Land Use

The area surrounding Asbury Avenue is commercial/residential. Our Lady of Mt. Carmel Roman Catholic Church is located between Pine Street and Central Avenue. Students generally utilize Comstock Street to walk to the Asbury Park Middle School and Bradley Elementary School to the south and north, respectively. Throughout the corridor are various auto service shops, barber shops, restaurants, and convenience stores. Additional features are shown on the project area map in Appendix B.

III. Crash Findings

The analysis used in the RSA was based on reportable crashes found in the NJDOT crash database resulting in a fatality, injury and/or property damage. Corridor-wide crash characteristics and overrepresentations were compared to the 2020 statewide average for the County road system as further detailed below. All crashes were plotted onto collision diagrams, which can be found in Appendix C and D.

According to the NJDOT crash database, 118 vehicular crashes occurred during the 3-year period between January 1, 2018 and December 31, 2020 along the study area. There were 8 pedestrian / bicyclist crashes over the 5-year period between January 1, 2016 and December 31, 2020. The total number of crashes in the RSA limits was 124.

A. Temporal Trends

Total crashes varied from the County average in May through July (higher) and in January and February (lower). This correlates to the City being a summer destination. In general, crashes were lower on Sundays and Mondays, and higher on Wednesdays, Thursdays, and Saturdays.

¹ Percentages may not equal 100% due to rounding. Other includes individuals who identified themselves as 'Native Hawaiian or Pacific Islander', 'Some Other Race Alone' or 'Two or More Races'

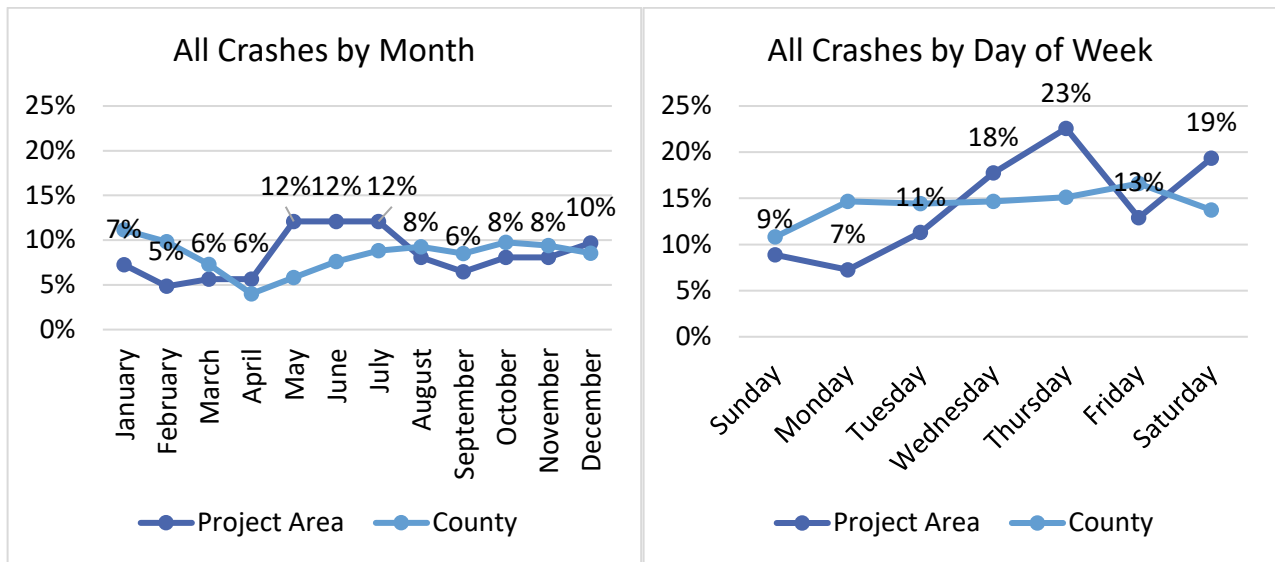


Figure 1 – Total Crashes by Month and Day of Week

Collisions with pedestrians and bicyclists were highest on Thursdays and during May to July, and October.

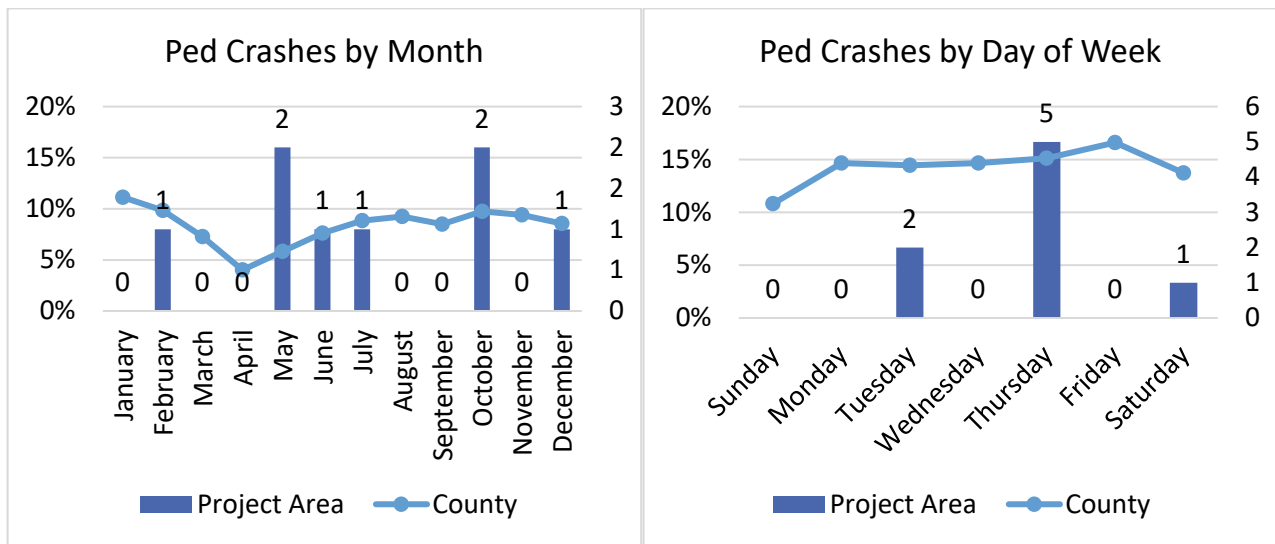
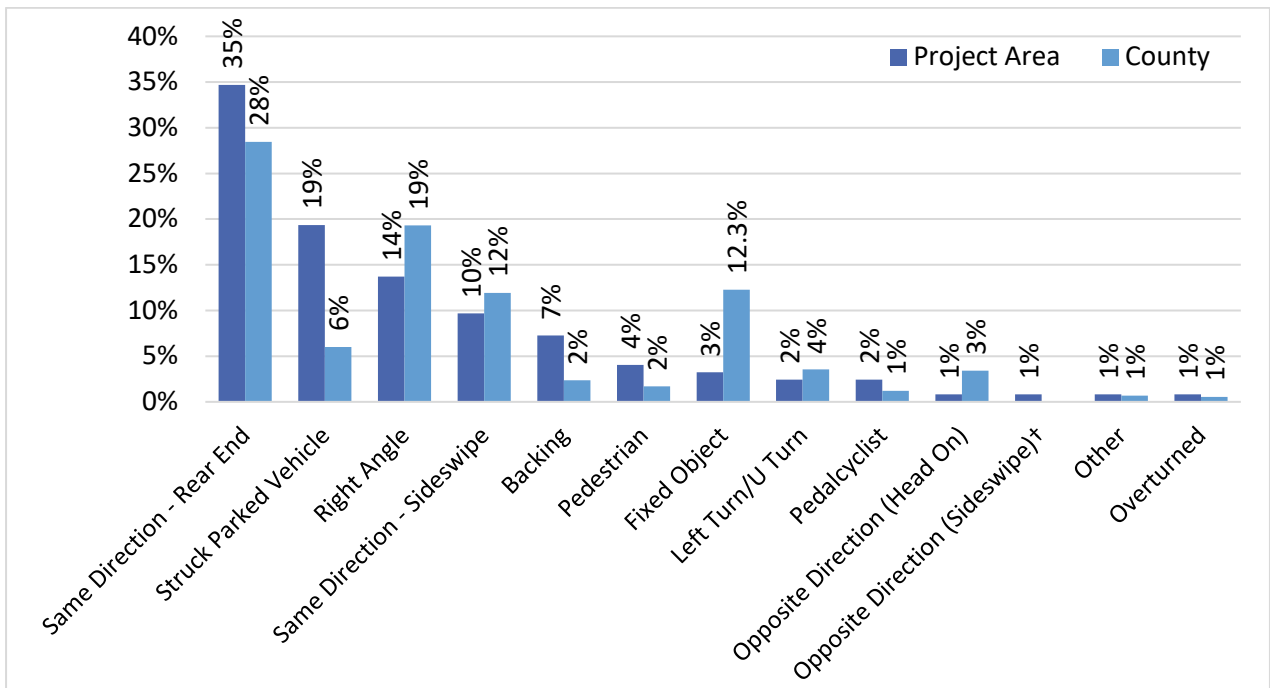


Figure 2 – Pedestrian/Bicyclist Crashes by Month and Day of Week

B. Collision Types

Overrepresented crash types included, rear end, struck parked vehicle, backing, and pedestrian/bicyclist. Same direction rear end crashes were the predominant crash type (29% of total).



† Summaries for county road system do not include this crash type, although it is listed on the NJTR-1 form.

Figure 3 – Crash Type Breakdown

C. Severity

No fatal vehicular crashes were identified in the studied time period. One (1) fatal pedestrian crash was identified, 5 included an injury, and 2 did not note an apparent injury during the time period studied.

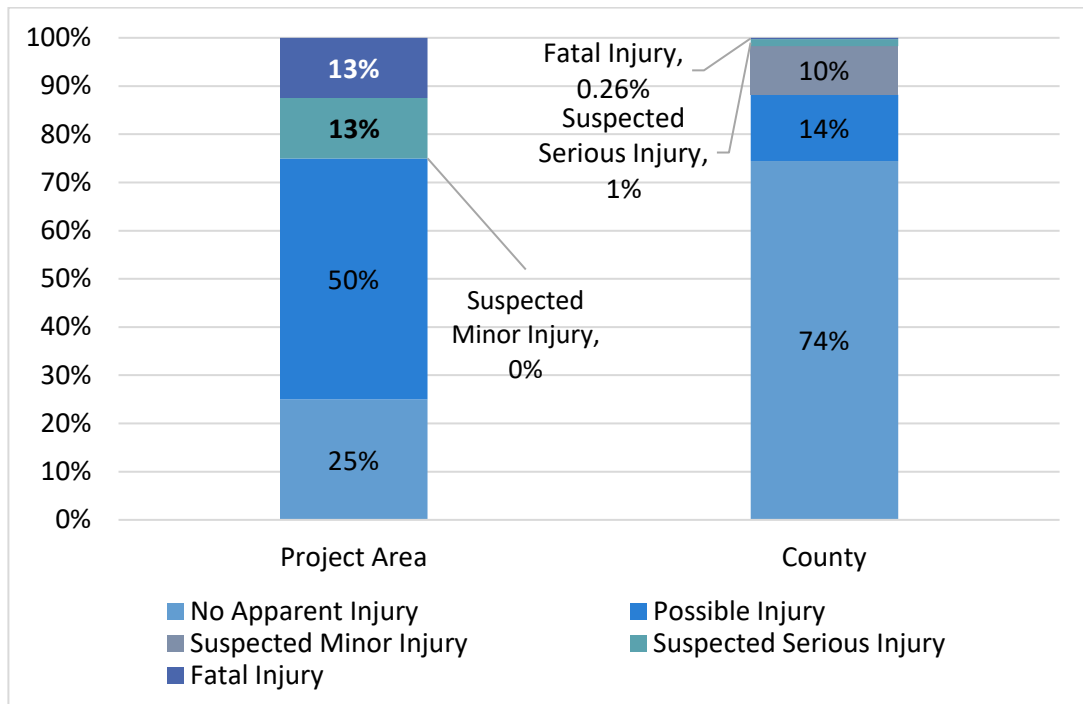


Figure 4 – Severity (Pedestrian/Bicycle Crashes)

D. Roadway Surface & Light Condition

Overrepresented conditions were nighttime crashes (22%). All other conditions are similar to or underrepresented compared to the county road system.

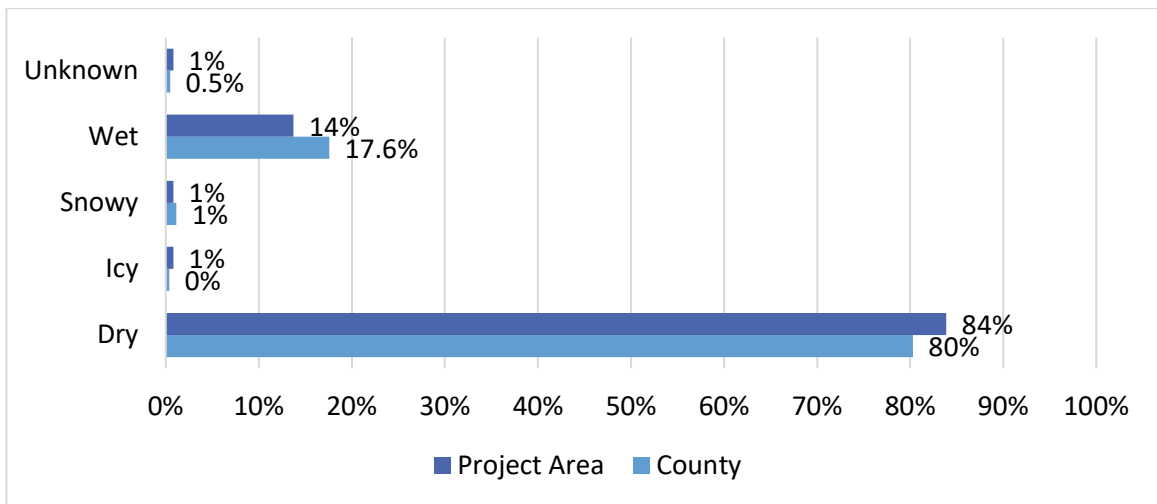


Figure 5 – Surface Conditions (All Crashes)

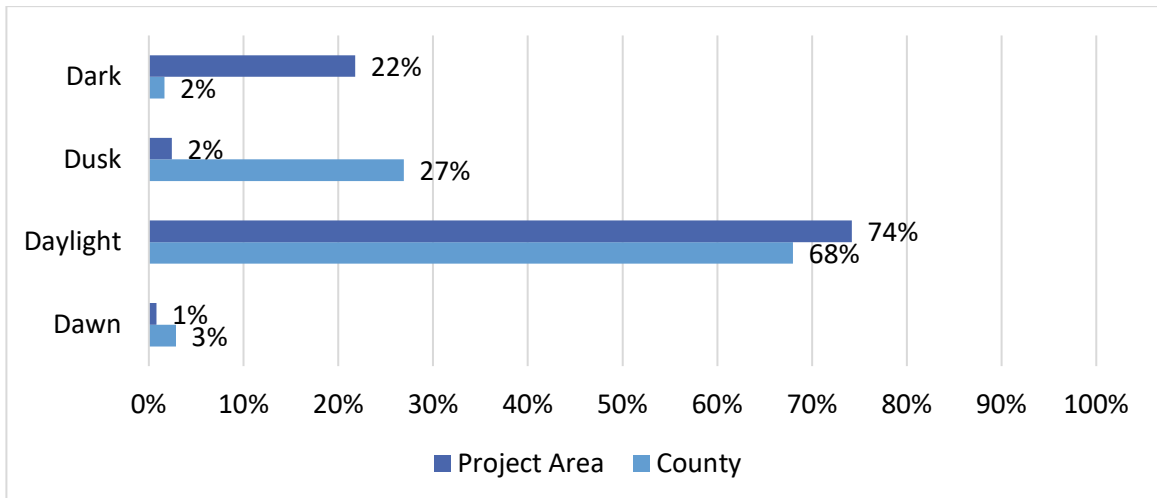


Figure 6 – Light Conditions (All Crashes)

One quarter (25%) of pedestrian crashes occurred at night and most occurred on dry surface. As shown, nighttime crashes are overrepresented compared to the county road system.

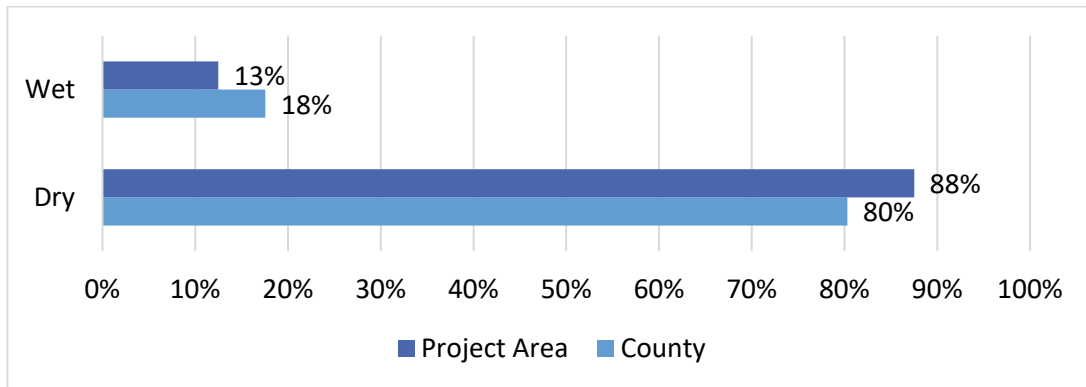


Figure 7 – Surface Conditions (Pedestrian/Bicycle Crashes)

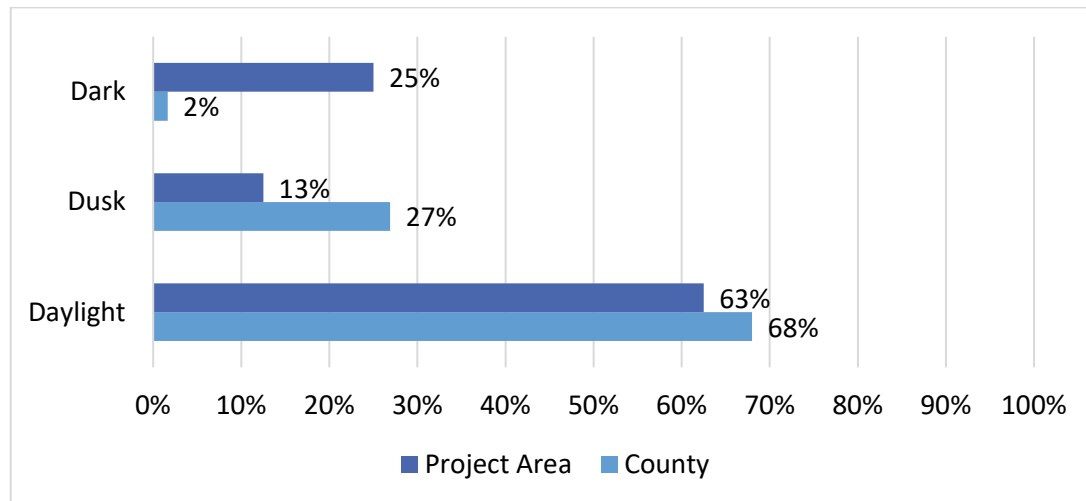


Figure 8 – Light Conditions (Pedestrian/Bicycle Crashes)

E. Location

Thirty-two percent (32%) of crashes occurred at signalized intersections and 63% occurred at between intersections. In comparison, 14% and 63% of crashes on all county roads occur at signalized and between intersections, respectively (2020 statewide average for the County road system). In addition, 3 of the 8 pedestrian crashes occurred between intersections.

IV. Identified Issues & Observations

This section summarizes the common corridor-wide safety issues identified during the RSA and are not all inclusive. They are categorized into operations (including visibility) and maintenance issues, and pedestrian and bicyclist issues. Additional site-specific issues and photographs are in Appendix F.

A. Pedestrian/Bicyclist

	<p><u>Observation / Photo Location</u></p> <p>Crosswalk markings are faded or missing</p> <p><i>Asbury Avenue and Memorial Drive</i></p>
	<p><u>Observation / Photo Location</u></p> <p>Ponding at the ramp of the crosswalks and no ramp/crosswalk as well</p> <p><i>Asbury Avenue and Prospect Avenue (Multiple Locations)</i></p>
	<p><u>Observation / Photo Location</u></p> <p>No pedestrian push buttons or countdown signal heads</p> <p><i>Asbury Ave and Comstock Street (Multiple Locations)</i></p>



Observation / Photo Location

No crosswalk or ramp at Pine Street across from the church

*Asbury Avenue and Church Street/
Pine Street*



Observation / Photo Location

Vehicle parked blocking the crosswalk

Asbury Avenue and Drummond Avenue

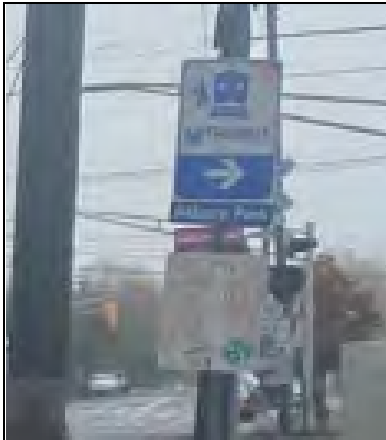
B. Operations, Visibility, and Maintenance



Observation / Photo Location

Pole is damaged

Asbury Avenue and Memorial Drive



Observation / Photo Location

Faded / damaged signs

Left: Asbury Avenue and Memorial Drive

Right: Asbury Avenue and Prospect Avenue



Observation / Photo Location

Missing sign / tripping hazard

Asbury Avenue and Church Street/Pine Street



Observation / Photo Location

Foldable stop signs used when signal is not functioning

Asbury Avenue and Pine Street

It was noted that the existing traffic signals, except for Ridge Avenue, are under jurisdiction of Asbury Park. Once upgraded, jurisdiction may go to the County. In addition, due to frequent flooding and old mechanical controllers, the signals are wired overhead, and some locations have foldable stop signs for use when the signal is not functioning (see photo above).

V. Findings and Recommendations

This section summarizes the site-specific and corridor-wide safety issues, potential strategies, and recommendations to improve the same. The safety benefit, time frame, cost, and jurisdiction are listed alongside each recommendation. Ratings used in the tables are described as follows. N/A indicates safety benefit not determined. Recommendations in **bold italics** are FHWA Proven Safety Countermeasures.

Symbol	Meaning	Definition
N/A	Not available	Safety benefit not determined
✓	Low safety benefit potential	May reduce total crashes by 1-25% ²
✓✓	Low to moderate safety benefit potential	May reduce total crashes by 26-49% ²
✓✓✓	Moderate safety benefit potential	May reduce total crashes by 50-74% ²
✓✓✓✓	High safety benefit potential	May reduce total crashes by 75+% ²
\$	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 and analysis
●	Long term	Could be accomplished in 3 years or more; may require full engineering and analysis

A. Recommendations

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

Table 4 – Corridor-Wide Recommendations

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Operations					
1	Consider upgrading all ramps for ADA compliance	✓✓✓ ³	\$\$\$	⦿	County/ City
2	Consider corridor-wide signal upgrades (8" to 12" signal heads, install backplates with retroreflective border , evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons for ADA compliance, signal timings, lighting, etc.)	✓✓	\$\$\$	●	County/ City

² 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.

³ 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 updating signage to ensure it is consistent throughout corridor	✓	\$	☉	County
4	Consider conducting a lighting analysis for the corridor	✓✓✓	\$\$	☉	City
5	Review access management for the corridor and consider driveway revisions or consolidation	✓	\$\$\$	☉	County
6	Upgrade controllers / cabinets and remove overhead signal head wiring to improve signal reliability (i.e. flooding / resiliency)	✓✓	\$\$\$	☉	County/ City
Bicycle/Pedestrian					
7	Inspect, repair and construct sidewalk in compliance with ADA as needed, including driveway aprons; complete missing connections	✓✓✓	\$\$	☉	County/ City
8	Examine inlets and install bicycle-safe grates	✓ ⁴	\$\$	☉	County
9	Examine crosswalks status: check placement, alignment, and markings	✓✓	\$	☉	County
10	Provide Leading Pedestrian Interval (LPI) at signalized intersections	✓✓✓	\$	☉	County
11	Consider bicycle lanes throughout the corridor	✓	\$	☉	County
12	Consider the relocation of utility poles impeding walkway, sight-distance, signage, etc.	✓✓	\$\$	☉	County
Maintenance					
13	Inspect existing striping for wear and restripe accordingly; add RPMs where appropriate	✓✓	\$	☉	County
14	Inspect and replace missing, faded, damaged or incorrect/outdated signage as needed (i.e., signs mounted below 7-ft, on non-breakaway posts or back-to-back signs that obscure shapes)	✓	\$	☉	County
15	Inspect drainage facilities; ensure they are free of debris	✓ ⁴	\$\$	☉	County
16	Investigate areas of missing or damaged curb; repair as needed	✓ ⁴	\$\$	☉	County
Education					
17	Consider periodic sidewalk, crosswalk, multimodal education campaign and code enforcement	✓ ⁴	\$	☉	City/ County

⁴ 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.

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

Table 5 – Site-Specific Recommendations

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Memorial Drive					
18	Consider corridor-wide recommendations 1, 2, 4, and 7, regarding ADA compliance, signal upgrades, lighting, and sidewalk	✓✓✓ ⁵	\$\$\$	●	County/ City
19	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	⦿	County
20	Consider better delineation for pedestrians across train tracks (i.e. concrete sidewalk vs. asphalt)	✓✓✓ ⁵	\$\$	●	NJ Transit
21	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	⦿	County
Langford Street					
22	Consider corridor-wide recommendations 1, 2, 4, 6, and 7, regarding ADA compliance, signal upgrades, lighting, and sidewalk	✓✓✓ ⁵	\$\$\$	●	County/ City
23	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	⦿	County
24	Consider corridor-wide recommendations 15 regarding drainage	✓ ⁵	\$\$	●	County
25	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	⦿	County
26	Consider adding a bus shelter	N/A	\$\$	●	City
Comstock Street					
27	Consider corridor-wide recommendations 1, 2, 4, 6, and 7, regarding ADA compliance, signal upgrades, lighting, and sidewalk	✓✓✓ ⁵	\$\$\$	●	County/ City
28	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	⦿	County
29	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	⦿	County
30	Investigate including an “all-red” clearance interval and No Turn on Red based on sight distance	✓ ⁵	\$	⦿	City/County
31	Investigate bus bulb outs or other delineation at bus stops to deter parking/improper use	✓✓ ⁵	\$\$	●	County
Pine Street/Church Street					
32	Consider corridor-wide recommendations 1, 2, 4, 6, and 7, regarding ADA compliance, signal upgrades, lighting, and sidewalk (offset geometry)	✓✓✓ ⁶	\$\$\$	●	County/ City

⁵ 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
33	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	☉	County
34	Consider making Pine Street north of the intersection a one-way street	✓✓	\$\$	☉	County/ City
35	Consider making Church Street a one-way street	✓✓	\$\$	☉	County/ City
36	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	☉	County
37	Consider improving or relocating the bus stop since it is in an undesirable location	N/A	\$	☉	City
38	Consider adding a roundabout or mini roundabout	✓✓✓✓	\$\$\$	☉	County
39	Consider corridor-wide recommendation 5 regarding access management	✓	\$\$\$	☉	County
Central Avenue					
40	Consider corridor-wide recommendations 1, 4, and 7, regarding ADA compliance, lighting, and sidewalk	✓✓✓ ⁶	\$\$\$	☉	County/ City
41	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	☉	County
42	Investigate revising the intersection skew to be closer to 90 degrees (e.g. physical curb extensions)	✓✓ ⁶	\$\$	☉	County
43	Consider painted curb extensions with delineators	✓ ⁷	\$	☉	County
44	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	☉	County
Dunlewy Street					
45	Consider corridor-wide recommendations 1, 4, and 7, regarding ADA compliance, lighting, and sidewalk	✓✓✓ ⁶	\$\$\$	☉	County/ City
46	Investigate revising the intersection skew to be closer to 90 degrees (e.g. physical curb extensions)	✓✓ ⁶	\$\$	☉	County
47	Consider painted curb extensions with delineators	✓ ⁷	\$	☉	County
48	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	☉	County
49	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	☉	County
Prospect Avenue					
50	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	☉	County
51	Consider corridor-wide recommendations 1, 2, 4, 6, and 7, regarding ADA compliance, signal upgrades, lighting, and sidewalk	✓✓✓ ⁶	\$\$\$	☉	County/ City
52	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	☉	County

⁶ 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
53	Consider corridor-wide recommendations 15 regarding drainage	✓ ⁷	\$\$	●	County
Drummond Avenue					
54	Consider corridor-wide recommendation 3 and 14 regarding signs	✓	\$	●	County
55	Investigate revising the intersection skew to be closer to 90 degrees (e.g. physical curb extensions)	✓✓ ⁷	\$\$	●	County
56	Consider painted curb extensions with delineators	✓ ⁷	\$	●	County
57	Consider corridor-wide recommendations 1, 4, and 7, regarding ADA compliance, lighting and sidewalk	✓✓✓ ⁷	\$\$\$	●	County/ City
58	Consider corridor-wide recommendation 9 and 13 regarding traffic markings and crosswalks	✓✓	\$	●	County
Ridge Avenue					
59	Consider corridor-wide recommendation 4 regarding lighting	✓	\$	●	County/ City

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. A copy of Monmouth County’s response is provided in Appendix H.

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. These examples are meant to be generic and for informational purposes only.

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 shoulder or 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

⁷ 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.

pedestrian must cross three lanes of traffic in one or both directions but may be implemented on smaller cross sections where space permits.

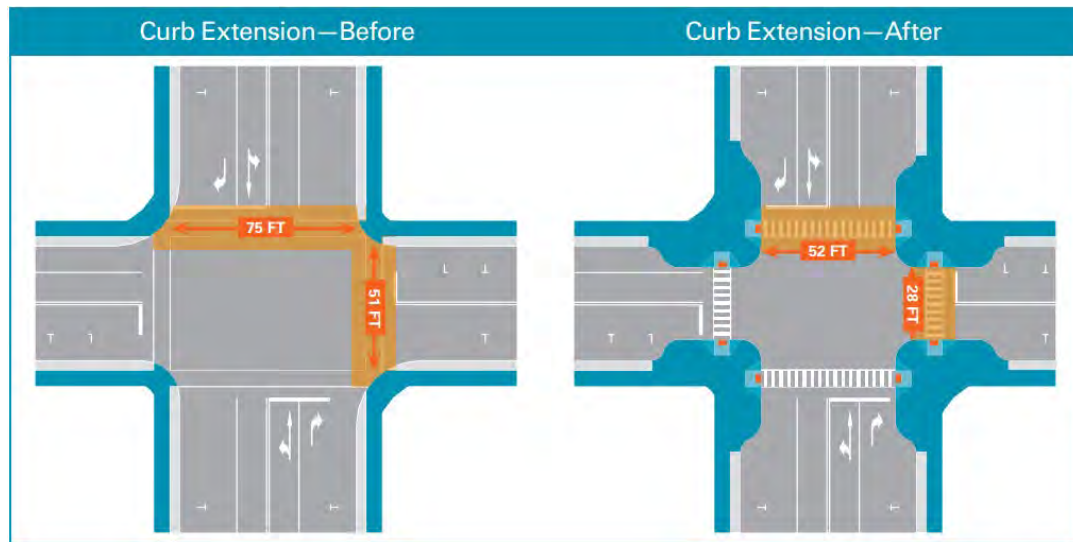


Figure 9 – Curb Extension Example (Source: CSDG)

An alternative to physical curb extensions is a painted curb extension with delineators. An accepted low-cost treatment implemented in urban areas is to use a truffle-colored high friction pavement coating, along with delineators, to capture the area of the pavement (which would be curbed in a full curb extension). This treatment is functionally similar to the curb extension; however, is very inexpensive and can be quickly implemented.



Figure 10 – Painted Curb Extension Example, Jersey City (Source: Google)

ADA standards specify a minimum 5-foot clear path width to accommodate two wheelchairs passing each other. In addition to providing a more accessible facility, this minimum width also creates a more comfortable environment for pedestrians to walk side-by-side and pass each other. Sidewalk width should support the surrounding street context, land uses, as well as current and future pedestrian demand.

The design of driveways should provide a continuous and level pedestrian path across the vehicular zone, encouraging drivers to stop for pedestrians on the sidewalk. Driveways should not be designed where the sidewalk is interrupted by the driveway.

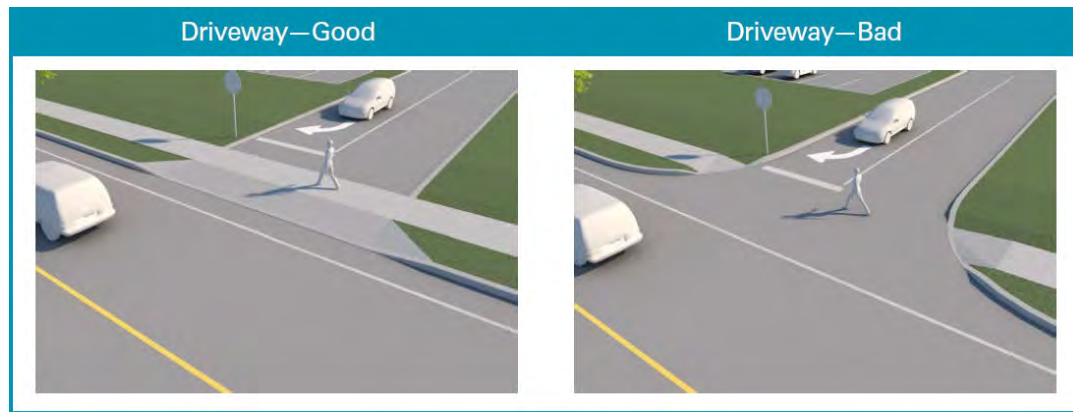


Figure 11 – Sidewalk and Driveways (Source: CSDG)

Crosswalk visibility enhancements, a FHWA Proven Safety Countermeasure, help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross.

2. Bicycle Facilities

Bicycle lanes provide an exclusive space for bicyclists using pavement markings and signage. These 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. 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

3. Bus Stops

In New Jersey, the bus network plays an integral role in the daily transportation needs of residents. Every transit passenger is a pedestrian before and after their transit trip. Safe, comfortable, and convenient pedestrian connections are therefore critical to an effective transit service and encouraging higher ridership. At bus stops, it is important to have an accessible boarding area that must be provided, typically measuring 5 feet long (parallel to the curb) by 8 feet wide (perpendicular to the curb). This includes 5 feet of width for a wheelchair waiting area, plus additional width to deploy a wheelchair ramp to serve the waiting area⁸. To reduce conflicts on state highways between through traffic and buses at stops, turnouts may be provided. Bus turnouts generally consist of entrance and exit tapers, a stopping area, and length for the bus to accelerate or decelerate. Turnouts are currently provided at stops near Industrial Avenue/Hollister Road.

4. Mini-Roundabout

Mini-roundabout design, a type of roundabout characterized by a small diameter and traversable islands, was recommended at the intersection of CR 533 and Talmage Avenue. Mini-roundabouts offer most of the benefits of regular roundabouts, with the added benefit of a smaller footprint. It should create conditions that reduce vehicle speed (although not at the same level as its larger counterpart) 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. Of note, most research and experience focuses on single-lane mini-roundabouts.



Figure 13 – Single Lane Mini-Roundabout in Neighborhood Example (Source: NATCO)

⁸ NACTO. *Transit Street Design Guide*. April 2016.

VI. Conclusions

The Asbury Avenue RSA was conducted to identify safety issues and corresponding countermeasures that compromise the multimodal nature of this 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 road users. Some of the strategies identified can be implemented through routine maintenance; however, 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 and the Towards Zero Deaths vision.

A. RSA TEAM

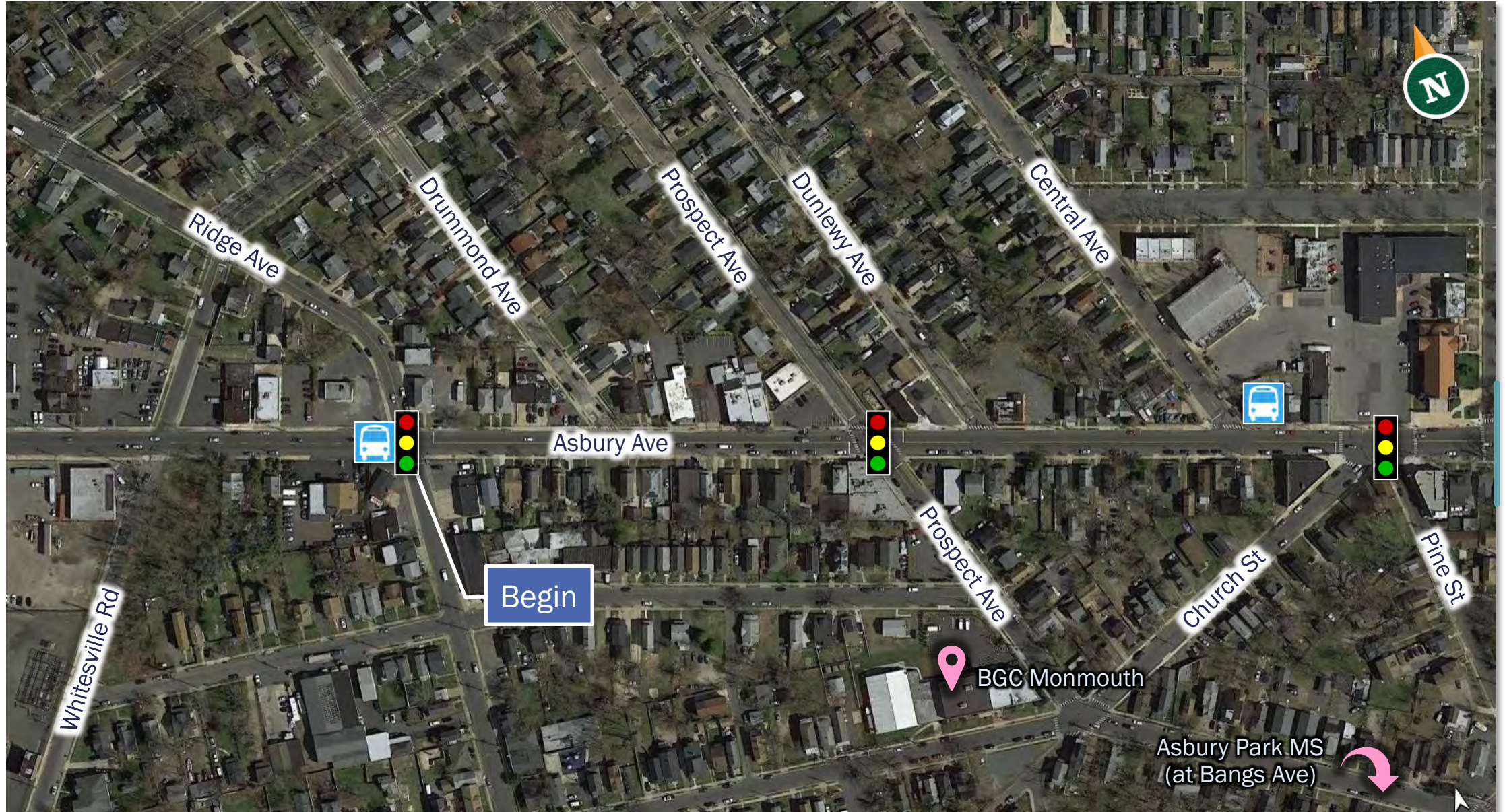
Audit Team

Name	Agency
Renu Chhonkar	Monmouth County Engineering
Michael Nei	Monmouth County Engineering
David Schmetterer	Monmouth County Planning
Michael Popovech	Monmouth County Planning
Victor Furmanec	Monmouth County Planning
James Bonanno	Asbury Park City Transportation Manager
John Moor	Asbury Park City
Jason Harzold	Asbury Park City Engineer (T&M Associates)
William Reng	Asbury Park Police Department
Polli Schildge	Asbury Park Complete Streets Condition
Amon Boucher	NJDOT Bureau of Safety, Bicycle and Pedestrian Programs
Yosy Cosme	NJDOT
Vanessa Meades	NJDOT Office of Community and Constituent Relations
Andy Kaplan	NJTPA
Lisa Lee	EZRide
Elmira Buongiorno	NJ Transit
Julia Steponanko	Greenman-Pedersen, Inc.
Victoria Rubinetti	Greenman-Pedersen, Inc.
Christopher Marra	Greenman-Pedersen, Inc.
Rachel Haberman	Greenman-Pedersen, Inc.



B. AREA MAP

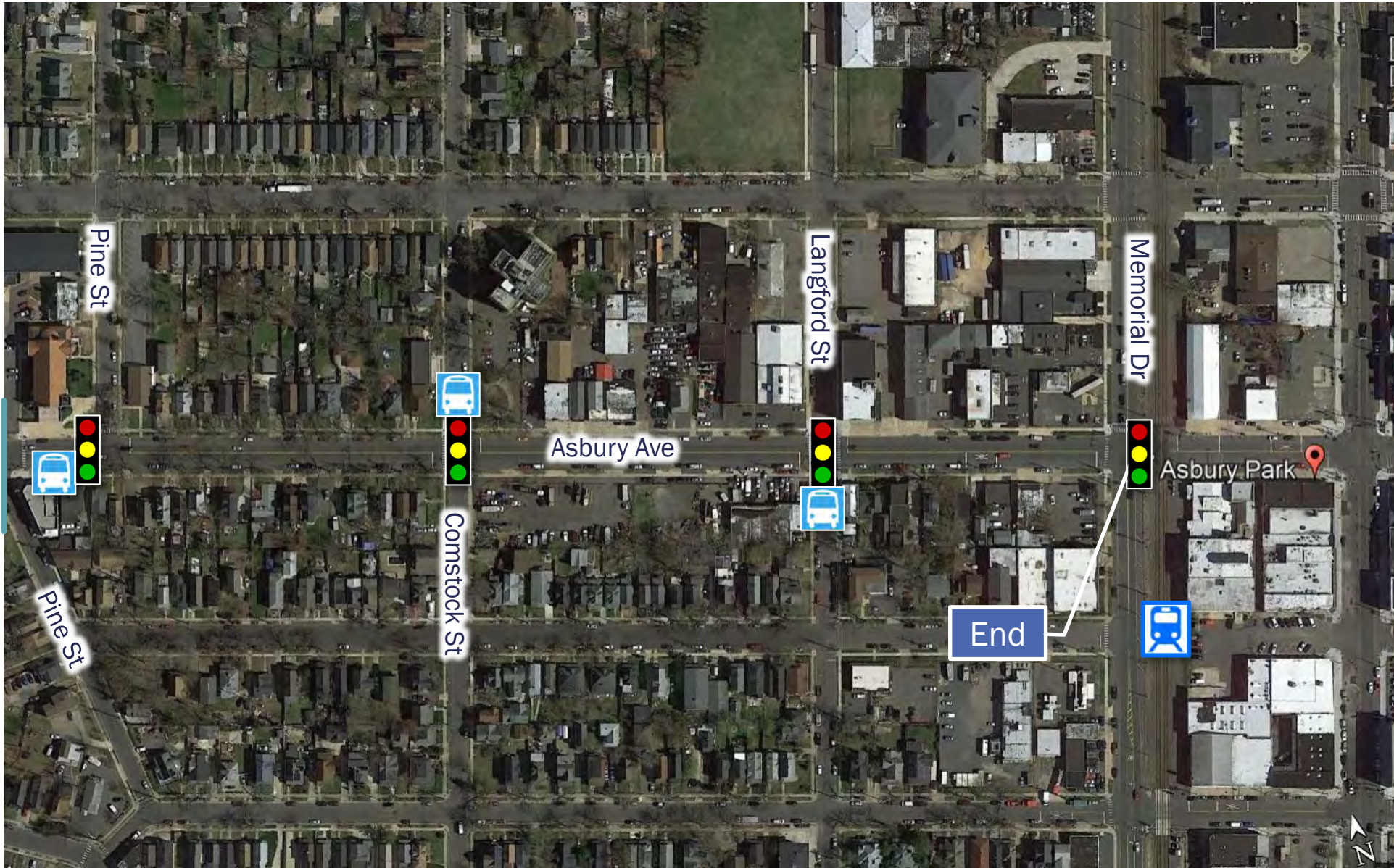
AREA MAP



MATCH LINE

AREA MAP

MATCH LINE



C.PEDESTRIAN CRASH DIAGRAMS



MATCH LINE A
SEE SHEET NO. 2 OF 5

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
1	21:44	THU	02-11-16	1	DRY	CLEAR	DARK

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
	ENCROACHMENT
	LEFT TURN
	RIGHT ANGLE
	STRUCK PARKED VEHICLE

COLORS	
	PEDESTRIAN CRASH

1/5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

2016-2020 PEDESTRIAN COLLISION DIAGRAMS

GPI Engineering Design Planning Construction Management

NOT TO SCALE

FILE: \\NJ-IST\videt\2021685_HSP_Project_Development_and_Support\Cad\HwyCrash_Diagrams\Monmouth_County\Sheets\Ped\Sheet_1.dgn
DATE: 7/22/2022
TIME: 10:23:01 AM
GREENMAN-PEDERSEN, INC.



MATCH LINE A
SEE SHEET NO. 1 OF 5

MATCH LINE B
SEE SHEET NO. 3 OF 5

LEGEND

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
	ENCROACHMENT
	LEFT TURN
	RIGHT ANGLE
	STRUCK PARKED VEHICLE

COLORS	
	PEDESTRIAN CRASH

2
5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

2016-2020 PEDESTRIAN COLLISION DIAGRAMS

	Engineering Design Planning Construction Management	NOT TO SCALE
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 GREENMAN-PEDERSEN, INC.



MATCH LINE B
SEE SHEET NO. 2 OF 5

MATCH LINE C
SEE SHEET NO. 4 OF 5

COLLISION DIAGRAM DATA							
NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
3	15:16	SAT	05-21-16	1	WET	CLEAR	DAY
4	17:47	TUE	07-05-16	1	DRY	CLEAR	DAY
6	12:39	SAT	06-15-19	1	DRY	CLEAR	DAY
7	18:07	SAT	10-05-19	1	DRY	CLEAR	DUSK

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
	ENCROACHMENT
	LEFT TURN
	RIGHT ANGLE
	STRUCK PARKED VEHICLE

COLORS
 PEDESTRIAN CRASH

3 / 5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

2016-2020 PEDESTRIAN COLLISION DIAGRAMS

GPI Engineering Design Planning Construction Management

NOT TO SCALE

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TIME: 10:27:50 AM

DATE: 7/12/2022 GREENMAN-PEDERSEN, INC.

MATCH LINE C
SEE SHEET NO. 3 OF 5



MATCH LINE D
SEE SHEET NO. 5 OF 5

ASBURY AVE
(CR 16)

COMSTOCK
STREET

LANGFORD
STREET

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
2	13:36	THU	05-12-16	0	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	1
INJURIES	0
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
	ENCROACHMENT
	LEFT TURN
	RIGHT ANGLE
	STRUCK PARKED VEHICLE

COLORS

PEDESTRIAN CRASH

4
5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

2016-2020 PEDESTRIAN COLLISION DIAGRAMS

GPI Engineering Design
Planning Construction Management

NOT TO SCALE

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TIME: 12:41:07 PM

DATE: 7/12/2022 GREENMAN-PEDERSEN, INC.

MATCH LINE D
SEE SHEET NO. 4 OF 5



COLLISION DIAGRAM DATA								
NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION	
5	19:56	SAT	12-22-18	1*	DRY	CLEAR	DARK	
8	16:19	THU	10-24-19	1	DRY	CLEAR	DAY	

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	<u>0</u>
INJURIES	<u>1</u>
FATALITIES*	<u>1</u>
TOTAL NO. OF CRASHES	<u>2</u>

SYMBOLS	
←	MOVING VEHICLE
←←	BACKING VEHICLE
- - -	NON-INVOLVED VEHICLE
x - - -	PEDESTRIAN
- - -	BICYCLIST
⊙	PROPERTY DAMAGE ONLY CRASH
⊙*	INJURY IN CRASH
⊙*	FATAL CRASH
□	FIXED OBJECT
△	ANIMAL
⊗	POT HOLE
⊘	NON-FIXED OBJECT

TYPES OF CRASHES	
←	REAR END
←	HEAD ON
←	SIDE SWIPE
←	OUT OF CONTROL
←	OVERTURNED
←	ENCROACHMENT
←	LEFT TURN
←	RIGHT ANGLE
←	STRUCK PARKED VEHICLE

COLORS
⊙ PEDESTRIAN CRASH

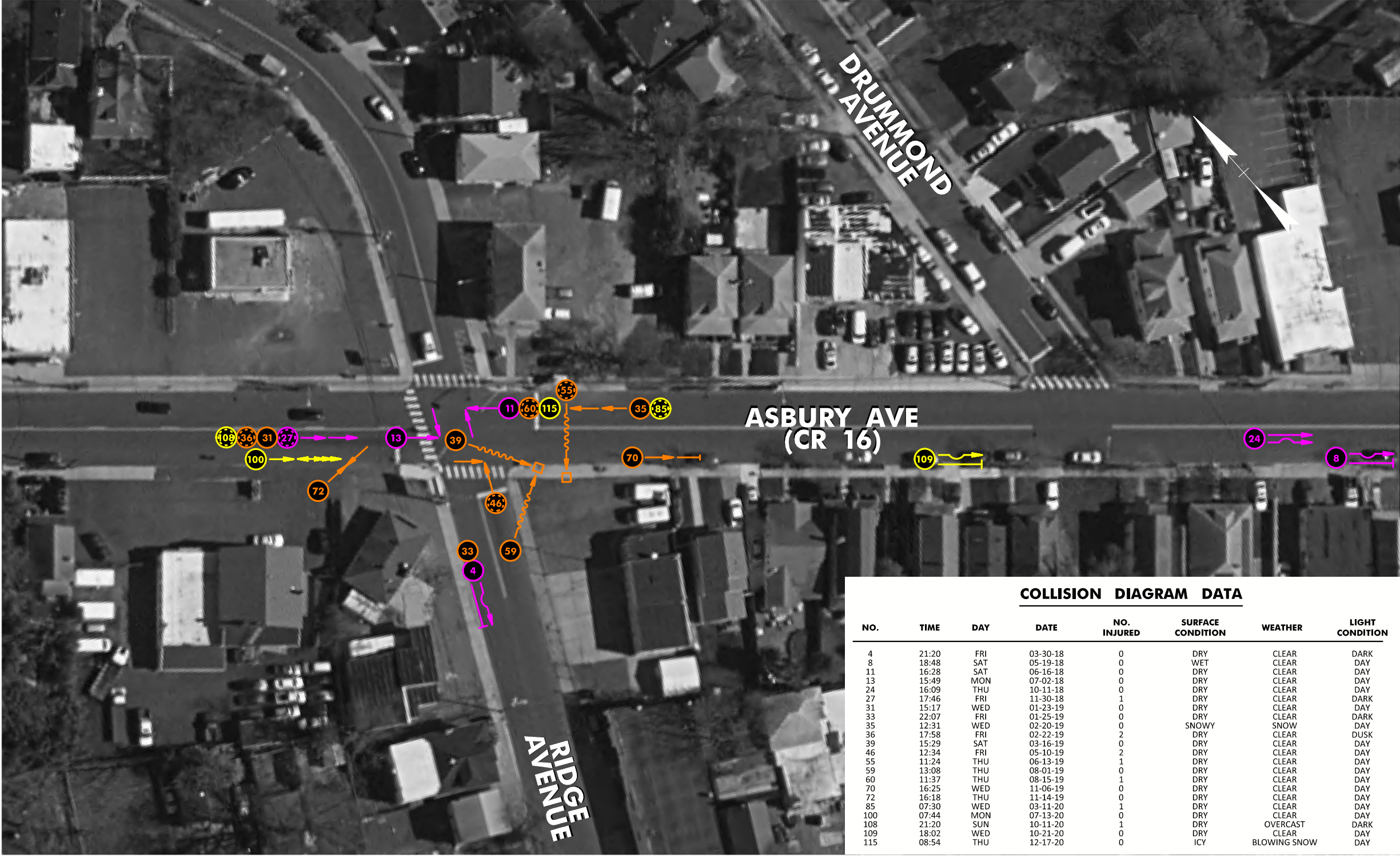
NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

2016-2020 PEDESTRIAN COLLISION DIAGRAMS

<p>Engineering Design Planning Construction Management</p>	NOT TO SCALE
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D. VEHICULAR CRASH DIAGRAMS



MATCH LINE A
SEE SHEET NO. 2 OF 5

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
4	21:20	FRI	03-30-18	0	DRY	CLEAR	DARK
8	18:48	SAT	05-19-18	0	WET	CLEAR	DAY
11	16:28	SAT	06-16-18	0	DRY	CLEAR	DAY
13	15:49	MON	07-02-18	0	DRY	CLEAR	DAY
24	16:09	THU	10-11-18	0	DRY	CLEAR	DAY
27	17:46	FRI	11-30-18	1	DRY	CLEAR	DARK
31	15:17	WED	01-23-19	0	DRY	CLEAR	DAY
33	22:07	FRI	01-25-19	0	DRY	CLEAR	DARK
35	12:31	WED	02-20-19	0	SNOWY	SNOW	DAY
36	17:58	FRI	02-22-19	2	DRY	CLEAR	DUSK
39	15:29	SAT	03-16-19	0	DRY	CLEAR	DAY
46	12:34	FRI	05-10-19	2	DRY	CLEAR	DAY
55	11:24	THU	06-13-19	1	DRY	CLEAR	DAY
59	13:08	THU	08-01-19	0	DRY	CLEAR	DAY
60	11:37	THU	08-15-19	1	DRY	CLEAR	DAY
70	16:25	WED	11-06-19	0	DRY	CLEAR	DAY
72	16:18	THU	11-14-19	0	DRY	CLEAR	DAY
85	07:30	WED	03-11-20	1	DRY	CLEAR	DAY
100	07:44	MON	07-13-20	0	DRY	CLEAR	DAY
108	21:20	SUN	10-11-20	1	DRY	OVERCAST	DARK
109	18:02	WED	10-21-20	0	DRY	CLEAR	DAY
115	08:54	THU	12-17-20	0	ICY	BLOWING SNOW	DAY

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	15
INJURIES	7
FATALITIES*	0
TOTAL NO. OF CRASHES	22

SYMBOLS	
→	MOVING VEHICLE
←	BACKING VEHICLE
- - -	NON-INVOLVED VEHICLE
x - - -	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
→ → →	ENCROACHMENT
→ ↘	LEFT TURN
→ ↙	RIGHT ANGLE
→ ⊥	STRUCK PARKED VEHICLE

COLORS	
○	2018 CRASHES
⊙	2019 CRASHES
⊕	2020 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

2018 - 2020 COLLISION DIAGRAMS

GPI Engineering Design Planning Construction Management

NOT TO SCALE

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TIME: 10:35:08 AM
GREENMAN-PEDERSEN, INC.



MATCH LINE A
SEE SHEET NO. 1 OF 5

MATCH LINE B
SEE SHEET NO. 3 OF 5

COLLISION DIAGRAM DATA

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12	19:26	THU	06-28-18	0	DRY	CLEAR	DAY
17	17:55	WED	07-18-18	0	DRY	CLEAR	DAY
18	11:33	SUN	07-22-18	0	UNKNOWN	UNKNOWN	UNKNOWN
28	18:13	SAT	12-01-18	0	WET	RAIN	DARK
34	14:25	TUE	02-19-19	1	DRY	CLEAR	DAY
43	04:39	SAT	04-20-19	0	DRY	OVERCAST	DARK
44	22:31	SAT	04-27-19	1	DRY	CLEAR	DARK
53	09:59	WED	06-12-19	0	DRY	CLEAR	DAY
54	23:14	WED	06-12-19	0	DRY	CLEAR	DARK
58	16:51	THU	07-18-19	0	WET	RAIN	DAY
62	07:20	TUE	09-10-19	0	DRY	CLEAR	DAY
63	18:56	WED	09-11-19	0	DRY	CLEAR	DAY
71	12:49	SAT	11-09-19	0	DRY	CLEAR	DAY
79	20:51	WED	12-25-19	0	DRY	CLEAR	DARK
93	15:21	SAT	06-06-20	1	DRY	CLEAR	DAY
112	19:16	SAT	11-07-20	0	DRY	CLEAR	DARK

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	14
INJURIES	3
FATALITIES*	0
TOTAL NO. OF CRASHES	17

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
→	ENCROACHMENT
←	HEAD ON
→	LEFT TURN
←	SIDE SWIPE
→	RIGHT ANGLE
~	OUT OF CONTROL
↺	OVERTURNED
↺	STRUCK PARKED VEHICLE

COLORS	
⊙	2018 CRASHES
⊙	2019 CRASHES
⊙	2020 CRASHES

2 / 5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY

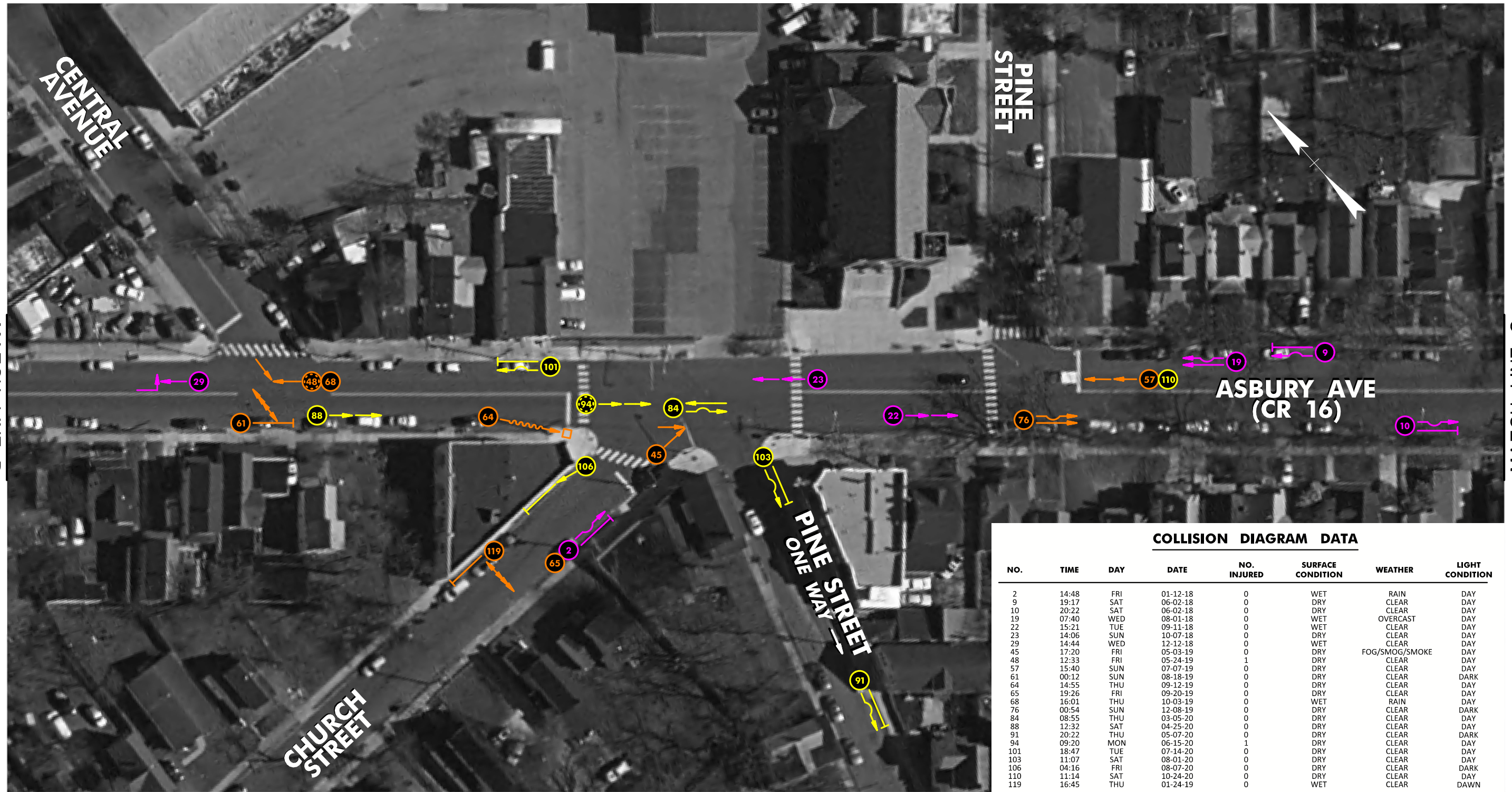
2018 - 2020 COLLISION DIAGRAMS

GPI Engineering Design Planning Construction Management

NOT TO SCALE

FILE: \\NJ-IST\videt\2021085_HSP_Project Development and_Support\Cad\HwyCrash_Diagrams\Monmouth_County\Sheets\Vehicle_Sheet 2.dgn
DATE: 7/22/2022
TIME: 10:35:14 AM
GREENMAN-PEDERSEN, INC.

FILE: \\NJ-Isr\videt\2021085 ISIP - Project Development and Support\Cad\HWY\Crash Diagrams\Monmouth County\Sheets\Vehicle\Sheet 3.dgn
 TIME: 10:37:22 AM
 DATE: 7/22/2022



MATCH LINE B
 SEE SHEET NO. 2 OF 5

MATCH LINE C
 SEE SHEET NO. 4 OF 5

COLLISION DIAGRAM DATA							
NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
2	14:48	FRI	01-12-18	0	WET	RAIN	DAY
9	19:17	SAT	06-02-18	0	DRY	CLEAR	DAY
10	20:22	SAT	06-02-18	0	DRY	CLEAR	DAY
19	07:40	WED	08-01-18	0	WET	OVERCAST	DAY
22	15:21	TUE	09-11-18	0	WET	CLEAR	DAY
23	14:06	SUN	10-07-18	0	DRY	CLEAR	DAY
29	14:44	WED	12-12-18	0	WET	CLEAR	DAY
45	17:20	FRI	05-03-19	0	DRY	FOG/SMOG/SMOKE	DAY
48	12:33	FRI	05-24-19	1	DRY	CLEAR	DAY
57	15:40	SUN	07-07-19	0	DRY	CLEAR	DAY
61	00:12	SUN	08-18-19	0	DRY	CLEAR	DARK
64	14:55	THU	09-12-19	0	DRY	CLEAR	DAY
65	19:26	FRI	09-20-19	0	DRY	CLEAR	DAY
68	16:01	THU	10-03-19	0	WET	RAIN	DAY
76	00:54	SUN	12-08-19	0	DRY	CLEAR	DARK
84	08:55	THU	03-05-20	0	DRY	CLEAR	DAY
88	12:32	SAT	04-25-20	0	DRY	CLEAR	DAY
91	20:22	THU	05-07-20	0	DRY	CLEAR	DARK
94	09:20	MON	06-15-20	1	DRY	CLEAR	DAY
101	18:47	TUE	07-14-20	0	DRY	CLEAR	DAY
103	11:07	SAT	08-01-20	0	DRY	CLEAR	DAY
106	04:16	FRI	08-07-20	0	DRY	CLEAR	DARK
110	11:14	SAT	10-24-20	0	DRY	CLEAR	DAY
119	16:45	THU	01-24-19	0	WET	CLEAR	DAWN

LEGEND

<p>NUMBER OF CRASHES WITH</p> <p>PROPERTY DAMAGE ONLY <u>22</u></p> <p>INJURIES <u>2</u></p> <p>FATALITIES* <u>0</u></p> <p>TOTAL NO. OF CRASHES <u>24</u></p>	<p>SYMBOLS</p> <p>→ MOVING VEHICLE</p> <p>← BACKING VEHICLE</p> <p>- - - NON-INVOLVED VEHICLE</p> <p>x - - - PEDESTRIAN - - - BICYCLIST</p> <p>○ PROPERTY DAMAGE ONLY CRASH</p> <p>⊙ INJURY IN CRASH ⊙ FATAL CRASH</p> <p>□ FIXED OBJECT △ ANIMAL</p> <p>⊞ NON-FIXED OBJECT ⊞ POTHOLE</p>	<p>TYPES OF CRASHES</p> <p>← REAR END ← ENCROACHMENT</p> <p>→ HEAD ON → LEFT TURN</p> <p>← SIDE SWIPE → RIGHT ANGLE</p> <p>~ OUT OF CONTROL → STRUCK PARKED VEHICLE</p> <p>↺ OVERTURNED</p>	<p>COLORS</p> <p>⊙ 2018 CRASHES</p> <p>⊙ 2019 CRASHES</p> <p>⊙ 2020 CRASHES</p>
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3 / 5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
 FROM RIDGE AVENUE TO MEMORIAL DRIVE
 ASBURY PARK CITY, MONMOUTH COUNTY

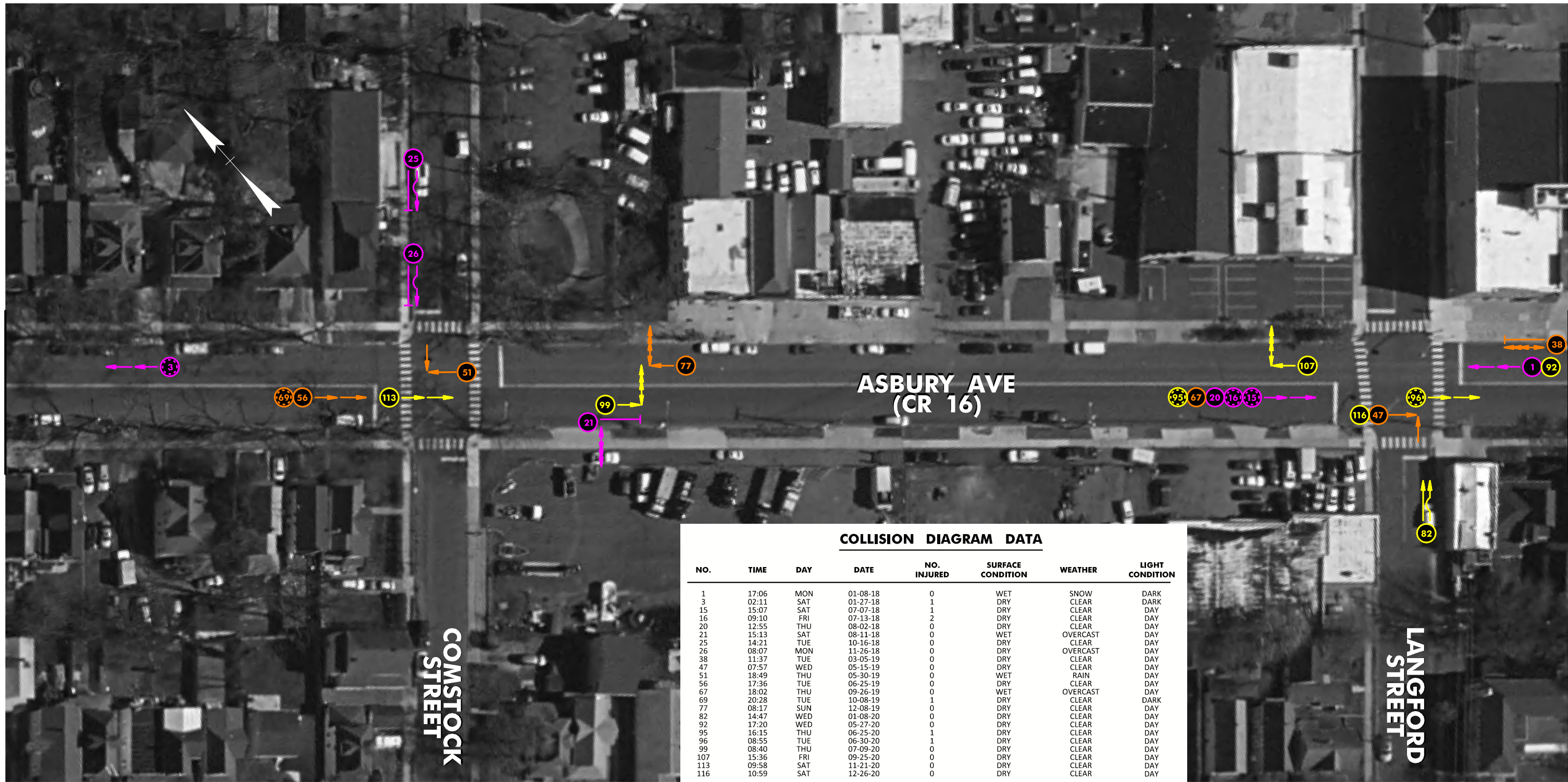
2018 - 2020 COLLISION DIAGRAMS

GPI Engineering Design Planning Construction Management

NOT TO SCALE

MATCH LINE C
SEE SHEET NO. 3 OF 5

MATCH LINE D
SEE SHEET NO. 5 OF 5



COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
1	17:06	MON	01-08-18	0	WET	SNOW	DARK
3	02:11	SAT	01-27-18	1	DRY	CLEAR	DARK
15	15:07	SAT	07-07-18	1	DRY	CLEAR	DAY
16	09:10	FRI	07-13-18	2	DRY	CLEAR	DAY
20	12:55	THU	08-02-18	0	DRY	CLEAR	DAY
21	15:13	SAT	08-11-18	0	WET	OVERCAST	DAY
25	14:21	TUE	10-16-18	0	DRY	CLEAR	DAY
26	08:07	MON	11-26-18	0	DRY	OVERCAST	DAY
38	11:37	TUE	03-05-19	0	DRY	CLEAR	DAY
47	07:57	WED	05-15-19	0	DRY	CLEAR	DAY
51	18:49	THU	05-30-19	0	WET	RAIN	DAY
56	17:36	TUE	06-25-19	0	DRY	CLEAR	DAY
67	18:02	THU	09-26-19	0	WET	OVERCAST	DAY
69	20:28	TUE	10-08-19	1	DRY	CLEAR	DARK
77	08:17	SUN	12-08-19	0	DRY	CLEAR	DAY
82	14:47	WED	01-08-20	0	DRY	CLEAR	DAY
92	17:20	WED	05-27-20	0	DRY	CLEAR	DAY
95	16:15	THU	06-25-20	1	DRY	CLEAR	DAY
96	08:55	TUE	06-30-20	1	DRY	CLEAR	DAY
99	08:40	THU	07-09-20	0	DRY	CLEAR	DAY
107	15:36	FRI	09-25-20	0	DRY	CLEAR	DAY
113	09:58	SAT	11-21-20	0	DRY	CLEAR	DAY
116	10:59	SAT	12-26-20	0	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	17
INJURIES	6
FATALITIES*	0
TOTAL NO. OF CRASHES	23

SYMBOLS	
	MOVING VEHICLE
	BACKING VEHICLE
	NON-INVOLVED VEHICLE
	PEDESTRIAN
	BICYCLIST
	PROPERTY DAMAGE ONLY CRASH
	INJURY IN CRASH
	FIXED OBJECT
	NON-FIXED OBJECT
	FATAL CRASH
	ANIMAL
	POT HOLE

TYPES OF CRASHES	
	REAR END
	HEAD ON
	SIDE SWIPE
	OUT OF CONTROL
	OVERTURNED
	ENCROACHMENT
	LEFT TURN
	RIGHT ANGLE
	STRUCK PARKED VEHICLE

COLORS	
	2018 CRASHES
	2019 CRASHES
	2020 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
FROM RIDGE AVENUE TO MEMORIAL DRIVE
ASBURY PARK CITY, MONMOUTH COUNTY
2018 - 2020 COLLISION DIAGRAMS

GPI Engineering Design Planning Construction Management

NOT TO SCALE

FILE: \\NJ-IST-VIDA\2021085_HSP_ProjectDevelopmentand_Support\Cad\HwyCrash_Diagrams\Monmouth_County\Sheets\Vehicle_Sheet_5.dgn
 TIME: 10:28:03 AM
 DATE: 7/22/2022

MATCH LINE D
 SEE SHEET NO. 4 OF 5



COLLISION DIAGRAM DATA							
NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
5	16:11	WED	04-04-18	3	DRY	CLEAR	DAY
6	21:02	FRI	05-11-18	1	DRY	CLEAR	DAY
14	13:33	TUE	07-03-18	0	DRY	CLEAR	DAY
30	13:35	WED	12-19-18	0	DRY	CLEAR	DAY
32	09:57	THU	01-24-19	0	WET	RAIN	DAY
37	18:28	FRI	02-22-19	0	DRY	CLEAR	DUSK
40	11:33	WED	04-03-19	0	DRY	CLEAR	DAY
41	10:14	THU	04-04-19	0	DRY	CLEAR	DAY
42	15:03	WED	04-10-19	0	DRY	CLEAR	DAY
49	00:05	SUN	05-26-19	0	DRY	CLEAR	DARK
50	16:01	THU	05-30-19	0	DRY	CLEAR	DAY
52	09:16	MON	06-03-19	0	DRY	CLEAR	DAY
66	02:09	SUN	09-22-19	2	DRY	CLEAR	DARK
73	18:31	SUN	11-24-19	0	DRY	CLEAR	DARK
75	13:23	SAT	11-30-19	0	DRY	CLEAR	DAY
78	22:25	TUE	12-10-19	0	WET	RAIN	DARK
80	21:51	TUE	12-31-19	1	DRY	CLEAR	DARK
81	07:33	THU	01-02-20	2	DRY	CLEAR	DAY
86	00:08	MON	03-16-20	0	DRY	CLEAR	DARK
87	15:26	WED	03-18-20	0	DRY	CLEAR	DAY
90	11:08	MON	05-04-20	0	DRY	CLEAR	DAY
97	22:49	THU	07-02-20	0	DRY	CLEAR	DARK
98	11:14	FRI	07-03-20	0	DRY	CLEAR	DAY
102	21:29	TUE	07-21-20	0	DRY	CLEAR	DARK
104	14:17	SUN	08-02-20	0	DRY	CLEAR	DAY
105	18:19	WED	08-05-20	0	DRY	CLEAR	DAY
111	13:13	THU	11-05-20	0	WET	CLEAR	DAY
114	12:42	MON	12-07-20	0	DRY	CLEAR	DAY
117	15:31	FRI	02-09-18	0	DRY	CLEAR	DAY
118	11:47	THU	06-28-18	0	DRY	CLEAR	DAY

LEGEND

<p>NUMBER OF CRASHES WITH</p> <p>PROPERTY DAMAGE ONLY <u>25</u></p> <p>INJURIES <u>5</u></p> <p>FATALITIES* <u>0</u></p> <p>TOTAL NO. OF CRASHES <u>30</u></p>	<p>SYMBOLS</p> <p>← MOVING VEHICLE</p> <p>← BACKING VEHICLE</p> <p>--- NON-INVOLVED VEHICLE</p> <p>x - - - PEDESTRIAN - - - BICYCLIST</p> <p>○ PROPERTY DAMAGE ONLY CRASH</p> <p>⊙ INJURY IN CRASH ⊙ FATAL CRASH</p> <p>□ FIXED OBJECT △ ANIMAL</p> <p>□ NON-FIXED OBJECT ⊗ POTHOLE</p>	<p>TYPES OF CRASHES</p> <p>← REAR END ← ENCROACHMENT</p> <p>← HEAD ON ← LEFT TURN</p> <p>← SIDE SWIPE ← RIGHT ANGLE</p> <p>← OUT OF CONTROL</p> <p>← OVERTURNED ← STRUCK PARKED VEHICLE</p>	<p>COLORS</p> <p>⊙ 2018 CRASHES</p> <p>⊙ 2019 CRASHES</p> <p>⊙ 2020 CRASHES</p>
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NEW JERSEY DEPARTMENT OF TRANSPORTATION

ASBURY AVENUE (CR 16)
 FROM RIDGE AVENUE TO MEMORIAL DRIVE
 ASBURY PARK CITY, MONMOUTH COUNTY

2018 - 2020 COLLISION DIAGRAMS

GPI Engineering Design
 Planning Construction Management

NOT TO SCALE

E. TRAFFIC DATA STRAIGHT LINE DIAGRAMS

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 07/31/2018 to 08/02/2018

Site names: 121339,ASBURY AVE-5.96,13000016__
 County: MONMOUTH
 Funct Class: Urban Minor Arterial
 Location: BET COMSTOCK ST LANGFORD ST

Seasonal Factor Grp: rg3_4U
 Daily Factor Grp: rg3_4U
 Axle Factor Grp: rg3_4U
 Growth Factor Grp: rg3_4U

	Sun, Jul 29, 2018			Mon, Jul 30, 2018			Tue, Jul 31, 2018			Wed, Aug 1, 2018			Thu, Aug 2, 2018			Fri, Aug 3, 2018			Sat, Aug 4, 2018		
	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W
00:00										42	17	25	33	8	25						
01:00										36	12	24	27	14	13						
02:00										30	14	16	44	23	21						
03:00										64	24	40	78	37	41						
04:00										154	59	95	177	76	101						
05:00										340	160	180	336	148	188						
06:00										443	214	229	454	228	226						
07:00										484	258	226	440	237	203						
08:00										490	281	209	541	313	228						
09:00										481	250	231	570	312	258						
10:00										542	272	270	619	310	309						
11:00							595	308	287	583	321	262									
12:00							602	289	313	558	281	277									
13:00							656	293	363	534	270	264									
14:00							651	335	316	597	322	275									
15:00							659	368	291	621	307	314									
16:00							604	346	258	588	348	240									
17:00							550	298	252	479	259	220									
18:00							395	204	191	403	191	212									
19:00							279	117	162	336	156	180									
20:00							246	79	167	245	99	146									
21:00							244	62	182	162	70	92									
22:00							79	36	43	90	27	63									
23:00							51	25	26	56	21	35									
Total							5,611	2,760	2,851	8,358	4,233	4,125	3,319	1,706	1,613						
AM Peak Vol										583	321	277									
AM Peak Fct										.842	.764	.911									
AM Peak Hr										11: 00	11: 00	10: 15									
PM Peak Vol							685	371	363	626	348	314									
PM Peak Fct							.906	.956	.908	.984	.935	.835									
PM Peak Hr							14: 30	14: 45	13: 00	15: 30	16: 00	15: 00									
Seasonal Fct							.972	.972	.972	1.001	1.001	1.001	1.001	1.001	1.001						
Daily Fct							.970	.970	.970	.922	.922	.922	.915	.915	.915						
Axle Fct							.486	.486	.486	.486	.486	.486	.486	.486	.486						
Pulse Fct							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						

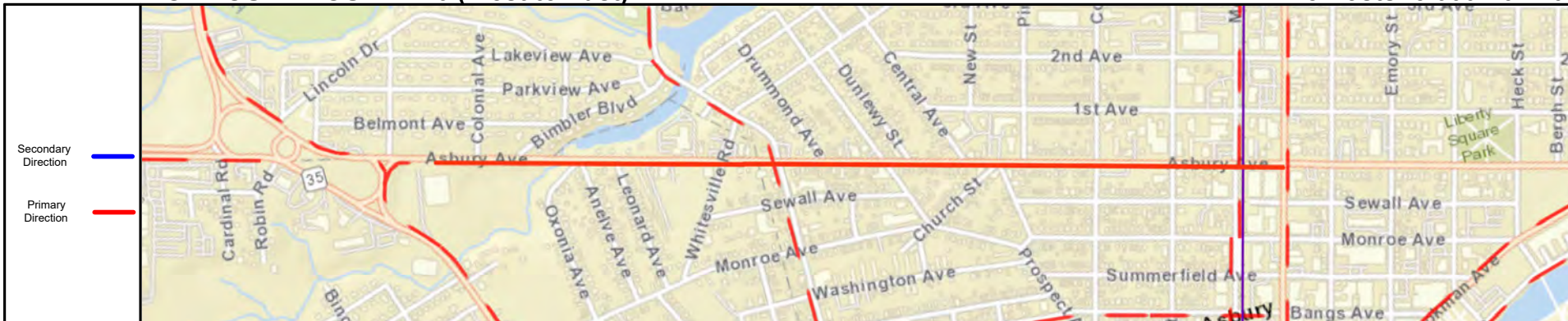
New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 07/31/2018 to 08/02/2018

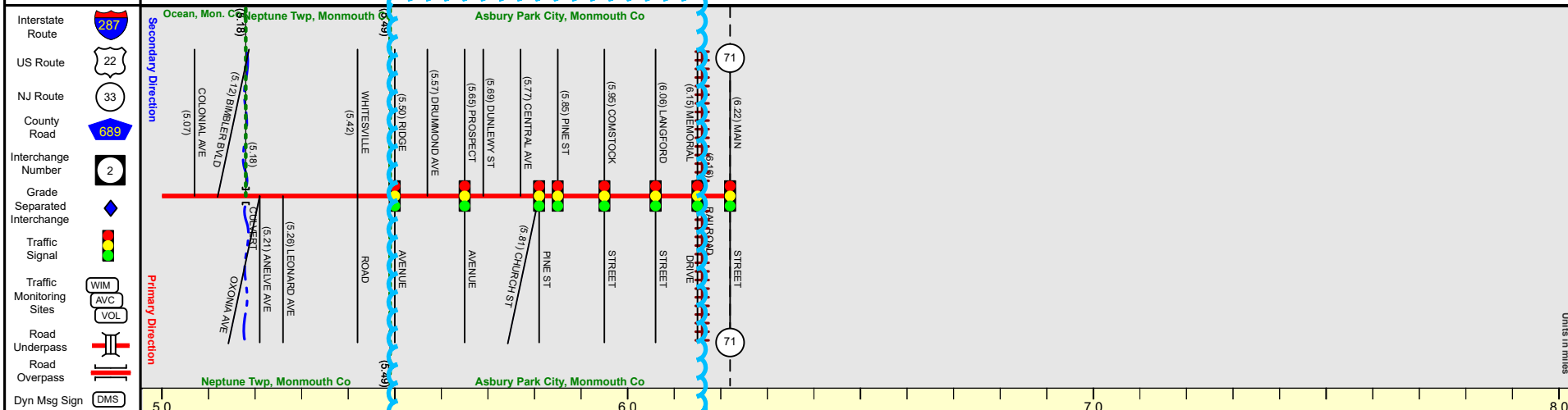
Site names: 121339,ASBURY AVE-5.96,13000016__
 County: MONMOUTH
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	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W
00:00										42	17	25	33	8	25						
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07:00										484	258	226	440	237	203						
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09:00										481	250	231	570	312	258						
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11:00							595	308	287	583	321	262									
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13:00							656	293	363	534	270	264									
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Daily Fct							.970	.970	.970	.922	.922	.922	.915	.915	.915						
Axle Fct							.486	.486	.486	.486	.486	.486	.486	.486	.486						
Pulse Fct							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						



Secondary Direction	Blue line
Primary Direction	Red line
Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Asbury Avenue	
Jurisdiction	County	
Functional Class	Urban Minor Arterial	
Federal Aid - NHS Sy	STP	
Control Section		
Speed Limit	35	25
Number of Lanes	2	
Med. Type	None	
Med. Width		
Pavement	40	48
Shoulder		
Traffic Volume		
Traffic Sta. ID		
Structure No.		
Enlarged Views		

F. PHOTOGRAPHS

Signal recently upgraded, may need additional intersection lighting



Curb ramp not ADA compliant, ponding observed



Parked vehicle blocks crosswalk, ramps not ADA compliant



MATCH LINE A



Mongoose light fixture on during daylight



Faded sign, not MUCTD compliant

LEGEND

 SIGNALIZED INTERSECTION

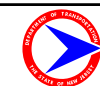
 PROJECT CORRIDOR

1
5

**NJDOT HSIP – ROAD SAFETY AUDIT
ASBURY AVENUE**

**ASBURY PARK
MONMOUTH COUNTY**

SITE PHOTOGRAPHS



GPI Engineering
Design
Planning
Construction Management

N.T.S.

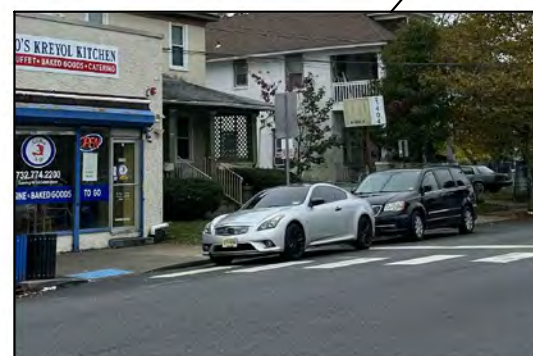
Outdated signal equipment, no pedestrian signal heads or push buttons



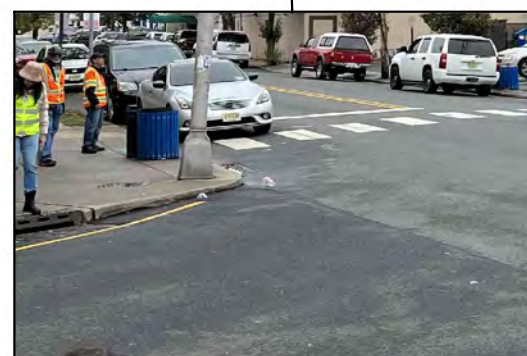
Damaged signal equipment



Building and vegetation obscures sight distance



Vehicle parked over crosswalk



Missing curb ramp and no marked crosswalk



Ponding on curb ramp, can freeze in winter

LEGEND

 SIGNALIZED INTERSECTION

 PROJECT CORRIDOR

2
5

**NJDOT HSIP – ROAD SAFETY AUDIT
ASBURY AVENUE**

ASBURY PARK
MONMOUTH COUNTY

SITE PHOTOGRAPHS



GPI Engineering
Design
Planning
Construction Management

N.T.S.

Intersection skew may limit sight distance, increases pedestrian crossing



Faded sign with metal pole in front



300 feet between stop bars (Pine St to Church St) may be confusing to road users



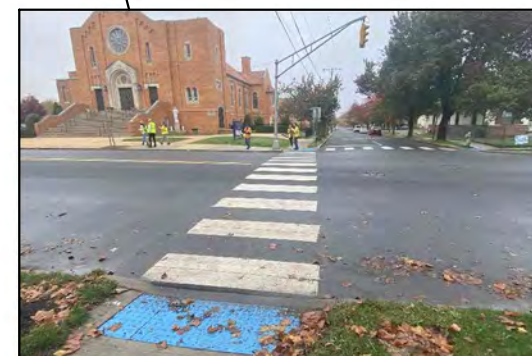
Sidewalk uneven / raised from street trees



Speed feedback sign blocked by parked vehicles



Missing curb ramps and crosswalk, tripping hazard near hydrant



No pedestrian signal heads or push buttons

LEGEND

 SIGNALIZED INTERSECTION

 PROJECT CORRIDOR

3
5

**NJDOT HSIP – ROAD SAFETY AUDIT
ASBURY AVENUE**

ASBURY PARK
MONMOUTH COUNTY

SITE PHOTOGRAPHS



GPI Engineering
Design
Planning
Construction Management

N.T.S.

Outdated signal head layout



No pedestrian signal heads or push buttons



Poorly defined parking areas and pedestrian paths



Outdated signal head layout, no pedestrian signal heads or push buttons



Sidewalk condition varies throughout corridor



Unknown electrical service equipment



Ponding at curb ramps

LEGEND



SIGNALIZED INTERSECTION



PROJECT CORRIDOR

4
5

NJDOT HSIP - ROAD SAFETY AUDIT
ASBURY AVENUE

ASBURY PARK
MONMOUTH COUNTY

SITE PHOTOGRAPHS



GPI Engineering
Design
Planning
Construction Management

N.T.S.

Wide concrete area may be confusing to road users



Wide driveway that is not well defined



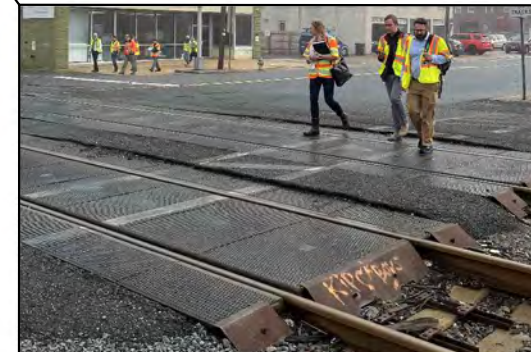
Outdated signal equipment, no pedestrian signal heads, worn crosswalk markings



Overgrowth onto sidewalk limits use, ponding in some areas



Many areas do not have curb



Pedestrian path across rail tracks not well defined, faded crosswalk, and uneven asphalt

LEGEND



SIGNALIZED INTERSECTION



PROJECT CORRIDOR

5
5

**NJDOT HSIP – ROAD SAFETY AUDIT
ASBURY AVENUE**

ASBURY PARK
MONMOUTH COUNTY

SITE PHOTOGRAPHS



GPI Engineering
Design
Planning
Construction Management

N.T.S.

G. PRE-AUDIT PRESENTATION



1

LOCATION / AUDIT TEAM



**NJDOT, NJTPA,
NJ Transit**



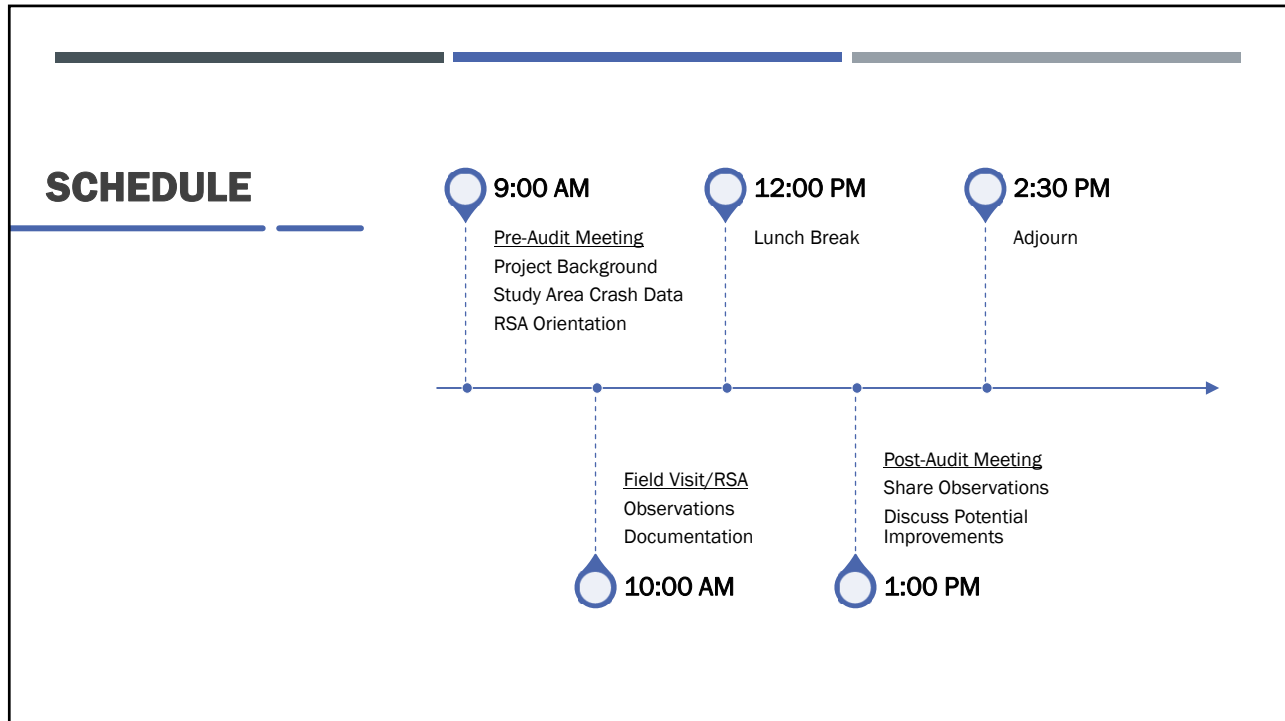
Monmouth County



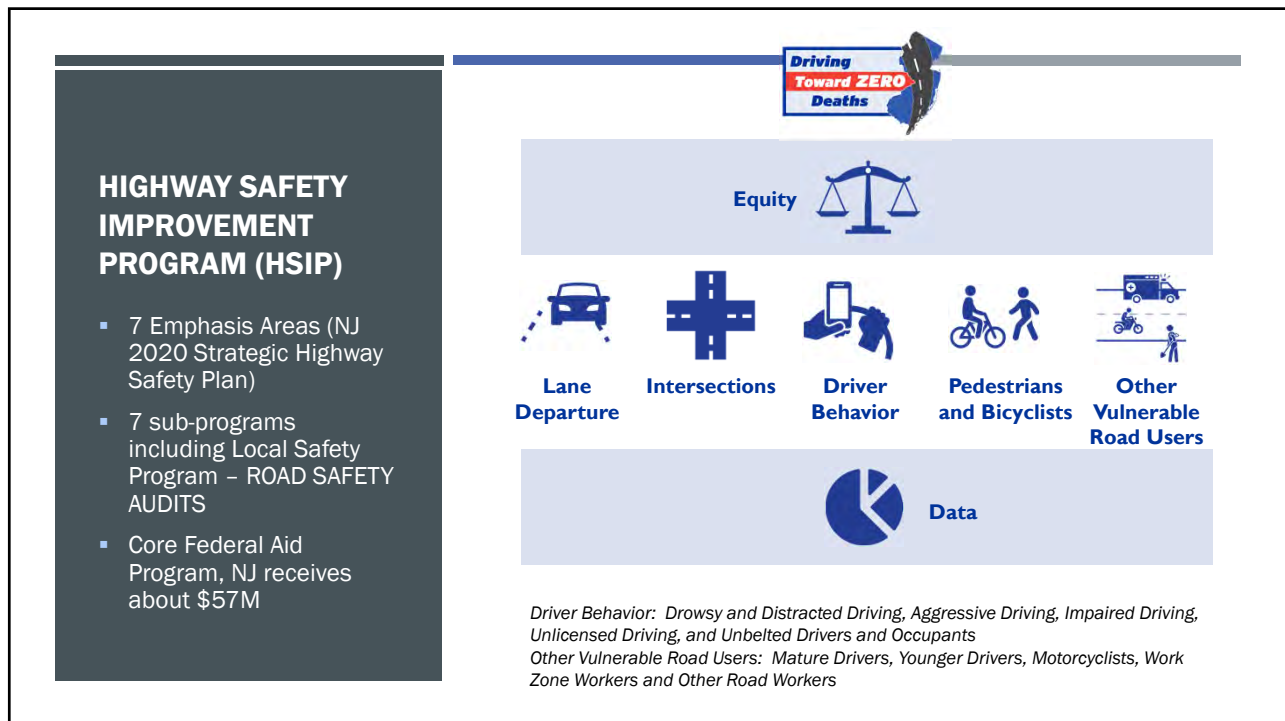
Asbury Park City

Funded by Federal Highway Administration and NJDOT
Presented by Greenman-Pedersen, Inc., NJDOT Consultant

2



3



4

HUMAN PERSPECTIVE

“Humbly observe where people in the community struggle. Ask the question: What is the next smallest thing we can do right now to address the issue? Do that thing. Repeat.”

— Charles Marohn
Founder, Strong Towns

5

FEDERAL TRANSPORTATION FUNDING

- **Local Safety and High Risk Rural Roads Programs**
 - \$235M on County / Local Roadways
 - Relatively quick-fix safety improvements
- **HSIP funds** – emphasizes data-driven, strategic approach to improving highway safety
- **Network Screening** – identifies locations experiencing:
 - High crash frequencies
 - Severe crash injuries
 - Specific crash types (e.g. right-angle, roadway departures)
- **Community Outreach** – opportunities for public, local officials and stakeholders to comment and ask questions

6

RSA PURPOSE

Formal safety performance examination by an independent, multidisciplinary audit team that identifies safety improvement opportunities for all road users.



Benefits

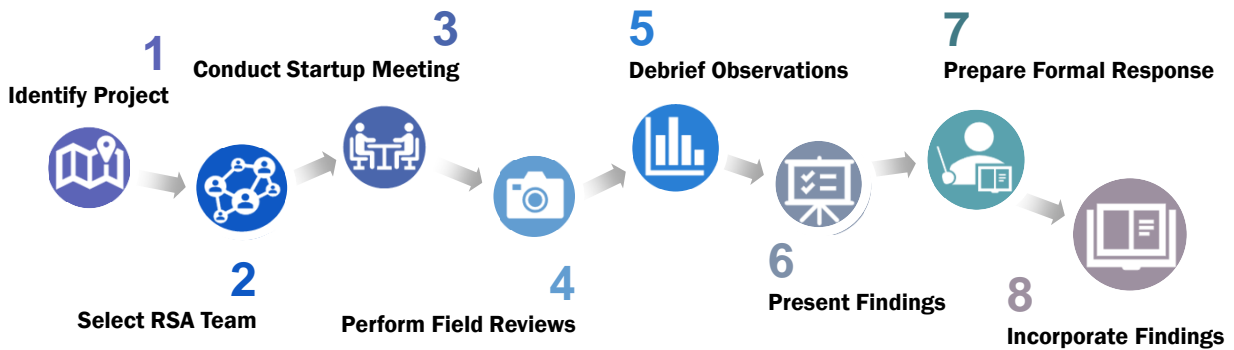
- Pro-actively address safety; reduce crashes
- Identify low-cost/high-value improvements
- Promote “safety culture”
- Provide continuous advancement of safety skills and knowledge
- Contribute feedback on safety issues
- Support optimized savings of lives, money and time



Not meant to replace

- Design quality control
- Standard compliance
- Traffic or safety impact studies
- Safety conscious planning
- Road safety inventory programs
- Traffic safety modeling efforts

7



RSA PROCESS



*Responsibilities: Steps 1-2 & 7-8: Design Team/Road Owner
Steps 3-6: RSA Team*

8

FHWA PROVEN SAFETY COUNTERMEASURES (PSC)

- 28 countermeasures
- Research proven strategies
 - ✓ Intersections
 - ✓ Roadway departures
 - ✓ Pedestrian/bicyclist
- Several crosscutting strategies address multiple safety focus areas



9

PSC EXAMPLES

Left:

- Roundabout, Cinnaminson Township, Burlington County
- Road diet, Maplewood Township, Essex County
- Pedestrian Hybrid Beacon (HAWK), Ocean City, Cape May County

Right:

- Backplates with Retroreflective Borders, Statewide
- Enhanced Delineation, Horizontal Curves, Statewide

Additional Considerations:

- Curb extensions



10

PROJECT AREA

Site Summary

- Undivided
- Urban minor arterial
- 2 lanes, on-street parking
- 25 mph
- Commercial/residential mix
 - Churches
 - Small retail/restaurants

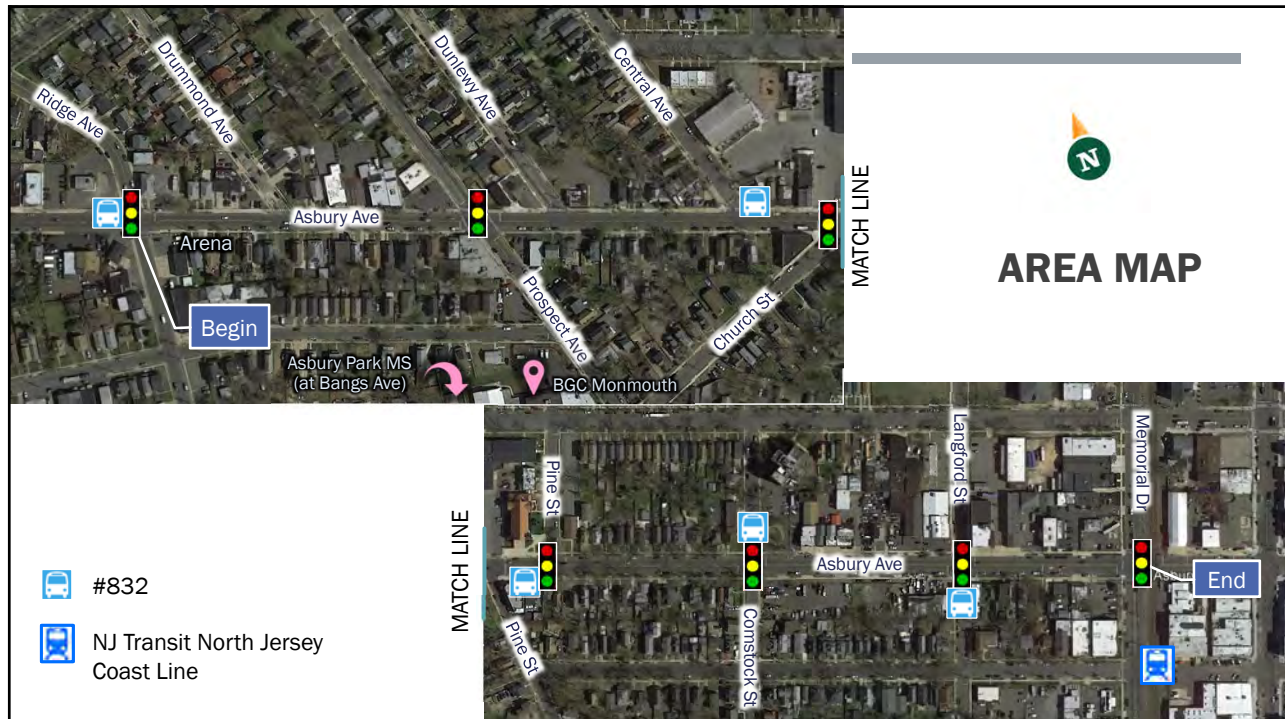
Demographics

Item*	Study Area	Monmouth Co.
DI	83%	-
POC	86%	25%
65+	10%	18%
18-	28%	21%
LI	23%	7%
LEP	10%	6%
PwD	17%	10%

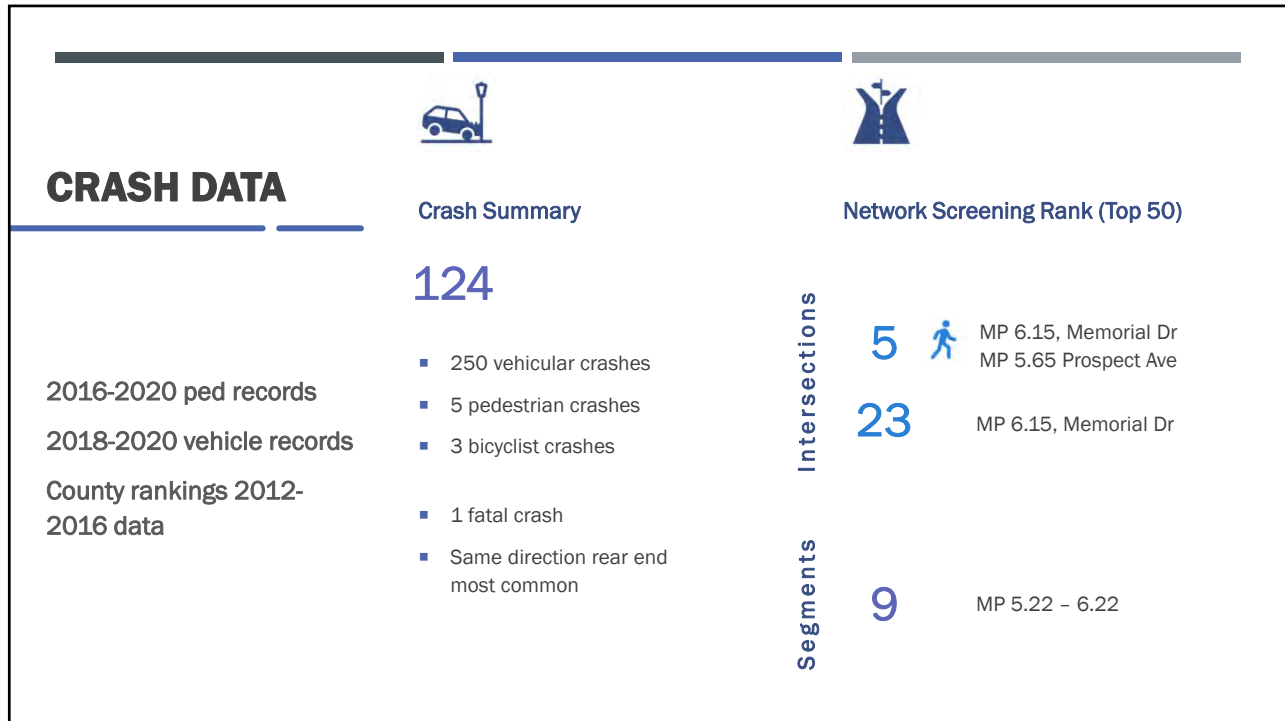
* DI = Demographic Index
 POC = People of Color
 65+ = People over age 64
 18- = People under age 18

LI = Low Income (persons)
 LEP = Limited English Proficiency
 PwD = Persons with a Disability
 DI > 50% indicates underserved

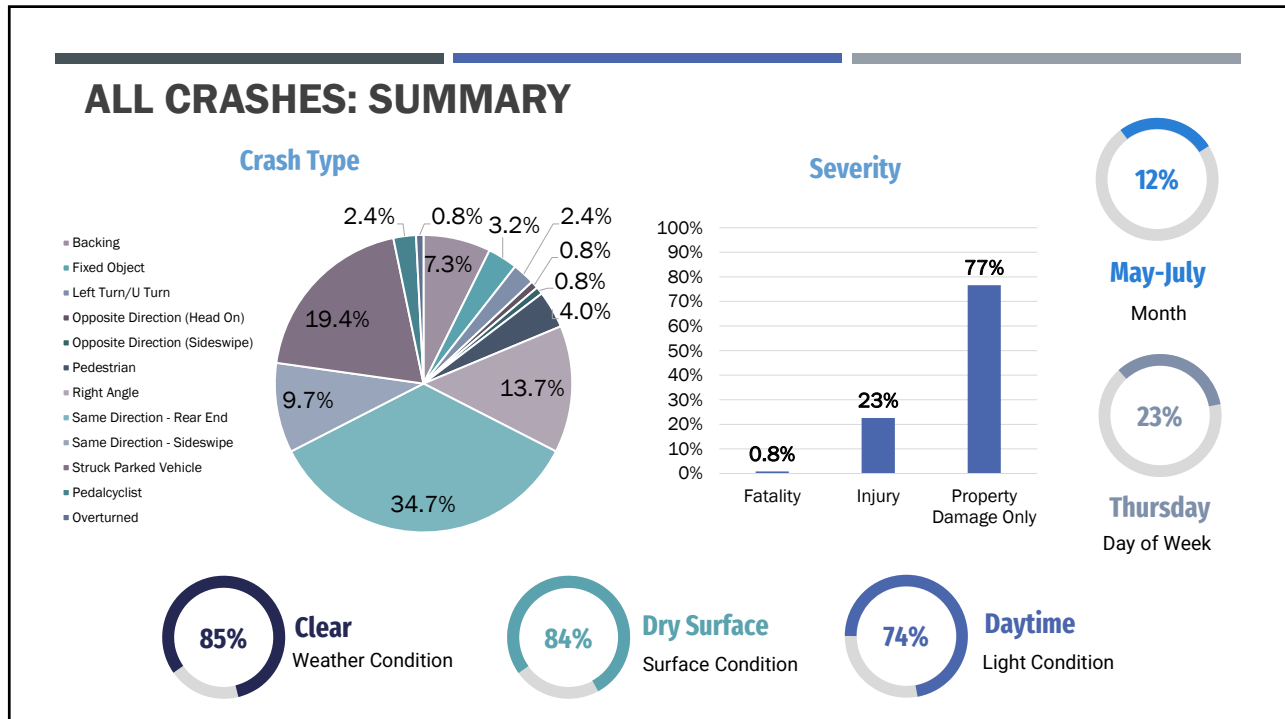
11



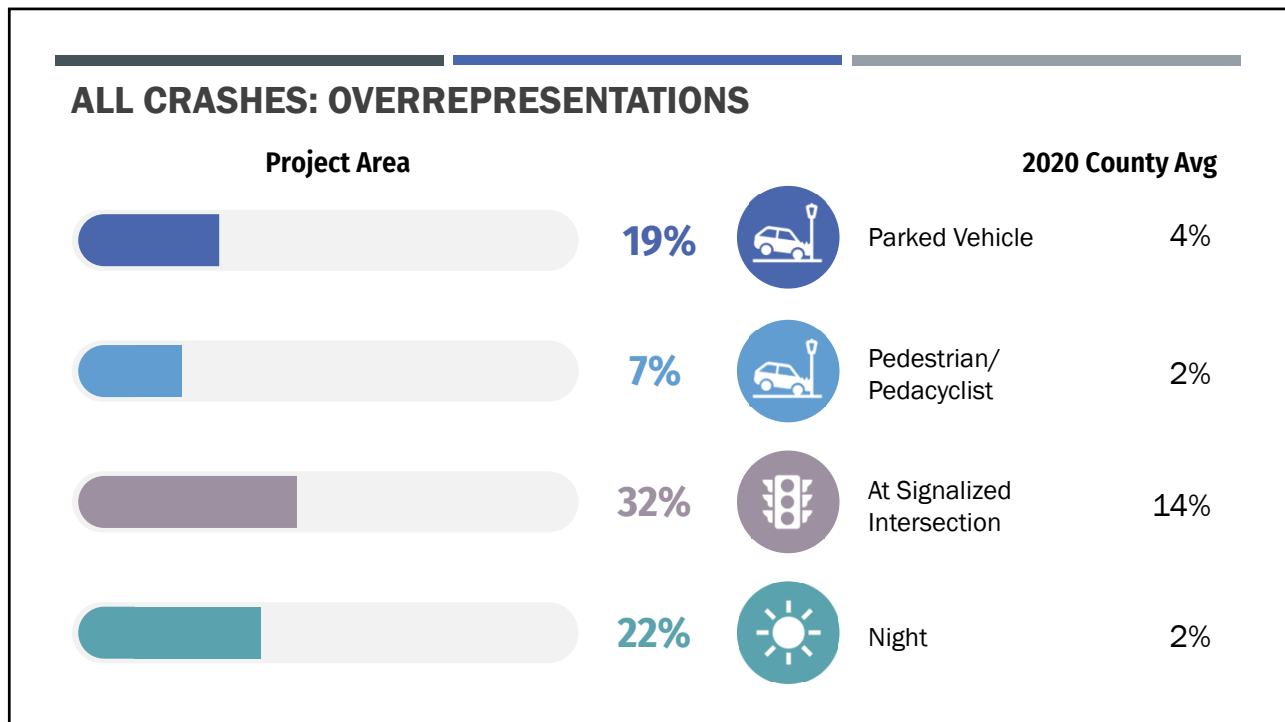
12



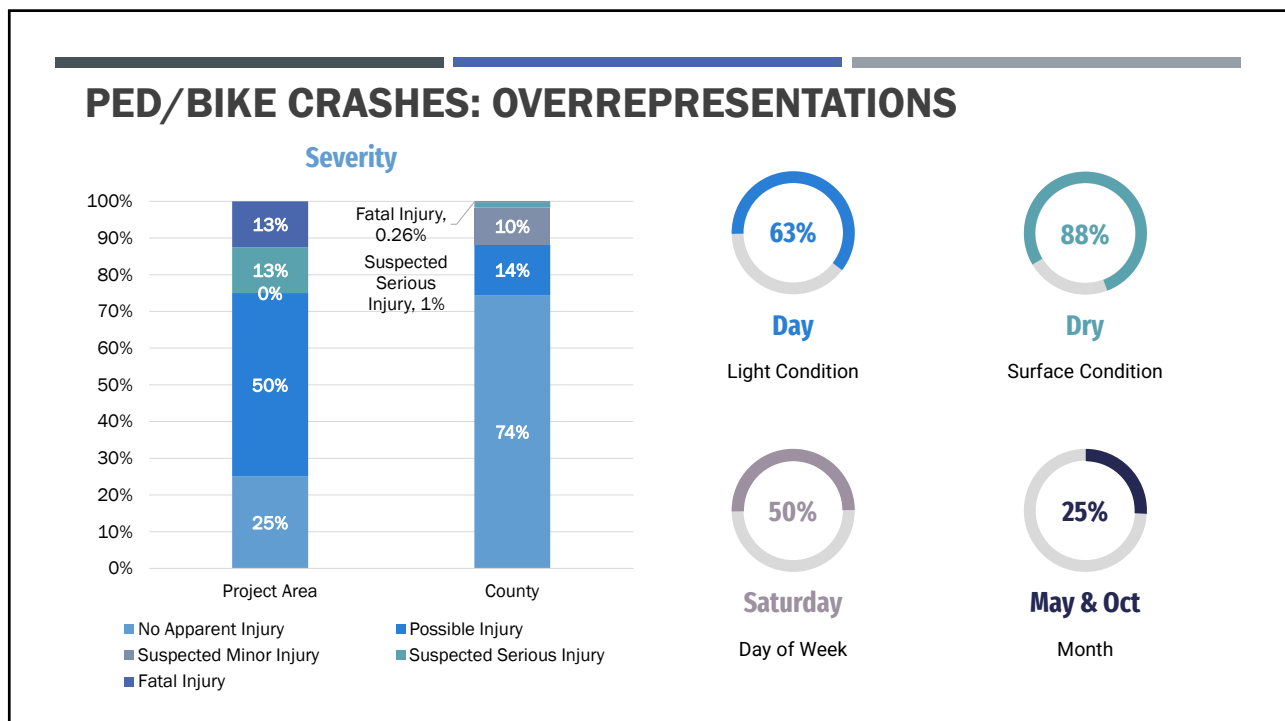
13



14






15



16

PED/BIKE CRASHES: LOCATION

2016-2020

-  Crash Cluster
-  School
-  Bus Stop



17

DISCUSSION DURING FIELD VISIT

Safety vests must be worn.



Observations

- What elements of the road may present a safety concern?
- To what extent, to which road users, and under what circumstances?
- What corridor safety issues did you observe?
- What localized safety issues did you observe?



Recommendations

- What opportunities exist to eliminate or mitigate identified safety concerns?
- What improvements would you make?
- Are any of the FHWA countermeasures beneficial?

18

FIELD VISIT



Safety First!

Return here at 1:00 PM for the post-audit discussion

19

DISCUSSION AFTER FIELD VISIT



Observations

- What elements of the road may present a safety concern?
- To what extent, to which road users, and under what circumstances?
- What corridor safety issues did you observe?
- What localized safety issues did you observe?



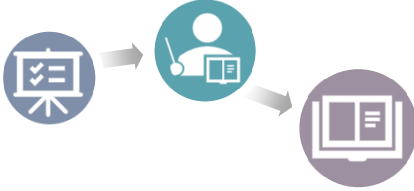
Recommendations

- What opportunities exist to eliminate or mitigate identified safety concerns?
- What improvements would you make?
- Are any of the FHWA countermeasures beneficial?

20

NEXT STEPS

Problem Statement Development will be conducted separately.



- Preparation of RSA Report
- Review/comments from RSA Team
- Preparation of Preliminary Final Report
- Preparation of Final Report
- Approximate timeframe: 6-8 weeks

21



ASBURY AVE (CR 16),
RIDGE AVE TO MEMORIAL DR
MONMOUTH COUNTY
October 26, 2022

ROAD SAFETY AUDIT

22

H. ROAD OWNER RESPONSE

The Board of County Commissioners of the County of Monmouth

DEPARTMENT OF PUBLIC WORKS & ENGINEERING

JOHN W. TOBIA
Director
Email: jwtobia@co.monmouth.nj.us



JOSEPH M. ETTORE
County Engineer
Email: engineer@co.monmouth.nj.us

**DIVISION OF ENGINEERING
& TRAFFIC SAFETY**
Hall of Records Annex
Freehold, New Jersey 07728
Telephone: (732) 431-7760
Fax: (732) 431-7765

December 21, 2023

Julia Steponanko, P.E., Project Manager,
Greenman-Pederson Inc (GPI)
520 US Highway 22, Suite 200,
Bridgewater, NJ 08807

Re: Monmouth County response to Road Safety Audit
CR 16 (Asbury Avenue)
between Ridge Ave and Memorial Drive
Asbury Park, Monmouth County

Dear Ms. Steponanko,

Monmouth County is committed to improving safety and implementing appropriate elements of our Complete Streets policy along all county roadways to better serve the traveling public.

Monmouth County thanks the Road Safety Audit team for their participation in this significant effort to evaluate traffic safety along CR 16 (Asbury Avenue) between Ridge Ave and Memorial Drive in the City of Asbury Park, and for your assistance with recommendations that will accommodate all road users within the corridor.

The County has reviewed the recommendations outlined in the report of Road Safety Audit (RSA) dated March 2023, and provides its concurrence for the short term and long term improvements, as well as the need for further investigations identified by the team to improve roadway safety along the above reference portion of the CR 16 corridor. However, as you are aware, implementation of specific improvements will require further analysis and/or design, municipal support, and funding.

These improvements primarily include corridor-wide and site-specific recommendations related to the following:

- Corridor-wide upgrade of all ramps for ADA compliance
- Corridor wide signal upgrades including backplates with retroreflective borders, evaluation of signal timing and clearance intervals, ADA compliance, etc. (While the County supports this effort, per the attached agreement with the City, Asbury Park is responsible for signal

upgrades prior to County assumption of maintenance. The County continues to work with the City to pursue funding opportunities for same.)

- Analysis of roadway and pedestrian lighting
- Review of all signage and striping for compliance with standards, (including retroreflectivity, size, placement, and sign posts)
- Construction and/or maintenance of sidewalks
- Inspect and address drainage facilities for obstructions and install bicycle safe grates
- Consider bicycle lanes throughout the corridor, pursuant to recommendations in this RSA and Asbury Park's "Plan for Walking and Biking"

Based on recommendations of the RSA team, as a next step, the County would explore funding alternatives for the design and implementation of these improvements. To that end, Monmouth County recently applied for a USDOT "Rebuilding American Infrastructure with Sustainability and Equity (RAISE)" grant, but was not successful. However, a new solicitation for FY 2024 grants was recently announced, and the County plans on submitting a new application for this corridor. In the meantime, the County does plan to implement short term spot improvements involving signing and striping along the corridor as part of its regular maintenance efforts along County routes.

Should you have any questions or concerns regarding the above, please do not hesitate to contact this office at (732) 431 7760.

Sincerely



Joseph M. Ettore, P.E.
County Engineer

cc:

Christine Mittman, NJTPA
Teri O'Connor, County Administrator
John Tobia, Director, Department of Public Works and Engineering
Debra Compton, Manager of Engineering Operations
Michael Nei, Traffic Engineer
Vincent Cardone, Principal Engineer II, Traffic Design