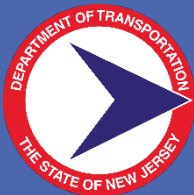




Road Safety Audit:

CHAMBERS BRIDGE ROAD AND BRICK BOULEVARD (CR 549),
ROUTE 70 TO N LAKE SHORE DRIVE
(MP 8.00-8.97)



April 2025

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Executive Summary

This document is the final report of the Road Safety Audit (RSA) conducted along Brick Boulevard (CR 549) from Route 70 to North Lake Shore Drive, in Brick Township, Ocean 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 310 vehicular crashes from 2020 to 2022 along the study area section of Brick Boulevard. There were 5 pedestrian and 10 pedalcyclist crashes from 2018 to 2022, none of them were fatal.

This RSA was conducted on Wednesday, October 16, 2024. The pre-audit meeting was conducted at the Brenton Woods Fire Co. 1 followed by the audit walk on the project site. Representatives from Ocean County, Brick Township, Brick Township Police Department, NJDOT, NJTPA, and DHTS were in attendance during the RSA.

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 representative. Corridor-wide and site-specific issues and recommendations, organized by location, are discussed in Section V. These recommendations addressed pedestrian safety by ensuring ADA compliance, repairing sidewalks, and providing compliant pedestrian signal equipment at traffic signals. Additionally, many suggestions were made to provide access management, provide a shared use path, improve, and simplify signage, improve the channelized right turn lanes at the intersections, 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).

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 Brick Boulevard was identified on NJDOT's Network Screening lists, as shown below. The current Network Screening list rankings are based on 2018-2020 vehicular and 2016-2020 pedestrian crash data, unless noted otherwise.

Table 1 – County Ranking, Top 50 (Corridor)

Location	Ped Corridor	Corridor
Brick Boulevard	#40 (MP 8.22-9.22)	#3 (MP 8.32-9.32)

Table 2 – County Ranking, Top 50 (Intersection)

Location	Intersections	Pedestrian Intersections
Hooper Avenue (MP 8.69)	#10	-
Cedar Bridge Avenue (MP 8.43)	#11	-
Jackson Avenue (MP 8.36)	-	#39

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 16, 2024. The pre-audit meeting was conducted at the Brenton Woods Fire Co. 1 followed by the audit walk on the project site. Representatives from Ocean County, Brick Township, Brick Township Police Department, NJDOT, NJTPA, and DHTS were in attendance during the RSA. A list of team members can be found in Appendix A. Other organizations that the RSA Team identified that may have an interest in the project area include the local businesses.

II. Corridor Description and Analysis

A. Study Location and Other Studies

The study area consists of approximately one (1) mile of Brick Boulevard (MP 8.00-8.97). The adjacent land use along the corridor is predominantly commercial properties. Of note, Oak Tree Road between Route 70 and North Lake Shore Drive is under the jurisdiction of Brick Township. The following sections provide additional information.

B. Roadway and Intersection Characteristics

County Route 549 is an urban principal arterial road. It consists of Chambers Bridge Road (between Route 70 and Brick Boulevard) and Brick Boulevard (between Hooper Avenue and N Lake Shore Drive). For the purpose of uniformity, the entire roadway is termed as Brick Boulevard.

The section of Chambers Bridge Road between Route 70 up to Brick Boulevard is an undivided five-lane section, with two travel lanes in each direction and a center two way turn lane. The section on Brick Boulevard between Chambers Bridge Road and up to N Lake Shore Drive is divided six-lane section, with three travel lanes in each direction. Throughout the project limits, the shoulders are notably narrow. The posted speed limit is 35 mph north of Cedar Bridge Avenue and 40 mph to the south. There are four signalized intersections and one unsignalized intersection along the corridor.

C. Existing Bicycle/Pedestrian Accommodations

Sidewalk is provided along the majority of Brick Boulevard. Some locations do not have a minimum of three (3) feet due to the overgrown grass around it. The intersections have long crosswalks due to the wide intersection. Marked crosswalks consist of double lines or ladder styles depending on location. Sidewalk and crosswalk conditions vary from newly installed to needing maintenance. There are no bicycle lanes or other bicycling infrastructure identified along the corridor. The Audit Team observed pedestrian and bicyclist movement along the Brick Boulevard.

D. Traffic Volumes

The 2020 Annual Daily Traffic (ADT) along Brick Boulevard is approximately 28,136 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 Chambers Bridge Road and Brick Boulevard via routes 67, 137, and 317. Stops are located at or near Brick Plaza, Cedar Bridge Avenue, and Boulevard Square Mall.

F. Community Profile

The American Community Survey (ACS) estimate, which updates the 2020 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 2018 through 2022. A summary of the demographics is listed below. Bold denotes that the percentage is above the Ocean County average.

Table 3 – Study Area Demographics

Characteristic	Study Area	County Average
Demographic Index	53%	-
Race/Ethnicity	-	-
<i>White</i>	<i>75%</i>	<i>83%</i>
<i>Hispanic/Latino</i>	20%	10%
<i>Black or African American</i>	2%	3%
<i>Asian American</i>	0%	2%
<i>American Indian/Alaskan</i>	0%	0%
<i>Other¹</i>	3%	2%
People over age 64	15%	22%
People under age 18	20%	24%
Low Income	27%	26%
Limited English Proficiency	1%	1%
Persons with a Disability	13%	14%
Use Public Transportation	1%	1%
Walk/Bike to Work	2%	1%
Homes with No Vehicle Available	6%	6%

The Demographic Index (DI), as noted in the table, is a percentile that shows how a community's percentage of low-income and minority residents compare to the rest of NJ. Fifty percent (50%) is the median. For example, an area with an underserved population category ranking in 80th percentile in NJ means its population percentage ranks higher than 80% of all census blocks in the NJ.

G. Land Use

The area surrounding Brick Boulevard is a mix of commercial and residential properties. Commercial establishments line the entire study corridor, attracting significant vehicular and pedestrian traffic, particularly due to the presence of restaurants, the Brick Boulevard AMC, and shopping centers. Two new residential apartment complexes have been developed at the north end of Chambers Bridge Road, increasing the need for safe pedestrian and bicycle infrastructure. Additional details and features of the project area are illustrated on the 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 2021 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.

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'

According to the NJDOT crash database, 310 vehicular crashes occurred during the 3-year period between January 1, 2020, and December 31, 2022, along the study area. There were 5 pedestrian and 10 bicyclist crashes over the 5-year period between January 1, 2018, and December 31, 2022. The total number of crashes used for the RSA was 325.

A. Temporal Trends

Total crashes varied (either higher or lower) from the county average except in March, July, November, and December. In general, crashes were in line with day of week averages.

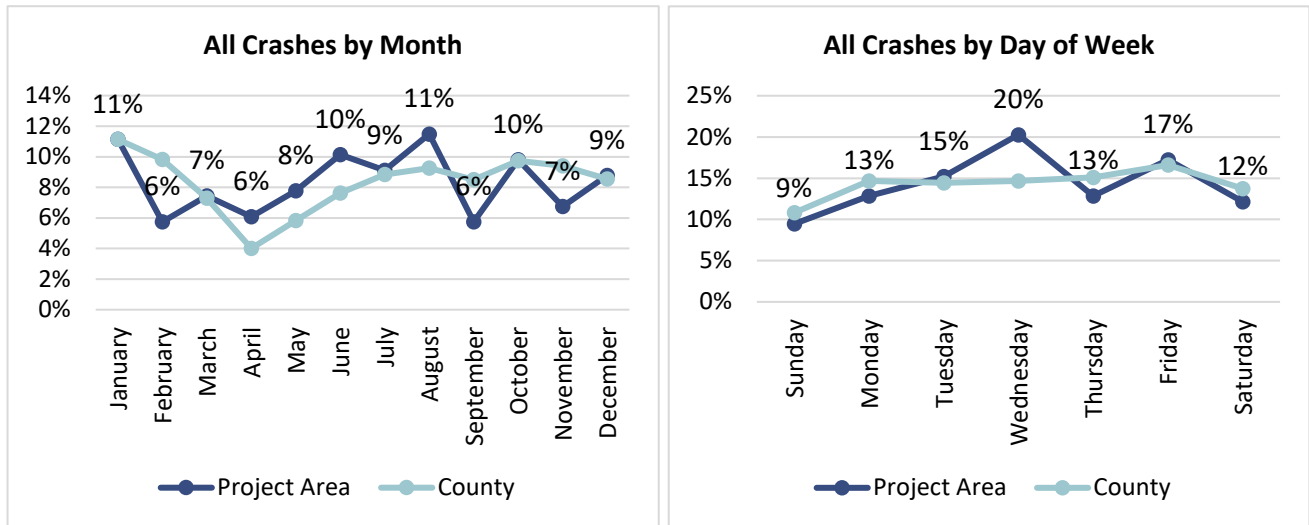


Figure 1 – Total Crashes by Month and Day of Week

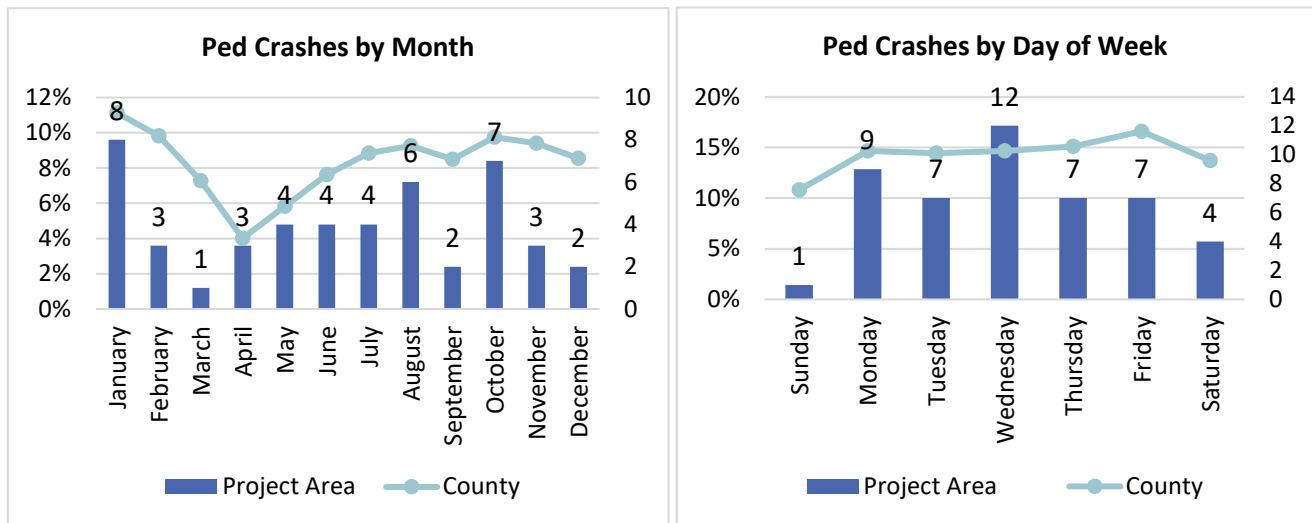


Figure 2 – Pedestrian/Bicyclist Crashes by Month and Day of Week

Collisions with pedestrians and bicyclists were highest on Wednesdays and during January.

B. Collision Types

Overrepresented crash types included backing, same direction – sideswipe, struck parked vehicle pedalcyclist and pedestrian. Struck parked vehicle and same direction-side swipe crashes were the predominant crash types (53% of total).

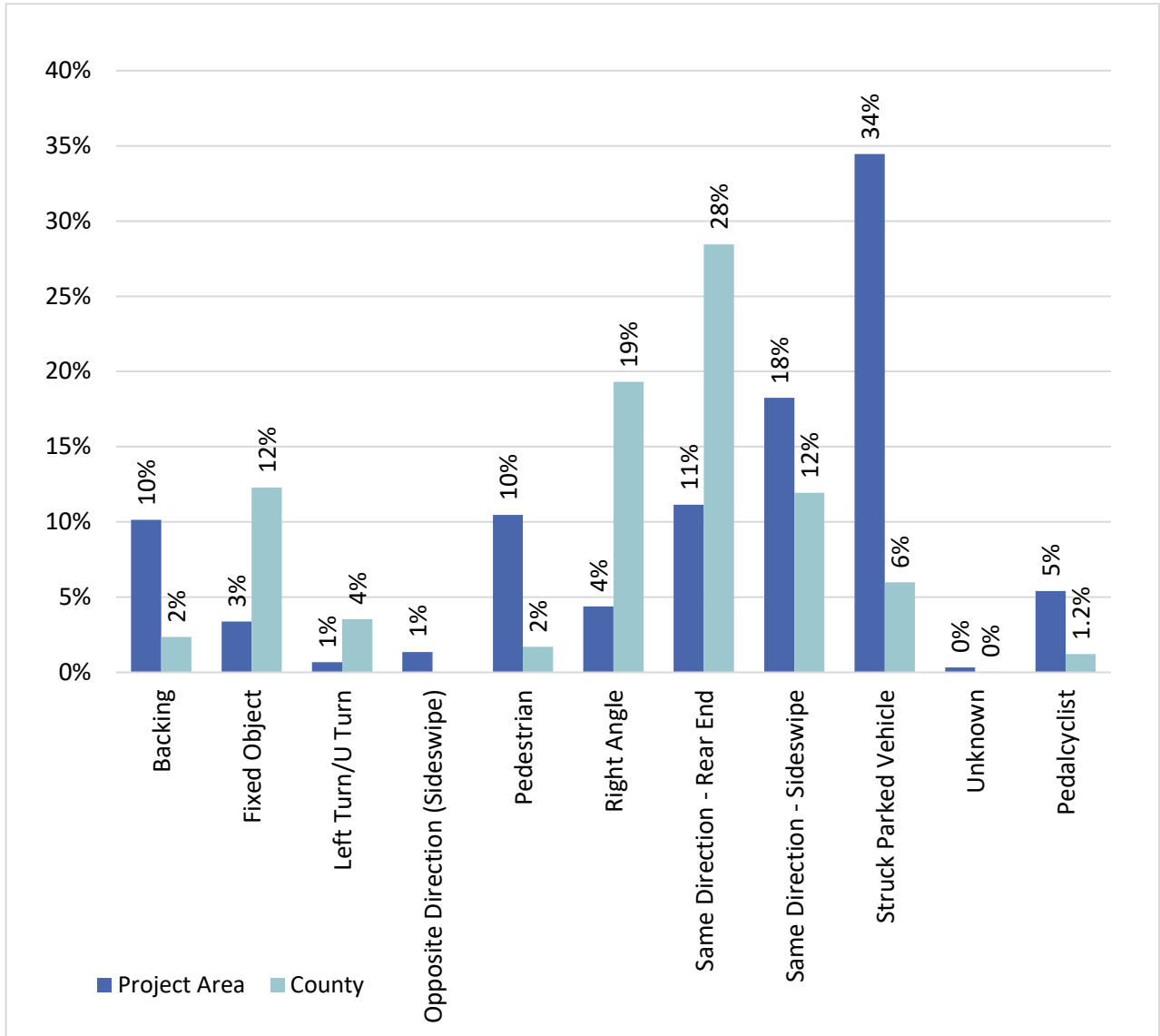


Figure 3 – Crash Type Breakdown

C. Severity

No fatal vehicular or pedestrian crashes were identified in the studied time period. Nine (9) pedestrian crashes included a possible injury, four (4) pedestrians included a suspected minor injury, and 1 pedestrian included no apparent injury during the time period studied.

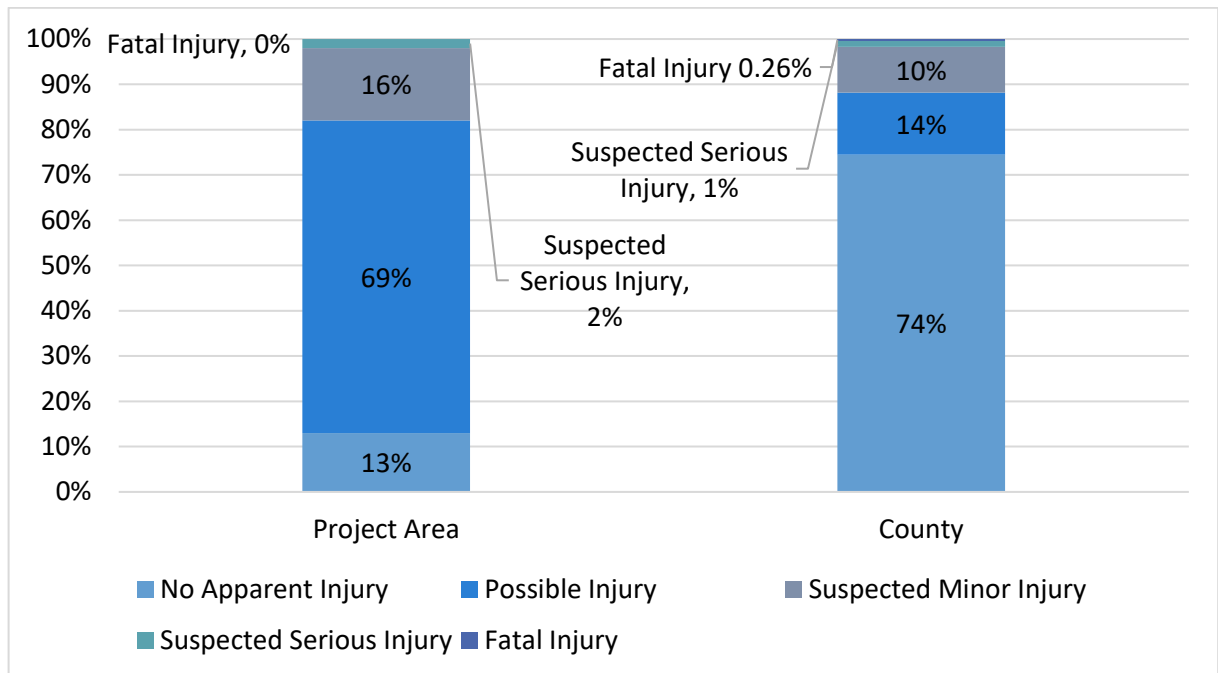


Figure 4 – Severity (Pedestrian/Bicycle Crashes)

D. Roadway Surface & Light Condition

Overrepresented conditions included daytime (76%) and dry (85%). All other conditions are similar to or underrepresented compared to the county road system.

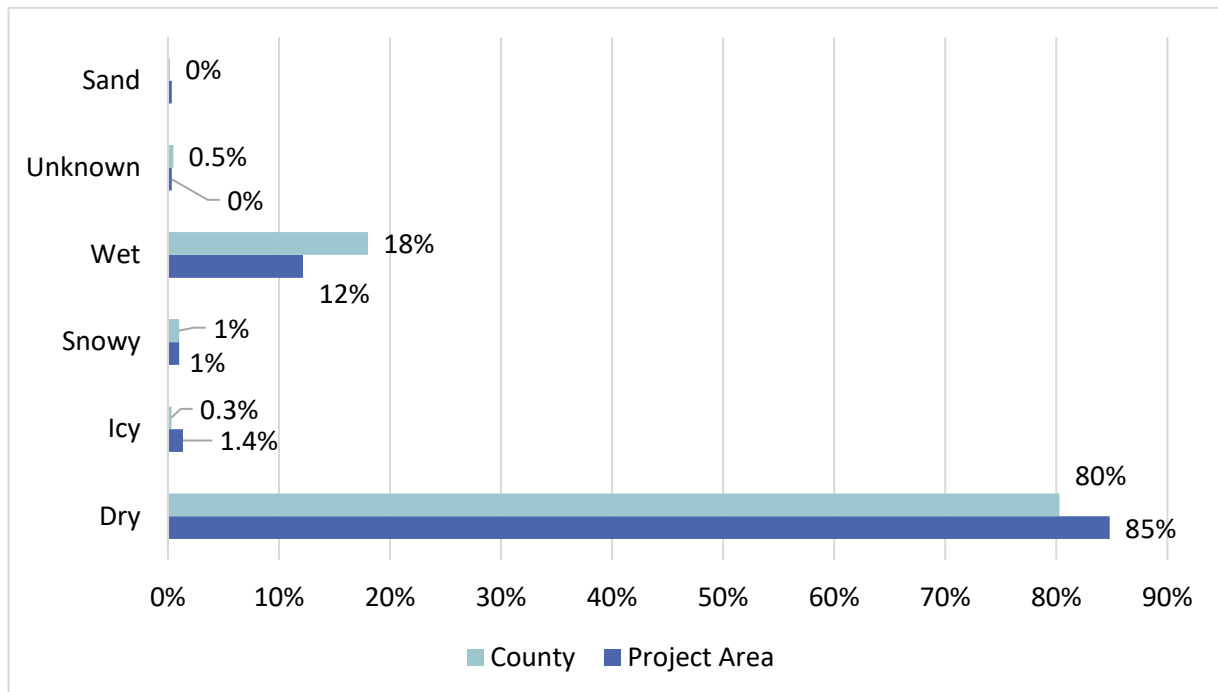


Figure 5 – Surface Conditions (All Crashes)

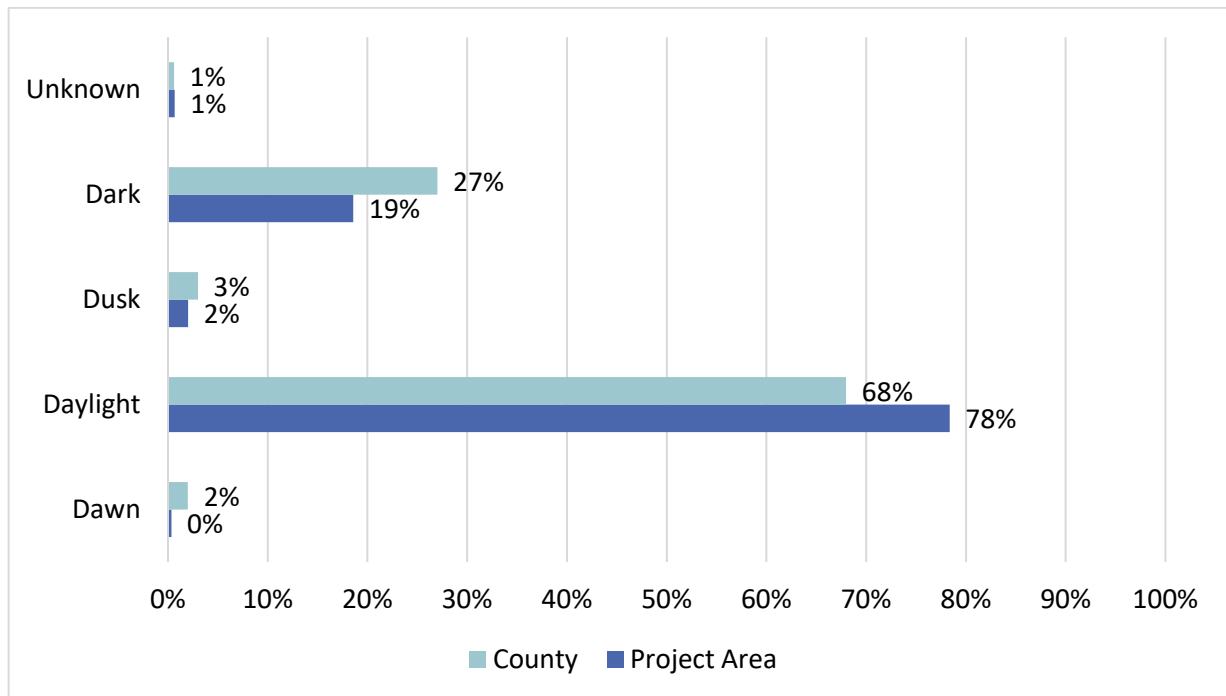


Figure 6 – Light Conditions (All Crashes)

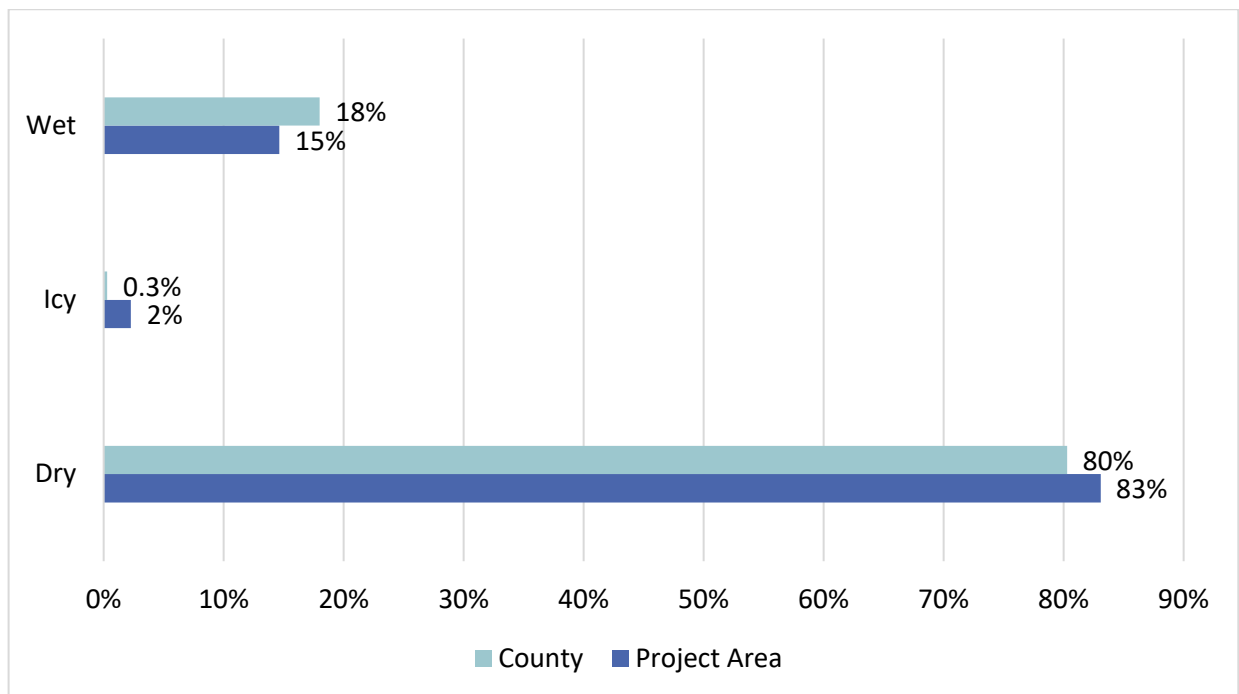


Figure 7 – Surface Conditions (Pedestrian/Bicycle Crashes)

Sixty eight percent (68%) of pedestrian crashes occurred during the day and 80% of the crashes occurred on dry surface. As shown in the figures below, these are overrepresented compared to the county road system.

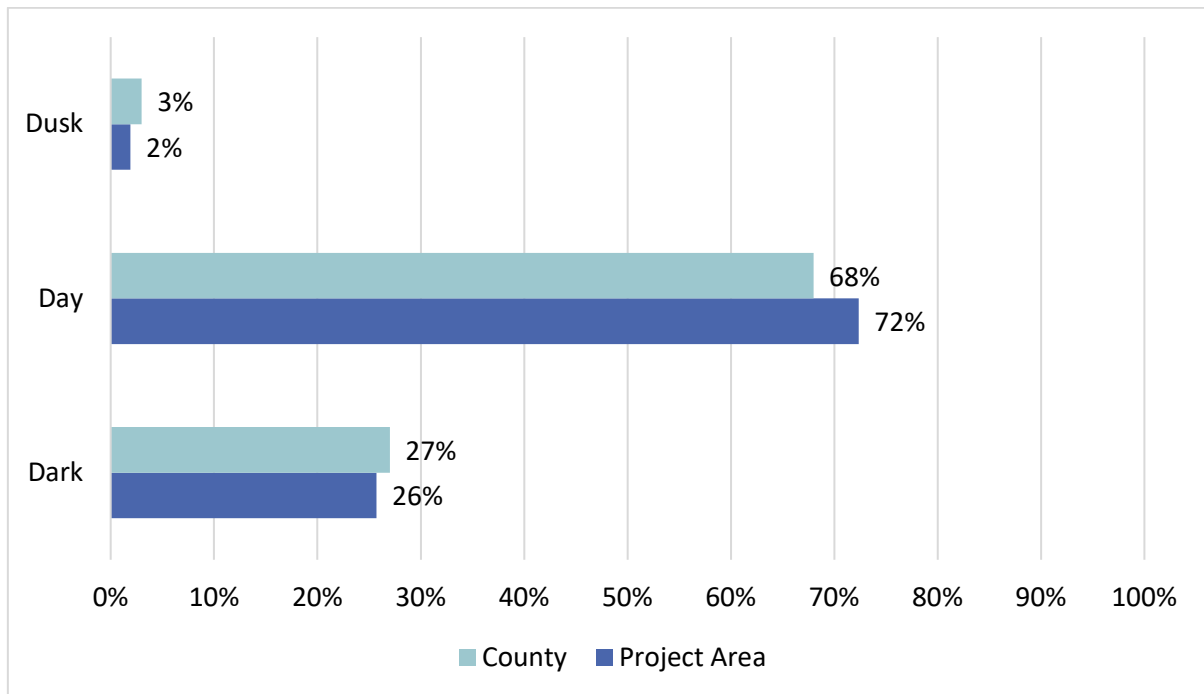


Figure 8 – Light Conditions (Pedestrian/Bicycle Crashes)

E. Location

Twenty eight percent (28%) of crashes occurred at signalized intersections, 7% occurred at unsignalized intersections, and 65% occurred between intersections. In comparison, 14%, 22%, and 64% of crashes on all county roads occur at signalized intersections, unsignalized intersections, and between intersections, respectively. Eight (8) pedestrian/bicyclist crashes occurred at a midblock location with the remaining seven (7) occurring at an intersection. Of those at an intersection, one crash occurred outside a marked crosswalk (e.g., crossing over a median barrier or divisional island; crossing not striped).

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.

The Audit Team also observed vehicles traveling at higher speeds than the posted speed limit; drivers running red lights; confusion with entry and exit points of commercial complexes; large curb radii at intersections; sightline obstructions from the side streets due to vegetation and retail signs; lack of shoulder markings; narrow pavement markings; worn crosswalk markings; intermittent sidewalk; and signs obstructing the sidewalk.

A. Pedestrian/Bicyclist



Observation / Photo Location

Left to right: Overgrown grass on the sidewalk.

Uneven sidewalk may pose tripping hazard.

Chambers Bridge Road between NJ 70 and Brick Boulevard



Left to right: Faded/Worn crosswalk markings.

Chambers Bridge Road and Brick Boulevard



Left to right: Missing ADA curb ramps and sidewalks terminate at driveways.

Splitter island lacks pedestrian path.

Brick Boulevard outside Wawa store



Left to right: Sidewalks are built to match the steep slope of driveways.

Debris is getting collected around the Cub ramps at the crosswalks at the intersection.

Brick Boulevard



Pedalcyclist using sidewalk; No bike path available on the Brick Boulevard and Chambers Bridge Road

Cedar Bridge Avenue and Brick Boulevard intersection

B. Operations, Visibility, and Maintenance



Observation / Photo Location

No left turn sign missing at the Auto Zone driveway.

Chambers Bridge Road (South Bound)

Note: The County has installed the missing 'No Left Turn' signs



Observation / Photo Location

Electric wires obstructing the visibility of traffic signal.

Chambers Bridge Road (Outside Brick Plaza driveway)



Missing turn lane signage on the road.

Brick Boulevard (Near Exxon Gas Station intersection)



Faded signs and walk signal instructions.

*Chambers Bridge Boulevard;
Brick Boulevard*



No yield sign for drivers at the U-turn for pedestrian safety

Intersection of N Lake Shore Drive and Brick Boulevard

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

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.

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/ Township
2	Evaluate the existing number of travel lanes and consider 2-3 per direction throughout	✓✓	\$\$	●	County/ Township
3	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/ Township
4	Consider installing additional signage (speed limit, intersection warning signs) and updating signage and ensure it is consistent throughout corridor	✓	\$	●	County/ Township
5	Consider conducting a lighting analysis for the corridor	✓✓✓	\$\$	●	County/ Township
6	Review access management for the corridor and consider driveway revisions or consolidation	✓	\$\$\$	●	County/ Township
7	Investigate installing edge lines and providing shoulder	✓ ³	\$	●	County/ Township
8	Consider appropriate and uniform posted speed limit for all road users	✓✓	\$\$	●	County/ Township
9	Consider reconfiguring stop-controlled intersections to right-in, right-out (RIRO) only operations on Chambers Bridge Road	✓✓	\$\$	●	County/ Township
10	Consider installing dynamic speed feedback signs	✓	\$	●	County/ Township
11	Consider clearing sight triangles at intersections	✓✓	\$	●	County/ Township
12	Consider providing raised median island where there are no driveways present (undivided section) on Chambers Bridge Road	✓✓✓	\$\$	●	County/ Township
13	Consider reducing the wide turning radii at the channelized right turn intersections	✓	\$\$	●	County/ Township

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
Bicycle/Pedestrian					
14	Inspect, repair and construct sidewalk in compliance with ADA as needed, including driveway aprons; complete any missing connections	✓✓✓	\$\$	●	County/ Township
15	Examine crosswalks status: check placement, alignment, and markings	✓✓	\$	●	County/ Township
16	Consider improvements to bus stops and locations including providing floating bus stops	N/A	\$	●	County/ NJ Transit
17	Consider providing high-visibility crosswalk markings for all intersections throughout corridor	✓✓	\$	●	County/ Township
18	Investigate providing Leading Pedestrian Interval (LPI) at signalized intersections	✓✓✓	\$	●	County/ Township
19	Consider shared use path throughout the corridor	✓	\$	●	County/ Township
Maintenance					
20	Inspect existing striping for wear and restripe accordingly	✓✓	\$	●	County/ Township
21	Examine track marks at intersection: re-stripe or install missing track marks on the intersections	✓	\$	●	County/ Township
22	Inspect and replace missing, faded, damaged or incorrect/outdated signage as needed (i.e., signs mounted below 7-ft, or on non-breakaway posts)	✓	\$	●	County/ Township
23	Inspect and trim foliage/vegetation and take out retail signs to improve sidewalk paths	✓ ⁴	\$\$	●	County/ Township
24	Inspect drainage facilities; ensure they are free of debris	✓ ⁴	\$\$	●	County/ Township
25	Consider replacing the raised grass median and guide rail with barrier curb; widen as feasible	✓✓✓ ✓	\$\$	●	County/ Township
Education					
26	Consider periodic sidewalk, crosswalk, multimodal education campaign and code enforcement	✓ ⁴	\$	●	GM TMA/ Township

Recommendations contained in this report should also consider the recommendations from the *Brick Township Bicycle and Pedestrian Master Plan*⁵. The following site-specific recommendations are in addition to the corridor-wide improvements, except if noted otherwise.

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.

⁵ Brick Township Bicycle and Pedestrian Master Plan. [1Bike-Ped-Plan-2019-LPS Brick FINAL opt.pdf](#)

Table 5 – Site-Specific Recommendations

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
NJ-70					
27	Consider corridor-wide recommendations 1, 5, 14, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁴	\$\$\$	●	NJDOT
28	Consider corridor-wide recommendation 19 and add track marks for safe transition between lanes	✓✓	\$\$	●	NJDOT
29	Evaluate a roundabout	✓✓✓✓	\$\$\$	●	NJDOT
Auto Zone Driveway Entrance (Chambers Bridge Road)					
30	Consider corridor-wide recommendation 9 for RIRO only operations <i>Note: The County has installed the missing 'No Left Turn' signs</i>	✓✓✓	\$	●	County/ Township
Brick Plaza Entrance (Chambers Bridge Road)					
31	Consider corridor-wide recommendations 1, 5, 14, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁶	\$\$\$	●	County/ Township
32	Consider corridor-wide recommendation 14 and 18 regarding crosswalk and stop bar	✓✓	\$	●	County/ Township
Chambers Bridge Road & Brick Boulevard					
33	Consider corridor-wide recommendations 1, 5, 13, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁶	\$\$\$	●	County/ Township
34	Consider corridor-wide recommendation 14 and 20 regarding crosswalk and stop bar	✓✓	\$	●	County/ Township
35	Consider corridor-wide recommendation 13 for the channelized right turns	✓✓	\$\$	●	County/ Township
36	Consider corridor-wide recommendation 21	✓	\$	●	County/ Township
37	Consider changing the yield sign at the channelized right turn to stop sign	✓✓ ⁶	\$	●	County/ Township
Brick Plaza driveway (Brick Boulevard)					
38	Consider corridor-wide recommendations 1, 5, 14, and 16 regarding ADA compliance and sidewalk	✓✓✓ ⁶	\$\$\$	●	County/ Township
39	Consider installation of pedestrian crossing sign	✓	\$	●	County
40	Consider installing No Left Turn sign	✓	\$	●	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
41	Evaluate the need of a bus turnout	#N/A	\$\$	🕒	County/NJ Transit
Jughandle next to Exxon Gas Station					
42	Consider corridor-wide recommendations 1, 5, and 14, regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁶	\$\$\$	🕒	County/Township
43	Consider corridor-wide recommendation 14 and 19 regarding crosswalk and stop bar	✓✓	\$	🕒	County/Township
44	Consider corridor-wide recommendation 13 for safe pedestrian crossing	✓✓	\$\$	🕒	County/Township
45	Consider installing Rectangular Rapid Flashing Beacon (RRFB)	✓✓	\$	🕒	County
Cedar Bridge Avenue					
46	Consider corridor-wide recommendations 1, 5, 13, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁷	\$\$\$	🕒	County/Township
47	Consider corridor-wide recommendation 14 and 20 regarding crosswalk and stop bar	✓✓	\$	🕒	County/Township
48	Consider corridor-wide recommendation 13 for the channelized right turns	✓✓	\$\$	🕒	County/Township
49	Consider corridor-wide recommendation 21	✓	\$	🕒	County/Township
50	Consider installing pedestrian refuge island	✓✓✓	\$\$	🕒	County/Township
51	Consider relocating bus stop away from the Exxon gas station driveway	N/A	\$	🕒	NJ Transit
Wawa Driveway					
52	Consider corridor-wide recommendations 1, 5, 13, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁷	\$\$\$	🕒	County/Township
53	Consider corridor-wide recommendation 14 and 19 regarding crosswalk and stop bar	✓✓	\$	🕒	County/Township
Duquesne Boulevard					
54	Consider corridor-wide recommendations 1, 5, 13, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁷	\$\$\$	🕒	County/Township
55	Consider corridor-wide recommendation 14 and 20 regarding crosswalk and stop bar	✓✓	\$	🕒	County/Township
Boulevard Square Driveway					
56	Consider relocating bus stop at the intersection away from the curb ramp to make it more accessible	N/A	\$	🕒	NJ Transit
57	Consider corridor-wide recommendation 9 for RIRO only operations with signage of no left turn and do not enter	✓✓✓	\$	🕒	County/Township

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
N Lake Shore Drive					
58	Consider corridor-wide recommendations 1, 5, 13, and 16 regarding ADA compliance, sidewalk, and crosswalks	✓✓✓ ⁷	\$\$\$	●	County/ Township
59	Consider redesigning the U turn and installing appropriate signage	✓✓✓	\$\$	●	County/ Township
60	Consider corridor-wide recommendation 13 for the slip road/ right turns	✓✓	\$\$	●	County/ Township

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.

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

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.

Crossing islands, or pedestrian refuge islands, reduce the exposure time of pedestrians to vehicular traffic. Pedestrians can cross in two stages — crossing one direction of vehicular travel lanes, pausing at the island, and then completing the crossing. While recommended for crossing three lanes of traffic in one or both directions, they may be implemented on smaller cross sections where space permits. Curb extensions physically and visually 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.

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.

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.

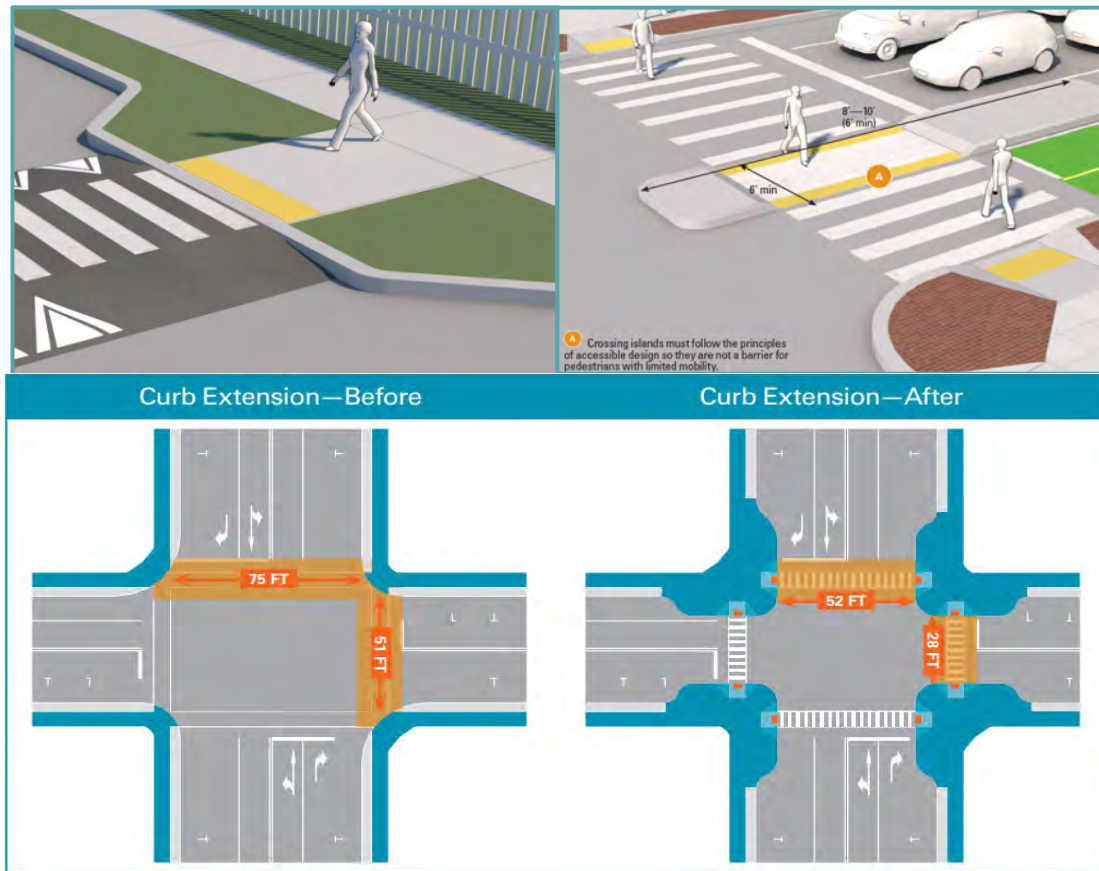


Figure 9 – Pedestrian Facility Examples

Left: Midblock Curb Extension. Right: Crossing Island. Bottom: Curb Extension (Source: CSDG)

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.

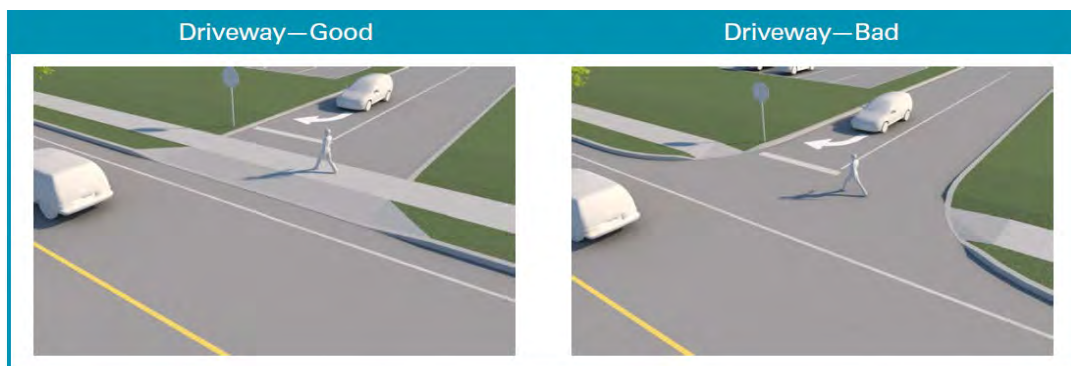


Figure 10 – Sidewalk and Driveways (Source: CSDG)

2. Bicycle Facilities

Shared-use paths are bikeways that are distinctly separate from the roadway. Located outside of the cartway, they are separated physically from motorized traffic by a buffer. Shared-use paths are typically designed to accommodate two-way travel for all non-motorized users and are paved or concrete. They can help provide low-stress bicycle accommodations in a variety of circumstances: a shortcut through residential neighborhoods, a commuting route from residential to commercial centers, a recreation route in a park or greenway, or as a side path along a roadway in lieu of (or in addition to) an on-road bicycle facility. Shared-use paths should be built as a system of off-road transportation routes that complements and enhances the on-road bicycle network. Recommendations contained in this report should also consider the recommendations from the *Brick Township Bicycle and Pedestrian Master Plan*⁸.



Figure 11 – Bicycle Facility Examples

Left: Curbside bicycle lane (Source: NATCO: UBG). Right: Sharrow Markings (Source: [Eric Gilliland/Flickr](#)) Bottom: Shared-use Path (Source: CSDG)

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 area⁹. To reduce conflicts

⁸ Brick Township Bicycle and Pedestrian Master Plan. [1Bike-Ped-Plan-2019-LPS Brick FINAL opt.pdf](#)

⁹ NACTO. *Transit Street Design Guide*. April 2016.

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.

4. Rectangular Rapid Flashing Beacons

To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) to accompany a pedestrian warning sign. RRFBs consist of two, rectangular-shaped yellow indications, each with a light-emitting diode (LED)-array-based light source¹⁰. RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers. RRFBs can also accompany school or trail crossing warning signs.



Figure 12 – Example of a Rectangular Rapid Flashing Beacon

(Source: NACTO-Urban Bikeway Design Guide)

5. Smart Right Turns

Conventional channelized turn lanes are designed for high-flow intersections, improving traffic efficiency by separating turn movements, reducing delays, and minimizing conflicts. However, the design must address common safety concerns, such as optimizing visibility for pedestrians and reducing vehicle speeds¹¹. A smart right turn (also called improved right turn slip lanes) widens the cone of vision of the driver towards the pedestrians as well as the cross-traffic by narrowing the angle of channelization to about 70 degrees. Thus, smart right-turns allow for safer pedestrian crossing by reducing turning speeds and improve vehicle–vehicle interactions,

¹⁰ MUTCD Interim Approval 21 - RRFBs at Crosswalks

¹¹ FHWA. *Pedestrian Safety Guide and Countermeasure Selection System*

since the new approach angle affords drivers a better view of the traffic stream, they are to merge with¹².

Improved right-turn slip lanes can incorporate features such as raised islands, high-visibility crosswalks, and narrowed lanes to ensure safety and accessibility. Additional measures like tactile cues for visually impaired pedestrians and active warning beacons in high-traffic areas further improve usability. By balancing traffic flow with pedestrian protection, these lanes enhance both safety and operational efficiency¹³.



Figure 13 – Example of an Existing Channelized Right Turn Lane on the Brick Boulevard
(Source: Google Street View)

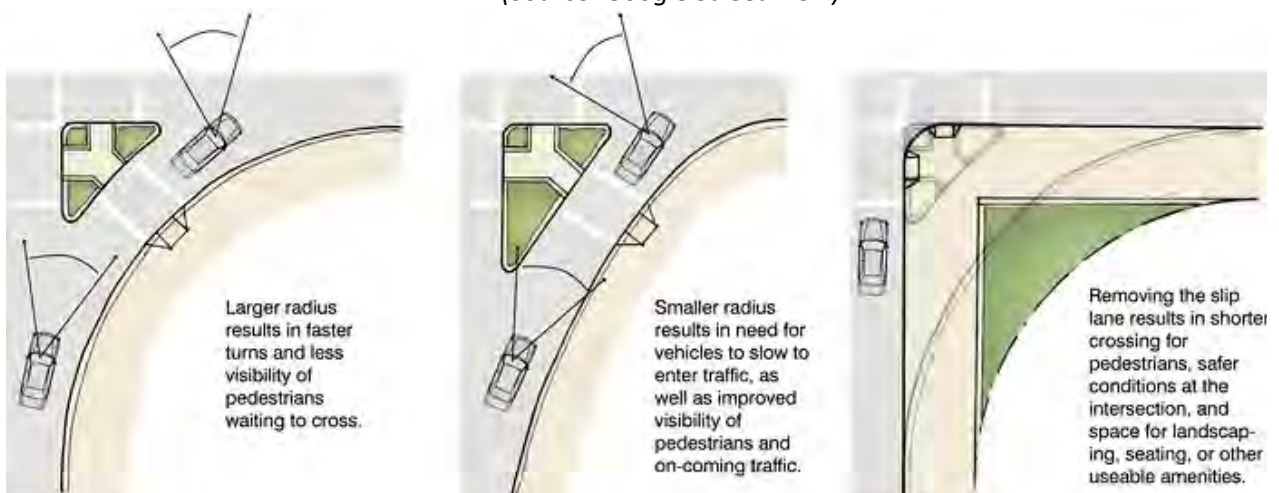


Figure 14 – Example of Smart Right Turn
(Source: SF Better Streets)

¹² ITE Journal. *Safety Effect of Smart Right-turn Design at Intersections*. Volume 88, Issue 11, pp 38-43 (Nov 2018)

¹³ Strategic Highway Safety Plan, Nevada. October 2014

VI. Conclusions

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

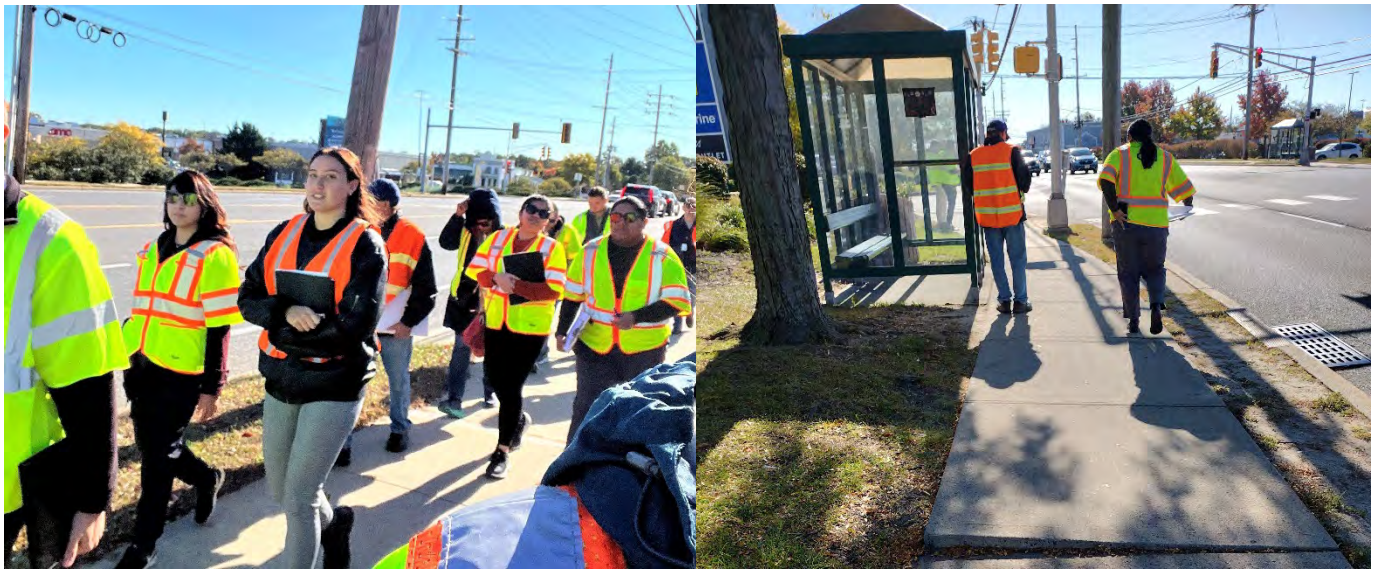
The recommendations documented in this report are designed to improve safety for all road users. Some of the strategies identified can be implemented through routine maintenance; however, all will be constrained by available time and budgetary priorities. The audit process and the resulting final document 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
Suzanne O' Hearn	DHTS
Yosy Cosme	NJDOT
Yuriy Assekritov	NJDOT
Swarna Venuri	NJDOT
Evangelia Vasilakis	Ocean County
Sean Areia	Ocean County
Tom Coraggio	Ocean County
Gregory Smith	Ocean County
Joseph Rossi	Brick Township Police Department
Tara Paxton	Brick Township
Elissa Commins	Brick Township
Christine Mittman	NJTPA
Julia Steponanko	Greenman-Pedersen, Inc.
Isabella Quimby	Greenman-Pedersen, Inc.
Shilpy Mehta	Greenman-Pedersen, Inc.
Jocelyne Bello	Greenman-Pedersen, Inc.



B. AREA MAP

Project Area

Ocean County Route 549, Brick Township



C.PEDESTRIAN CRASH DIAGRAMS

FILE: L:\2021\2022\HSP - Project Development and Support\Cad\Drawings\Crash Diagrams\Brick Ocean Blvd\Pedestrian Sheets\Sheet 1.dgn
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DATE: 8/12/2024
GREENMAN-PEDERSEN, INC.



COLLISION DIAGRAM DATA

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5	14:00	FRI	07-19-19	1	DRY	CLEAR	DAY
12	15:21	MON	07-26-21	1	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	1
INJURIES	2
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
	POT HOLE
	NON-FIXED OBJECT

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

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N. LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY

2018-2022 PEDESTRIAN COLLISION DIAGRAMS

GPI

Engineering
Design
Planning
Construction Management

NOT TO SCALE

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GREENMAN-PEDERSEN, INC.

MATCH LINE A
SEE SHEET NO. 1 OF 7



COLLISION DIAGRAM DATA

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2	18:04	TUE	11-06-18	1	DRY	CLEAR	DARK
9	20:47	WED	02-05-20	1	DRY	OVERCAST	DARK

LEGEND

NUMBER OF CRASHES WITH PROPERTY DAMAGE ONLY 0 INJURIES 2 FATALITIES 0 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 ENCROACHMENT LEFT TURN RIGHT ANGLE STRUCK PARKED VEHICLE	COLORS PEDESTRIAN CRASH	NEW JERSEY DEPARTMENT OF TRANSPORTATION BRICK BOULEVARD (CR 549) AND CHAMBERS BRIDGE ROAD (CR 549) FROM N. LAKESHORE AVENUE TO ROUTE 70 BRICK TOWNSHIP, OCEAN COUNTY 2018-2022 PEDESTRIAN COLLISION DIAGRAMS NOT TO SCALE
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MATCH LINE B
SEE SHEET NO. 2 OF 7



MATCH LINE C
SEE SHEET NO. 4 OF 7

LEGEND

NUMBER OF CRASHES WITH		SYMBOLS		TYPES OF CRASHES		COLORS		NEW JERSEY DEPARTMENT OF TRANSPORTATION				
PROPERTY DAMAGE ONLY	0	 MOVING VEHICLE	 BACKING VEHICLE	 REAR END	 ENCROACHMENT	 PEDESTRIAN CRASH		BRICK BOULEVARD (CR 549) AND CHAMBERS BRIDGE ROAD (CR 549) FROM N. LAKESHORE AVENUE TO ROUTE 70 BRICK TOWNSHIP, OCEAN COUNTY				
INJURIES	0	 NON-INVOLVED VEHICLE	 PEDESTRIAN	 BICYCLIST	 HEAD ON				 LEFT TURN	2018-2022 PEDESTRIAN COLLISION DIAGRAMS		
FATALITIES	0	 PROPERTY DAMAGE ONLY CRASH	 INJURY IN CRASH	 FATAL CRASH	 SIDE SWIPE				 RIGHT ANGLE		GPI Engineering Design Planning Construction Management	
TOTAL NO. OF CRASHES	0	 FIXED OBJECT	 ANIMAL	 OUT OF CONTROL	 OVERTURNED				 STRUCK PARKED VEHICLE			NOT TO SCALE
		 NON-FIXED OBJECT	 POTHOLE									

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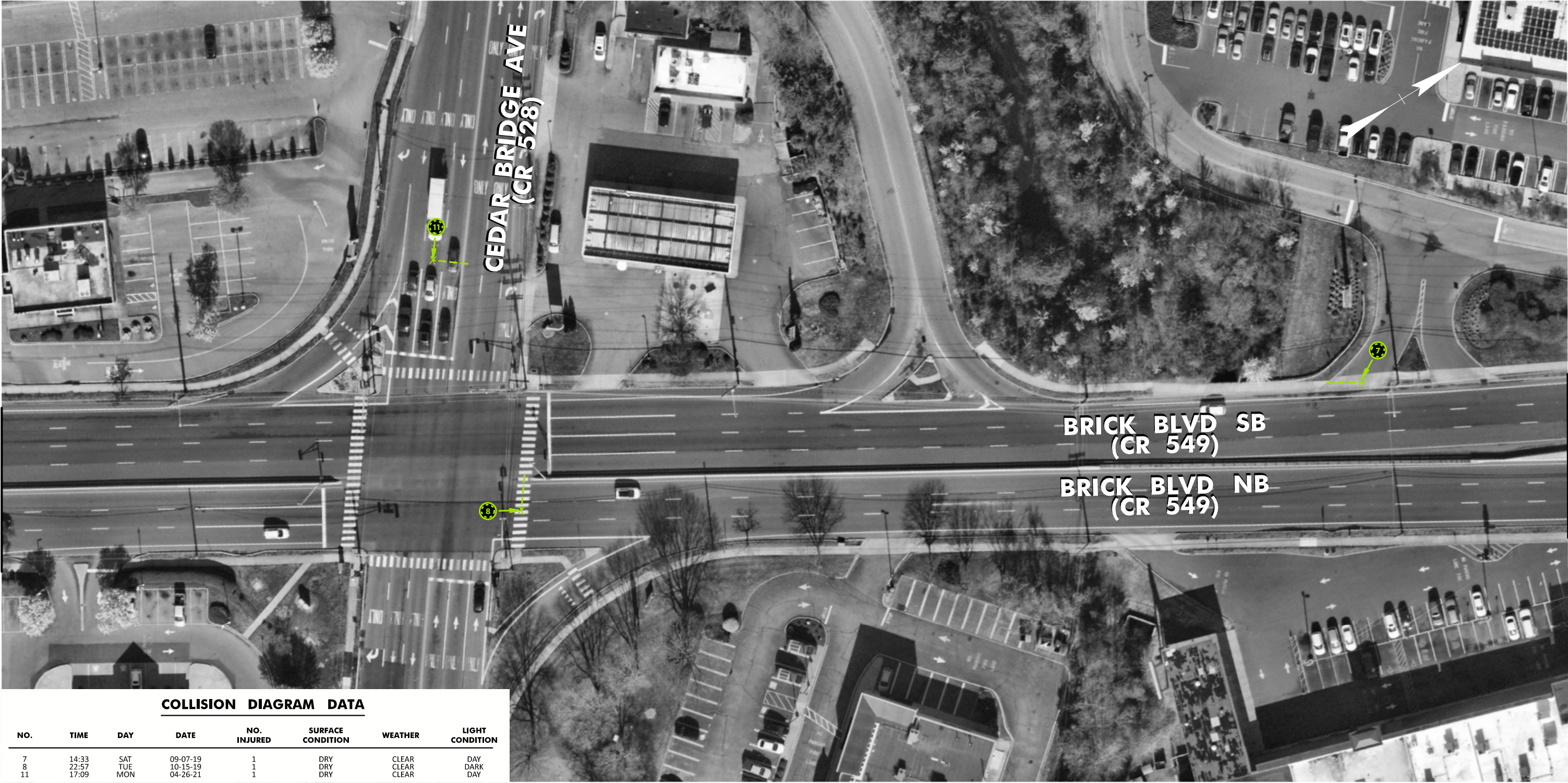
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GREENMAN-PEDERSEN, INC.

SEE SHEET NO. 3 OF 7

MATCH LINE C



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8	22:57	TUE	10-15-19	1	DRY	CLEAR	DARK
11	17:09	MON	04-26-21	1	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY

INJURIES

FATALITIES

TOTAL NO. OF CRASHES

0

3

0

3

SYMBOLS

←

MOVING VEHICLE

←→

BACKING VEHICLE

NON-INVOLVED VEHICLE

✕---

PEDESTRIAN

⊙

PROPERTY DAMAGE ONLY CRASH

⊙

INJURY IN CRASH

□

FIXED OBJECT

□

NON-FIXED OBJECT

⊙

BICYCLIST

⊙

FATAL CRASH

△

ANIMAL

⊗

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

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N.LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY

2018-2022 PEDESTRIAN COLLISION DIAGRAMS

GPI

Engineering
Design
Planning
Construction Management

NOT TO SCALE

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7

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LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY

INJURIES

FATALITIES

TOTAL NO. OF CRASHES

0

1

0

1

SYMBOLS

MOVING VEHICLE

BACKING VEHICLE

NON-INVOLVED VEHICLE

PEDESTRIAN

PROPERTY DAMAGE ONLY CRASH

INJURY IN CRASH

FIXED OBJECT

NON-FIXED OBJECT

BICYCLIST

FATAL CRASH

ANIMAL

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

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N. LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY

2018-2022 PEDESTRIAN COLLISION DIAGRAMS

GPI

Engineering
Design
Planning
Construction Management

NOT TO SCALE

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7

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SEE SHEET NO. 6 OF 7



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6	11:49	SAT	09-07-19	1	DRY	CLEAR	DAY
14	19:23	THU	12-15-22	1	WET	RAIN	DARK

LEGEND

NUMBER OF CRASHES WITH

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

SYMBOLS

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

TYPES OF CRASHES

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

COLORS

PEDESTRIAN CRASH

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N. LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY

2018-2022 PEDESTRIAN COLLISION DIAGRAMS

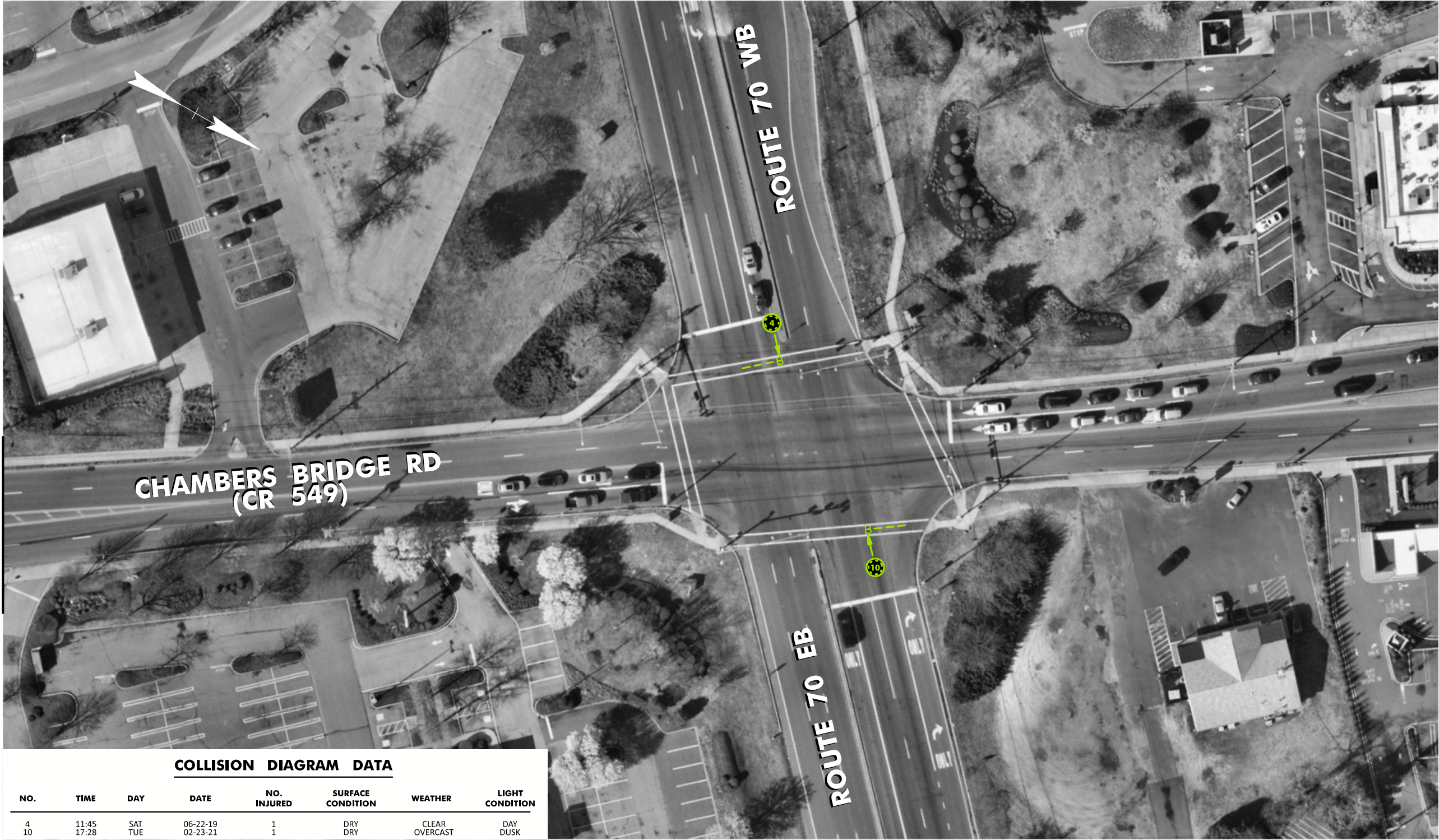
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Engineering
Design
Planning
Construction Management

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SEE SHEET NO. 6 OF 7



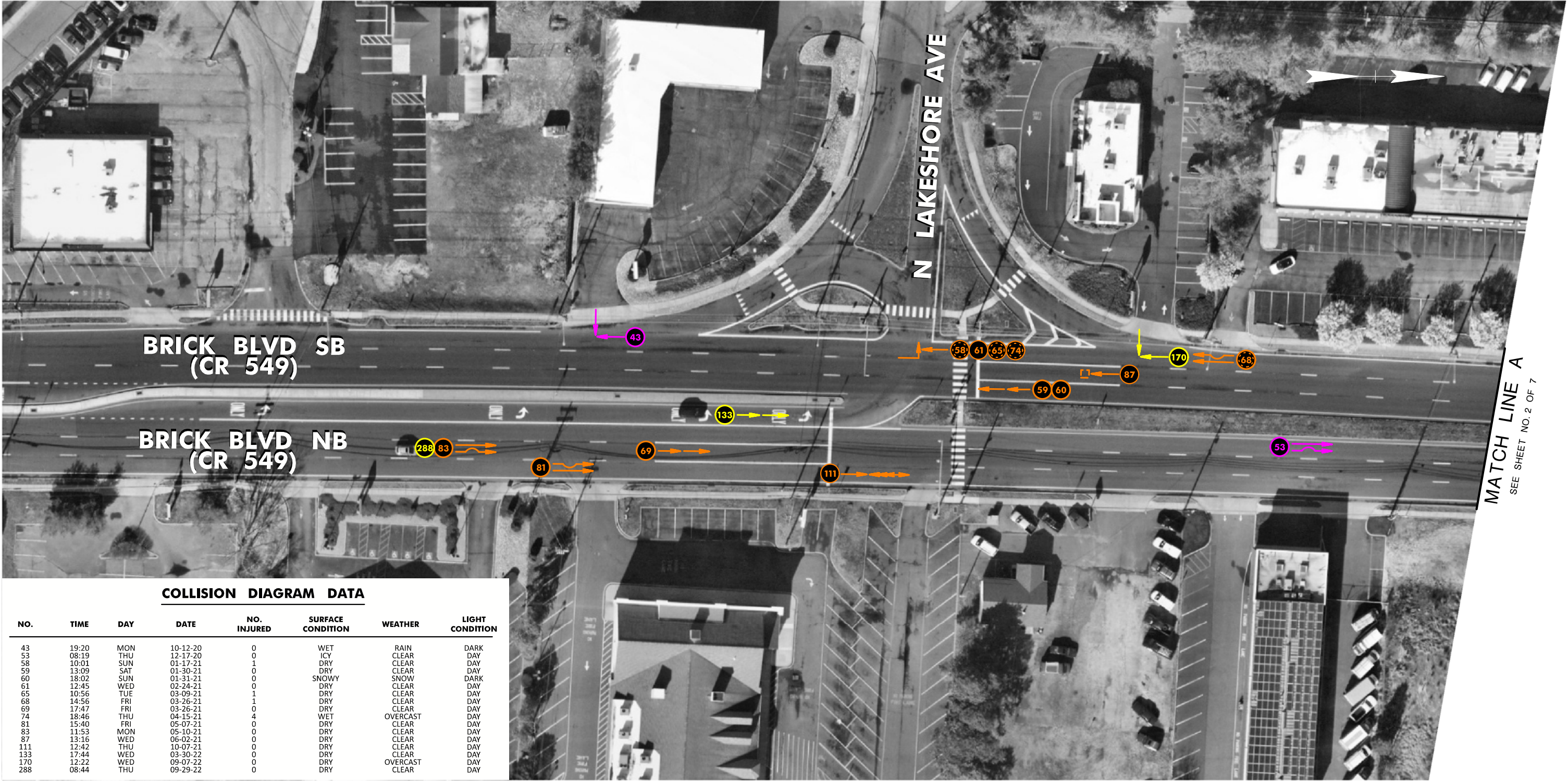
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10	17:28	TUE	02-23-21	1	DRY	OVERCAST	DUSK

LEGEND

NUMBER OF CRASHES WITH PROPERTY DAMAGE ONLY 0 INJURIES 2 FATALITIES 0 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 ↗ ENCROACHMENT → HEAD ON ↘ LEFT TURN ↔ SIDE SWIPE ↕ RIGHT ANGLE ← OUT OF CONTROL ↗ STRUCK PARKED VEHICLE ← OVERTURNED ↘	COLORS ⊙ PEDESTRIAN CRASH
NEW JERSEY DEPARTMENT OF TRANSPORTATION BRICK BOULEVARD (CR 549) AND CHAMBERS BRIDGE ROAD (CR 549) FROM N. LAKESHORE AVENUE TO ROUTE 70 BRICK TOWNSHIP, OCEAN COUNTY 2018-2022 PEDESTRIAN COLLISION DIAGRAMS	GPI Engineering Design Planning Construction Management	NOT TO SCALE	

D. VEHICULAR CRASH DIAGRAMS

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GREENMAN-PEDERSEN, INC.



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53	08:19	THU	12-17-20	0	ICY	CLEAR	DAY
58	10:01	SUN	01-17-21	1	DRY	CLEAR	DAY
59	13:09	SAT	01-30-21	0	DRY	CLEAR	DAY
60	18:02	SUN	01-31-21	0	SNOWY	SNOW	DARK
61	12:45	WED	02-24-21	0	DRY	CLEAR	DAY
65	10:56	TUE	03-09-21	1	DRY	CLEAR	DAY
68	14:56	FRI	03-26-21	1	DRY	CLEAR	DAY
69	17:47	FRI	03-26-21	0	DRY	CLEAR	DAY
74	18:46	THU	04-15-21	4	WET	OVERCAST	DAY
81	15:40	FRI	05-07-21	0	DRY	CLEAR	DAY
83	11:53	MON	05-10-21	0	DRY	CLEAR	DAY
87	13:16	WED	06-02-21	0	DRY	CLEAR	DAY
111	12:42	THU	10-07-21	0	DRY	CLEAR	DAY
133	17:44	WED	03-30-22	0	DRY	CLEAR	DAY
170	12:22	WED	09-07-22	0	DRY	OVERCAST	DAY
288	08:44	THU	09-29-22	0	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	13
INJURIES	4
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
⊠	NON-FIXED OBJECT
△	ANIMAL
⊗	POTHOLE

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

COLORS	
○	2020 CRASHES
○	2021 CRASHES
○	2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N. LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

GPI Engineering
Design
Planning
Construction Management

NOT TO SCALE

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DATE: 8/12/2024

MATCH LINE A
SEE SHEET NO. 1 OF 7



COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
99	12:33	FRI	07-23-21	0	DRY	CLEAR	DAY
104	08:53	THU	08-12-21	0	DRY	CLEAR	DAY
108	14:47	THU	09-23-21	1	DRY	CLEAR	DAY
143	02:30	SUN	05-22-22	2	DRY	CLEAR	DARK

LEGEND

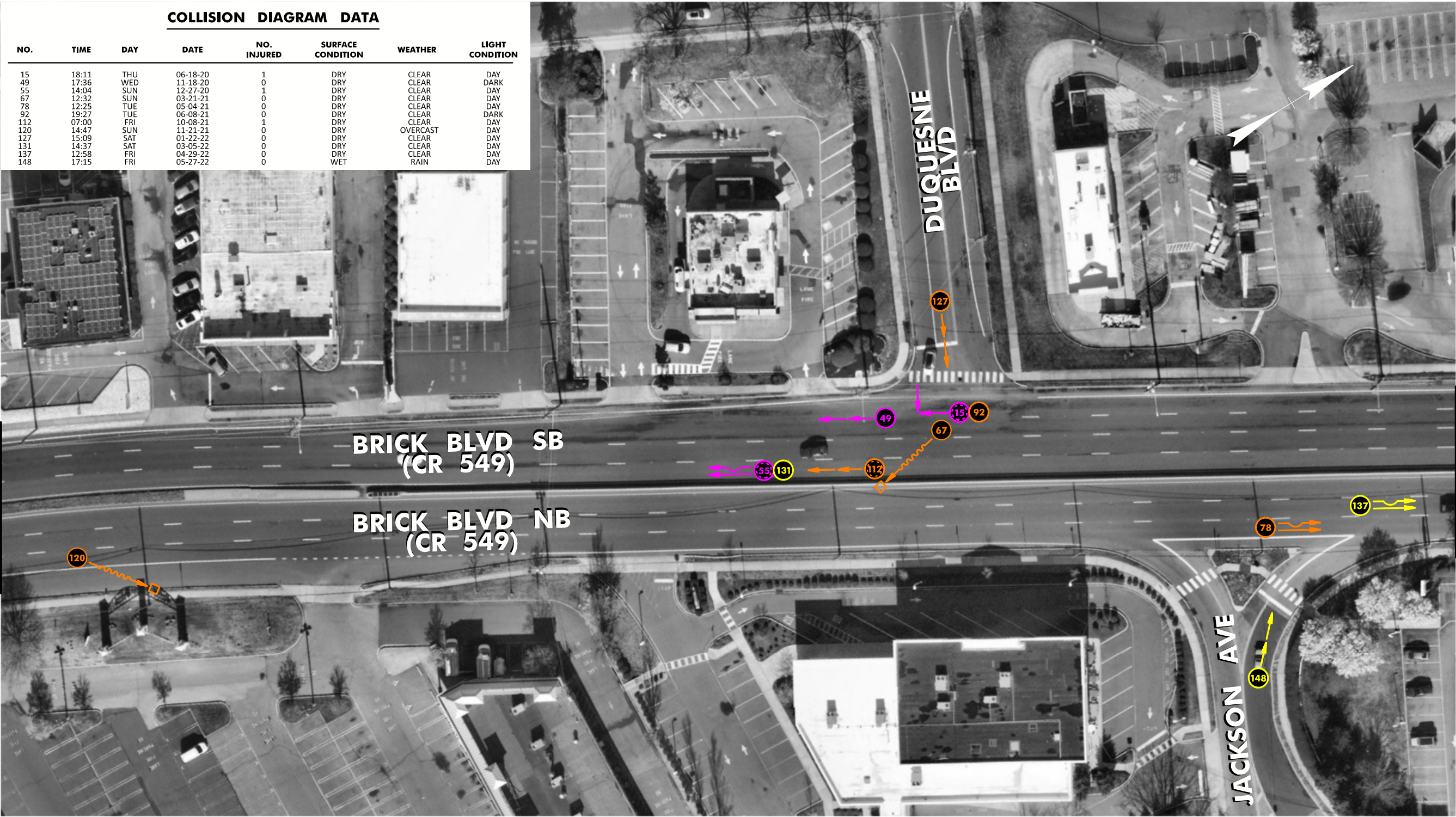
NUMBER OF CRASHES WITH PROPERTY DAMAGE ONLY <u>2</u> INJURIES <u>2</u> FATALITIES* <u>0</u> TOTAL NO. OF CRASHES <u>4</u>	SYMBOLS ← MOVING VEHICLE ←→ BACKING VEHICLE - - - NON-INVOLVED VEHICLE * - - - PEDESTRIAN - - - BICYCLIST ○ PROPERTY DAMAGE ONLY CRASH ○ INJURY IN CRASH ○ FATAL CRASH □ FIXED OBJECT △ ANIMAL □ NON-FIXED OBJECT ⊗ POTHOLE	TYPES OF CRASHES ← REAR END ← ENCROACHMENT → HEAD ON → LEFT TURN ← SIDE SWIPE → RIGHT ANGLE ← OUT OF CONTROL → STRUCK PARKED VEHICLE ← OVERTURNED →	COLORS ○ 2020 CRASHES ○ 2021 CRASHES ○ 2022 CRASHES	NEW JERSEY DEPARTMENT OF TRANSPORTATION BRICK BOULEVARD (CR 549) AND CHAMBERS BRIDGE ROAD (CR 549) FROM N. LAKESHORE AVENUE TO ROUTE 70 BRICK TOWNSHIP, OCEAN COUNTY 2020 - 2022 COLLISION DIAGRAMS GPI Engineering Design Planning Construction Management NOT TO SCALE
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GREENMAN-PEDERSEN, INC.

COLLISION DIAGRAM DATA

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49	17:36	WED	11-18-20	0	DRY	CLEAR	DARK
55	14:04	SUN	12-27-20	1	DRY	CLEAR	DAY
67	12:32	SUN	03-21-21	0	DRY	CLEAR	DAY
78	12:25	TUE	05-04-21	0	DRY	CLEAR	DAY
92	19:27	TUE	06-08-21	0	DRY	CLEAR	DARK
112	07:00	FRI	10-08-21	1	DRY	CLEAR	DAY
120	14:47	SUN	11-21-21	0	DRY	OVERCAST	DAY
127	15:09	SAT	01-22-22	0	DRY	CLEAR	DAY
131	14:37	SAT	03-05-22	0	DRY	CLEAR	DAY
137	12:58	FRI	04-29-22	0	DRY	CLEAR	DAY
148	17:15	FRI	05-27-22	0	WET	RAIN	DAY

MATCH LINE B
SEE SHEET NO. 2 OF 7



MATCH LINE C
SEE SHEET NO. 4 OF 7

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	9
INJURIES	3
FATALITIES*	0
TOTAL NO. OF CRASHES	12

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
○ 2020 CRASHES
○ 2021 CRASHES
○ 2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

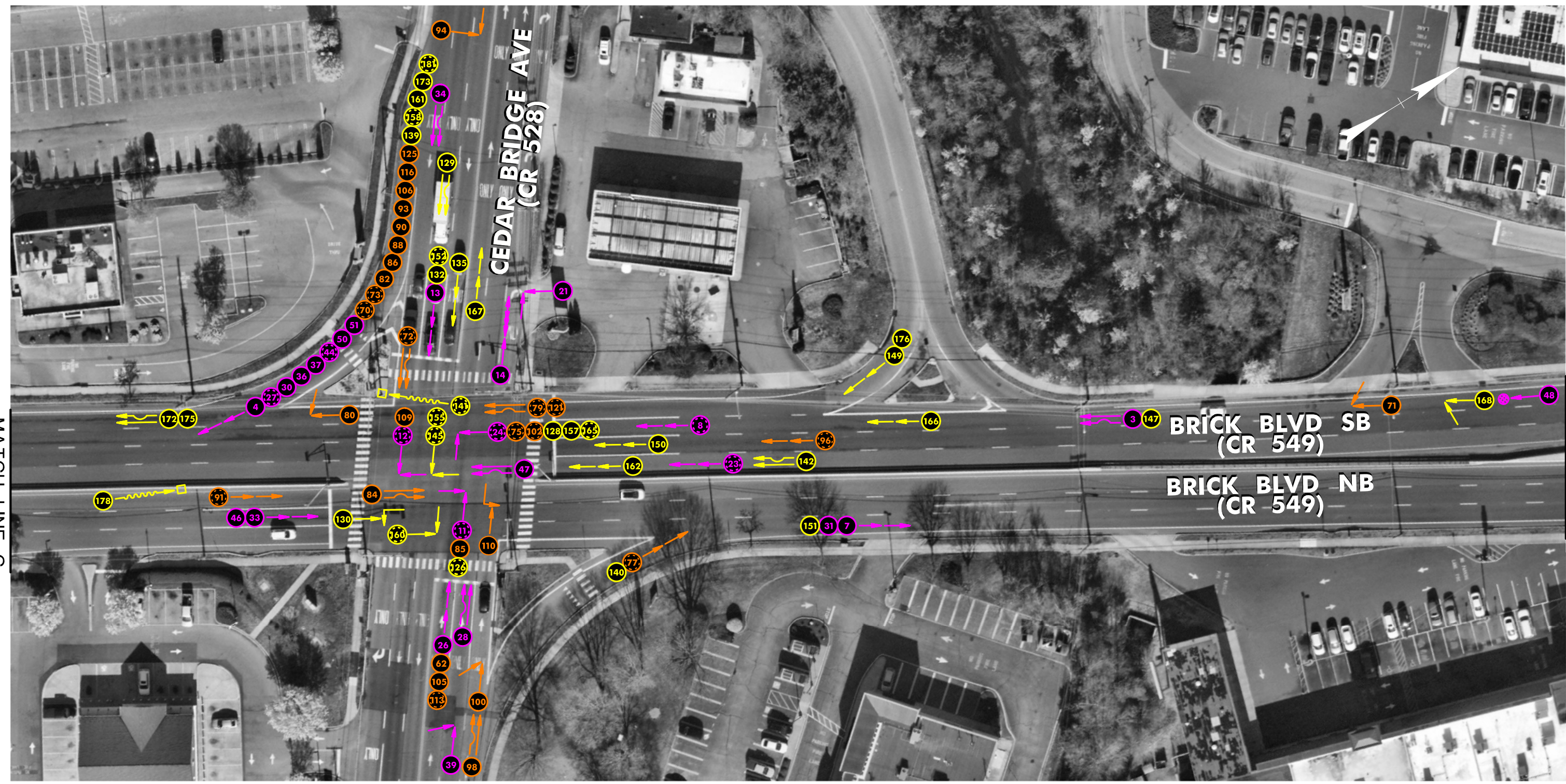
BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N. LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

GPI
Engineering
Design
Planning
Construction Management

NOT TO SCALE

FILE: \\NF-IsV\pda\2021065_HSP_Projct Development and Support\Cad\Hwy Crash Diagrams\11 - NJTPA Ocean Brick Blvd\Vehicle Streets\Sheet 4.dgn
DATE: 9/12/2024
TIME: 11:15:31 AM
GREENMAN-PEDERSEN, INC.

SEE SHEET NO. 3 OF 7
MATCH LINE C



MATCH LINE D
SEE SHEET NO. 5 OF 7

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	62
INJURIES	27
FATALITIES*	0
TOTAL NO. OF CRASHES	89

SYMBOLS	
→	MOVING VEHICLE
←	BACKING VEHICLE
---	NON-INVOLVED VEHICLE
x - - -	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	
○	2020 CRASHES
○	2021 CRASHES
○	2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION	
BRICK BOULEVARD (CR 549) AND CHAMBERS BRIDGE ROAD (CR 549) FROM N. LAKESHORE AVENUE TO ROUTE 70 BRICK TOWNSHIP, OCEAN COUNTY 2020 - 2022 COLLISION DIAGRAMS	
GPI Engineering Design Planning Construction Management	NOT TO SCALE

FILE: L:\2021res HSP Project Development and Support\Cadd\hwy\Crash Diagrams\Brick Ocean Bkvt Vehicular Streets\Sheet 4.dgn
DATE: 8/12/2024
TIME: 8:38:51 AM
GREENMAN-PEDERSEN, INC.

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
3	16:13	THU	01-23-20	0	DRY	CLEAR	DAY
4	19:44	TUE	01-28-20	0	DRY	CLEAR	DARK
7	10:22	SAT	02-15-20	0	DRY	CLEAR	DAY
8	07:46	MON	02-24-20	1	DRY	CLEAR	DAY
11	18:41	TUE	04-28-20	3	DRY	CLEAR	DAY
12	19:34	SAT	05-09-20	1	DRY	CLEAR	DUSK
13	12:46	TUE	05-19-20	0	DRY	CLEAR	DAY
14	20:03	FRI	06-05-20	0	WET	RAIN	DARK
21	08:25	TUE	07-07-20	0	DRY	CLEAR	DAY
23	16:15	FRI	07-10-20	1	WET	RAIN	DAY
24	23:20	MON	07-13-20	4	DRY	CLEAR	DARK
26	10:53	SAT	07-25-20	0	DRY	CLEAR	DAY
27	10:41	SAT	08-08-20	1	DRY	CLEAR	DAY
28	12:56	MON	08-10-20	0	DRY	CLEAR	DAY
30	22:55	TUE	08-18-20	0	DRY	CLEAR	DARK
31	10:37	SAT	08-22-20	0	DRY	CLEAR	DAY
33	09:42	WED	09-09-20	0	DRY	OVERCAST	DAY
34	14:15	WED	09-09-20	0	DRY	OVERCAST	DAY
36	14:37	WED	09-23-20	0	DRY	CLEAR	DAY
37	18:12	MON	09-28-20	0	DRY	CLEAR	DAY
39	15:42	MON	10-05-20	0	DRY	CLEAR	DAY
44	13:11	MON	10-19-20	1	DRY	CLEAR	DAY
46	13:22	SAT	10-31-20	0	DRY	CLEAR	DAY
47	23:50	SAT	10-31-20	0	DRY	CLEAR	DARK
48	23:30	TUE	11-03-20	0	DRY	CLEAR	DARK
50	14:25	SAT	11-28-20	0	DRY	CLEAR	DAY
51	09:14	FRI	12-11-20	0	DRY	CLEAR	DAY
62	17:34	WED	03-03-21	0	DRY	CLEAR	DAY
70	12:45	WED	03-31-21	1	DRY	CLEAR	DAY
71	22:19	WED	03-31-21	0	WET	RAIN	DARK
72	18:13	MON	04-05-21	1	DRY	CLEAR	DAY
73	16:06	FRI	04-09-21	1	DRY	OVERCAST	DAY
75	16:33	SUN	04-18-21	2	DRY	CLEAR	DAY
77	08:20	TUE	04-20-21	1	DRY	CLEAR	DAY
79	15:33	TUE	05-04-21	1	DRY	CLEAR	DAY
80	19:04	THU	05-06-21	0	DRY	CLEAR	DAY
82	16:42	FRI	05-07-21	0	DRY	CLEAR	DAY
84	08:00	THU	05-13-21	0	DRY	CLEAR	DAY
85	21:50	SAT	05-15-21	0	DRY	CLEAR	DARK
86	16:23	TUE	05-25-21	0	DRY	CLEAR	DAY
88	13:02	FRI	06-04-21	0	DRY	CLEAR	DAY
90	13:27	TUE	06-08-21	0	DRY	CLEAR	DAY
91	14:53	TUE	06-08-21	1	DRY	CLEAR	DAY
93	15:23	SAT	06-12-21	0	DRY	CLEAR	DAY
94	12:40	MON	06-14-21	0	DRY	CLEAR	DAY
96	15:53	SUN	07-04-21	1	DRY	CLEAR	DAY
98	10:17	SUN	07-18-21	0	DRY	CLEAR	DAY
100	07:48	THU	07-29-21	0	DRY	CLEAR	DAY
102	01:21	WED	08-04-21	1	DRY	CLEAR	DARK
105	14:54	MON	08-16-21	0	DRY	CLEAR	DAY
106	13:14	FRI	08-20-21	0	WET	CLEAR	DAY
109	08:54	WED	10-06-21	0	DRY	OVERCAST	DAY
110	22:15	WED	10-06-21	0	DRY	CLEAR	DARK
113	09:12	THU	10-14-21	1	DRY	CLEAR	DAY
116	17:20	MON	11-01-21	0	DRY	CLEAR	DAY
121	17:54	SUN	11-21-21	1	DRY	CLEAR	DARK
125	14:56	TUE	12-28-21	0	DRY	CLEAR	DAY
126	06:37	WED	01-19-22	2	DRY	CLEAR	DARK
128	21:56	WED	01-26-22	0	DRY	CLEAR	DARK
129	09:43	SAT	01-29-22	0	SNOWY	SNOW	DAY
130	17:12	MON	01-31-22	0	WET	CLEAR	DAY
132	16:08	MON	03-07-22	0	DRY	CLEAR	DAY
135	08:21	SAT	04-09-22	0	WET	CLEAR	DAY
139	15:43	SUN	05-15-22	0	DRY	CLEAR	DAY
140	07:33	WED	05-18-22	0	DRY	CLEAR	DAY
141	03:13	FRI	05-20-22	1	DRY	CLEAR	DARK
142	17:19	FRI	05-20-22	0	WET	RAIN	DUSK
145	13:23	TUE	05-24-22	2	DRY	CLEAR	DAY
147	10:23	THU	05-26-22	0	DRY	CLEAR	DAY
149	12:38	SAT	05-28-22	0	DRY	CLEAR	DAY
150	16:35	TUE	06-07-22	0	DRY	CLEAR	DAY
151	16:57	WED	06-08-22	0	DRY	CLEAR	DAY
152	20:31	SAT	06-11-22	1	DRY	CLEAR	DARK
155	09:05	MON	06-20-22	2	DRY	CLEAR	DAY
157	22:09	THU	06-30-22	0	DRY	CLEAR	DARK
158	12:13	THU	07-07-22	1	DRY	CLEAR	DAY
160	10:14	TUE	07-19-22	1	DRY	CLEAR	DAY
161	17:08	TUE	07-19-22	0	DRY	CLEAR	DAY
162	17:36	TUE	07-26-22	0	DRY	CLEAR	DAWN
165	15:56	SUN	08-21-22	1	DRY	CLEAR	DAY
166	18:21	WED	08-24-22	0	DRY	CLEAR	DAY
167	08:43	FRI	08-26-22	0	DRY	CLEAR	DAY
168	17:34	FRI	08-26-22	0	DRY	CLEAR	DAY
172	16:09	SAT	09-24-22	0	DRY	CLEAR	DAY
173	14:59	TUE	09-27-22	0	DRY	CLEAR	DAY
175	16:17	TUE	11-01-22	0	DRY	CLEAR	DAY
176	16:43	TUE	11-15-22	0	DRY	CLEAR	DARK
178	07:11	SUN	11-20-22	0	DRY	CLEAR	DAY
181	17:53	SUN	12-18-22	1	DRY	CLEAR	DARK

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	62
INJURIES	27
FATALITIES*	0
TOTAL NO. OF CRASHES	89

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	
	2020 CRASHES
	2021 CRASHES
	2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N.LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

GPI Engineering
Design
Planning
Construction Management

NOT TO SCALE

FILE: \\NF-ISA\pda\2021685 -HSIP - Project Development and Support\Cad\Hwy\Crash Diagrams\11 - NJTPA - Ocean - Brick Blvd\Vehicle Streets\Sheet 5.dgn
DATE: 9/12/2024
TIME: 11:25:39 AM
GREENMAN-PEDERSEN, INC.

MATCH LINE D
SEE SHEET NO. 4 OF 7

COLLISION DIAGRAM DATA							
NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
1	12:45	THU	01-09-20	0	DRY	CLEAR	DAY
2	20:18	SAT	01-11-20	0	DRY	CLEAR	DARK
9	17:07	SUN	03-08-20	0	DRY	CLEAR	DAY
17	12:20	WED	07-01-20	0	DRY	CLEAR	DAY
19	14:28	THU	07-02-20	0	DRY	CLEAR	DAY
22	13:35	THU	07-09-20	0	DRY	CLEAR	DAY
25	20:52	WED	07-22-20	1	WET	RAIN	DARK
29	10:11	SAT	08-15-20	0	DRY	CLEAR	DAY
32	17:59	TUE	09-01-20	0	DRY	CLEAR	DAY
35	17:24	SUN	09-13-20	0	DRY	CLEAR	DAY
38	12:14	SAT	10-03-20	1	DRY	CLEAR	DAY
40	16:38	TUE	10-06-20	0	DRY	CLEAR	DAY
41	16:41	WED	10-07-20	0	DRY	OVERCAST	DAY
42	10:52	THU	10-08-20	1	DRY	CLEAR	DAY
52	17:56	SUN	12-13-20	0	DRY	CLEAR	DARK
54	12:39	SAT	12-26-20	0	DRY	CLEAR	DAY
56	15:02	TUE	12-29-20	0	DRY	CLEAR	DAY
57	13:14	MON	01-11-21	0	DRY	CLEAR	DAY
63	17:47	WED	03-03-21	0	DRY	CLEAR	DAY
66	11:53	THU	03-18-21	0	WET	RAIN	DAY
76	19:09	MON	04-19-21	1	DRY	CLEAR	DUSK
97	21:02	WED	07-07-21	0	DRY	CLEAR	DARK
101	14:53	FRI	07-30-21	0	DRY	CLEAR	DAY
103	16:18	TUE	08-10-21	1	DRY	CLEAR	DAY
107	11:52	FRI	08-27-21	0	DRY	CLEAR	DAY
114	12:43	SAT	10-30-21	0	DRY	CLEAR	DAY
115	20:00	SUN	10-31-21	0	DRY	CLEAR	DARK
117	08:43	SAT	11-06-21	0	DRY	CLEAR	DAY
118	18:54	MON	11-08-21	0	DRY	CLEAR	DARK
122	10:18	MON	11-22-21	0	WET	OVERCAST	DAY
123	18:22	FRI	11-26-21	2	DRY	CLEAR	DARK
124	12:58	THU	12-23-21	0	DRY	CLEAR	DAY

COLLISION DIAGRAM DATA (continued)							
NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
134	17:50	WED	04-06-22	0	DRY	CLEAR	DAY
136	14:53	MON	04-11-22	0	DRY	CLEAR	DAY
138	17:59	FRI	05-06-22	0	WET	RAIN	DAY
144	10:16	MON	05-23-22	0	DRY	CLEAR	DAY
146	16:44	TUE	05-24-22	0	DRY	CLEAR	DAY
153	13:10	FRI	06-17-22	0	DRY	CLEAR	DAY
154	15:58	SUN	06-19-22	0	DRY	CLEAR	DAY
156	10:37	MON	06-20-22	0	DRY	CLEAR	DAY
159	16:59	THU	07-14-22	1	DRY	CLEAR	DAY
163	14:17	WED	07-27-22	0	DRY	CLEAR	DAY
164	14:04	SUN	08-07-22	3	DRY	CLEAR	DAY
169	17:23	TUE	08-30-22	1	DRY	CLEAR	DAY
171	18:11	WED	09-07-22	0	DRY	CLEAR	DAY
174	14:28	MON	10-03-22	0	WET	RAIN	DAY
177	11:56	FRI	11-18-22	1	DRY	CLEAR	DAY
179	21:12	WED	12-14-22	1	DRY	CLEAR	DARK
180	17:01	FRI	12-16-22	0	WET	OVERCAST	DARK
182	08:03	TUE	12-20-22	1	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	38
INJURIES	12
FATALITIES*	0
TOTAL NO. OF CRASHES	50

SYMBOLS	
→	MOVING VEHICLE
↔	BACKING VEHICLE
- - -	NON-INVOLVED VEHICLE
* - - -	PEDESTRIAN
⊙	PROPERTY DAMAGE ONLY CRASH
⊙*	INJURY IN CRASH
⊠	FIXED OBJECT
⊡	NON-FIXED OBJECT
⊙	FATAL CRASH
△	ANIMAL
⊗	POTHOLE

TYPES OF CRASHES	
→ →	REAR END
→ →	HEAD ON
→ ↘	SIDE SWIPE
→ ~	OUT OF CONTROL
→ ∞	OVERTURNED
→ →	ENCROACHMENT
→ ↘	LEFT TURN
→ ↗	RIGHT ANGLE
→ ⊥	STRUCK PARKED VEHICLE

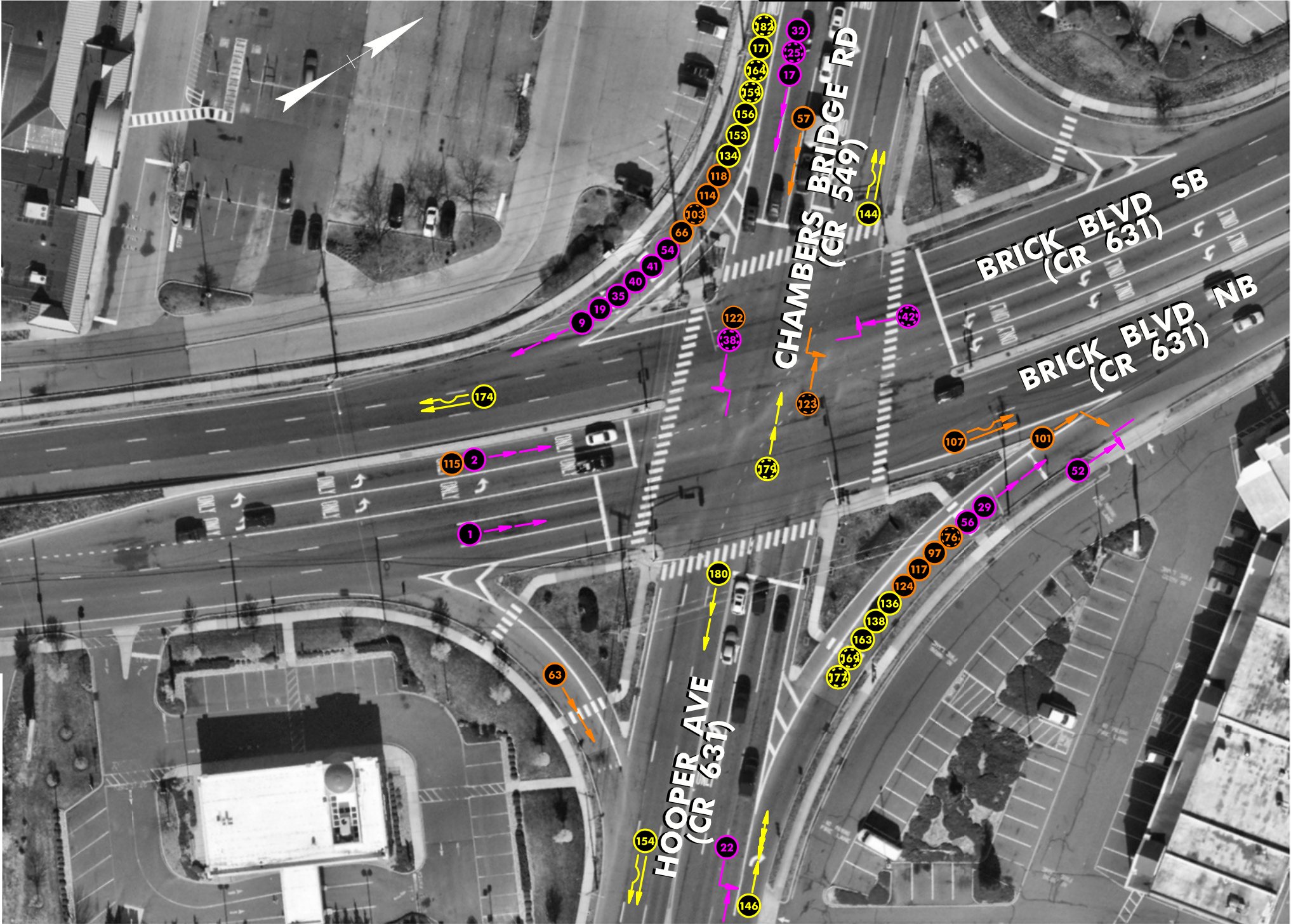
COLORS	
⊙	2020 CRASHES
⊙	2021 CRASHES
⊙	2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N.LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

GPI
Engineering
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Construction Management

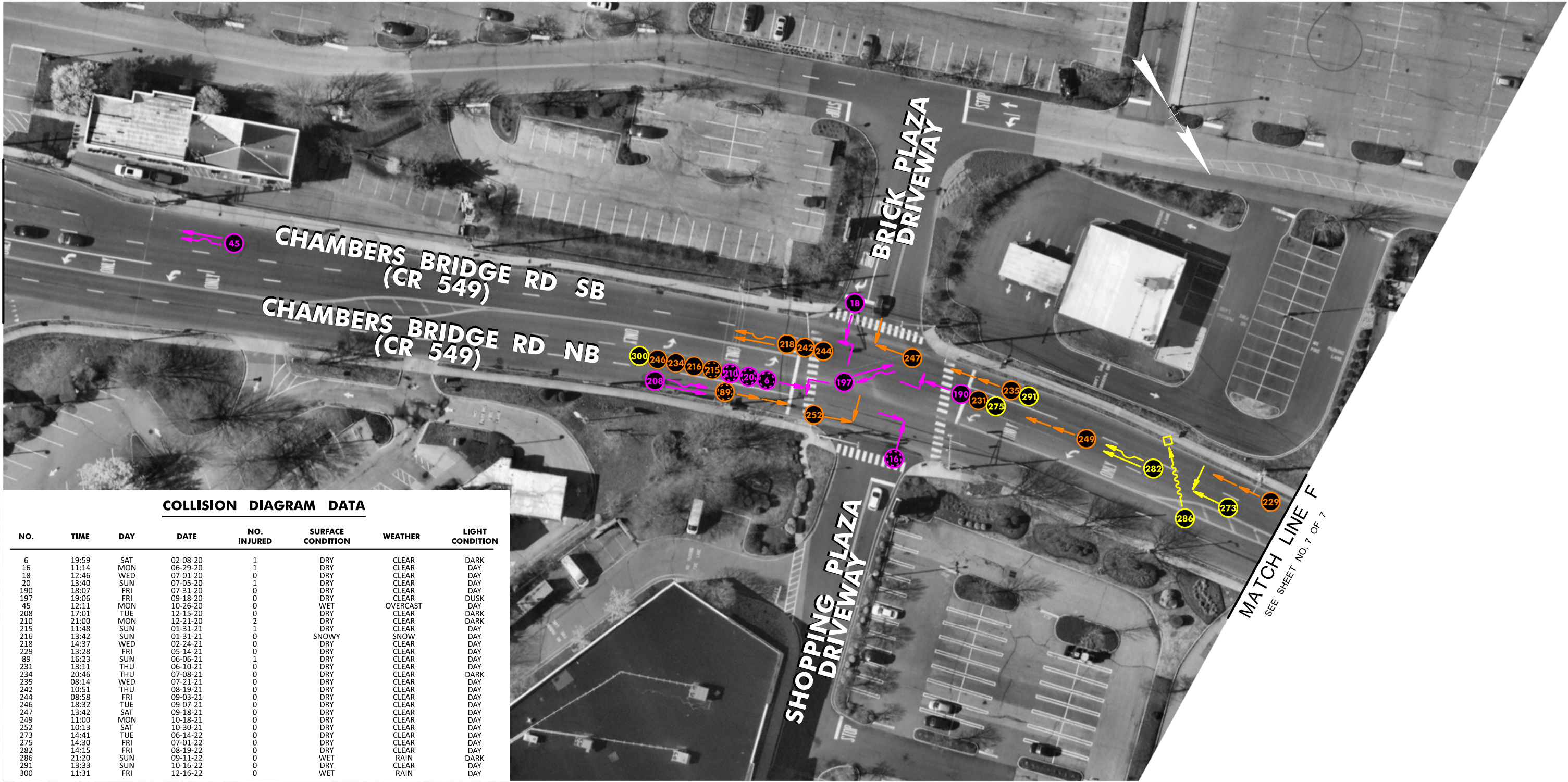
NOT TO SCALE



MATCH LINE E
SEE SHEET NO. 6 OF 7

FILE: \\NF-IsV\pda\2021685 HSIP - NJTPA - Ocean Blvd\Vehicle Streets\Sheet 6.dgn DATE: 9/16/2024 TIME: 11:25:47 AM

MATCH LINE E
SEE SHEET NO. 5 OF 7



COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
6	19:59	SAT	02-08-20	1	DRY	CLEAR	DARK
16	11:14	MON	06-29-20	1	DRY	CLEAR	DAY
18	12:46	WED	07-01-20	0	DRY	CLEAR	DAY
20	13:40	SUN	07-05-20	1	DRY	CLEAR	DAY
190	18:07	FRI	07-31-20	0	DRY	CLEAR	DAY
197	19:06	FRI	09-18-20	0	DRY	CLEAR	DUSK
45	12:11	MON	10-26-20	0	WET	OVERCAST	DAY
208	17:01	TUE	12-15-20	0	DRY	CLEAR	DARK
210	21:00	MON	12-21-20	2	DRY	CLEAR	DARK
215	11:48	SUN	01-31-21	1	DRY	CLEAR	DAY
216	13:42	SUN	01-31-21	0	SNOWY	SNOW	DAY
218	14:37	WED	02-24-21	0	DRY	CLEAR	DAY
229	13:28	FRI	05-14-21	0	DRY	CLEAR	DAY
89	16:23	SUN	06-06-21	1	DRY	CLEAR	DAY
231	13:11	THU	06-10-21	0	DRY	CLEAR	DAY
234	20:46	THU	07-08-21	0	DRY	CLEAR	DARK
235	08:14	WED	07-21-21	0	DRY	CLEAR	DAY
242	10:51	THU	08-19-21	0	DRY	CLEAR	DAY
244	08:58	FRI	09-03-21	0	DRY	CLEAR	DAY
246	18:32	TUE	09-07-21	0	DRY	CLEAR	DAY
247	13:42	SAT	09-18-21	0	DRY	CLEAR	DAY
249	11:00	MON	10-18-21	0	DRY	CLEAR	DAY
252	10:13	SAT	10-30-21	0	DRY	CLEAR	DAY
273	14:41	TUE	06-14-22	0	DRY	CLEAR	DAY
275	14:30	FRI	07-01-22	0	DRY	CLEAR	DAY
282	14:15	FRI	08-19-22	0	DRY	CLEAR	DAY
286	21:20	SUN	09-11-22	0	WET	RAIN	DARK
291	13:33	SUN	10-16-22	0	DRY	CLEAR	DAY
300	11:31	FRI	12-16-22	0	WET	RAIN	DAY

LEGEND

NUMBER OF CRASHES WITH

PROPERTY DAMAGE ONLY23

INJURIES6

FATALITIES*0

TOTAL NO. OF CRASHES29

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

POTHOLE

TYPES OF CRASHES

REAR END

HEAD ON

SIDE SWIPE

OUT OF CONTROL

OVERTURNED

ENCROACHMENT

LEFT TURN

RIGHT ANGLE

STRUCK PARKED VEHICLE

COLORS

2020 CRASHES

2021 CRASHES

2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N.LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

GPI

Engineering
Design
Planning
Construction Management

NOT TO SCALE



LEGEND

NUMBER OF CRASHES WITH	
PROPERTY DAMAGE ONLY	76
INJURIES	18
FATALITIES*	0
TOTAL NO. OF CRASHES	94

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



STRUCK PARKED VEHICLE



OVERTURNED

COLORS

2020 CRASHES

2021 CRASHES

2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N. LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

GPI | Engineering
Design
Planning
Construction Management

NOT TO SCALE

FILE: L:\2021res HSP Project Development and Support\Cadd\Hwy\Crash Diagrams\Brick Ocean Bkvt Vehicular Streets\Sheet 7.dgn
TIME: 9:29:40 AM
DATE: 8/12/2024
GREENMAN-PEDERSEN, INC.

COLLISION DIAGRAM DATA

NO.	TIME	DAY	DATE	NO. INJURED	SURFACE CONDITION	WEATHER	LIGHT CONDITION
183	19:46	FRI	03-06-20	0	WET	RAIN	DARK
184	12:14	SUN	03-08-20	0	DRY	CLEAR	DAY
185	07:51	THU	03-12-20	0	DRY	OVERCAST	DAY
186	08:01	THU	03-12-20	0	DRY	CLEAR	DAY
187	10:38	THU	03-26-20	0	DRY	CLEAR	DAY
188	17:22	TUE	04-07-20	1	DRY	CLEAR	DAY
189	17:00	TUE	07-21-20	1	DRY	CLEAR	DAY
191	10:02	MON	08-17-20	1	DRY	CLEAR	DAY
192	15:13	THU	08-20-20	0	DRY	CLEAR	DAY
193	21:18	FRI	08-21-20	0	DRY	CLEAR	DARK
194	15:37	SUN	08-23-20	0	WET	OVERCAST	DAY
195	16:41	WED	09-16-20	0	DRY	CLEAR	DAY
196	15:07	FRI	09-18-20	0	DRY	CLEAR	DAY
198	10:33	SAT	10-03-20	0	DRY	CLEAR	DAY
199	16:11	FRI	10-16-20	1	WET	RAIN	DAY
200	13:56	WED	10-21-20	0	DRY	CLEAR	DAY
201	12:33	SUN	11-08-20	0	DRY	CLEAR	DAY
202	18:58	MON	11-16-20	2	DRY	CLEAR	DARK
203	10:41	FRI	11-27-20	0	DRY	CLEAR	DAY
204	08:52	SAT	11-28-20	0	DRY	CLEAR	DAY
205	10:55	WED	12-02-20	3	DRY	CLEAR	DAY
206	08:19	MON	12-07-20	0	DRY	CLEAR	DAY
207	12:58	FRI	12-11-20	0	DRY	CLEAR	DAY
209	11:27	WED	12-16-20	0	DRY	OVERCAST	DAY
211	19:00	WED	01-06-21	0	DRY	CLEAR	DARK
212	12:50	SAT	01-23-21	0	DRY	CLEAR	DAY
213	13:53	THU	01-28-21	1	DRY	CLEAR	DAY
214	17:53	FRI	01-29-21	0	DRY	CLEAR	DARK
217	10:20	TUE	02-09-21	0	WET	RAIN	DAY
219	16:24	SUN	03-07-21	0	DRY	CLEAR	DAY
220	12:06	SUN	03-14-21	0	DRY	CLEAR	DAY
222	10:13	FRI	03-19-21	0	DRY	CLEAR	DAY
223	15:54	TUE	04-06-21	0	DRY	CLEAR	DAY
224	09:26	SAT	04-10-21	1	DRY	OVERCAST	DAY
225	14:47	TUE	04-20-21	0	DRY	CLEAR	DAY
226	11:21	SUN	04-25-21	0	WET	RAIN	DAY
227	11:27	WED	05-05-21	0	WET	RAIN	DAY
228	10:31	TUE	05-11-21	0	DRY	CLEAR	DAY
230	16:46	WED	05-26-21	0	DRY	CLEAR	DAY
232	11:16	SAT	06-19-21	0	DRY	CLEAR	DAY
233	09:08	MON	06-21-21	0	DRY	CLEAR	DAY
236	04:04	MON	07-26-21	0	DRY	CLEAR	DARK
237	13:09	MON	07-26-21	0	DRY	CLEAR	DAY
238	21:12	MON	07-26-21	0	DRY	CLEAR	DARK
239	12:49	SUN	08-01-21	2	DRY	OVERCAST	DAY
240	16:53	THU	08-05-21	1	DRY	CLEAR	DAY
241	20:39	TUE	08-10-21	0	DRY	CLEAR	DARK
243	23:51	THU	08-19-21	2	DRY	CLEAR	DARK
245	17:43	TUE	09-07-21	0	DRY	CLEAR	DAY
248	17:26	THU	09-23-21	0	WET	RAIN	DARK
250	19:24	MON	10-18-21	0	DRY	CLEAR	DARK
251	13:44	TUE	10-19-21	0	DRY	CLEAR	DAY
253	07:00	MON	11-08-21	1	DRY	CLEAR	DAY
254	10:21	SAT	11-13-21	0	DRY	CLEAR	DAY
255	21:42	MON	11-22-21	0	DRY	CLEAR	DARK
256	11:12	SUN	12-05-21	0	DRY	CLEAR	DAY
257	13:05	SAT	12-11-21	0	DRY	CLEAR	DAY
258	10:59	MON	12-27-21	0	DRY	CLEAR	DAY
259	13:41	THU	01-06-22	0	DRY	CLEAR	DAY
260	09:55	FRI	01-28-22	1	DRY	OVERCAST	DAY
261	16:57	THU	02-17-22	0	DRY	CLEAR	DAY
262	19:40	SAT	02-19-22	0	DRY	CLEAR	DARK
263	20:04	MON	03-07-22	0	DRY	CLEAR	DARK
264	17:30	THU	03-10-22	0	DRY	CLEAR	DUSK
266	13:37	TUE	04-26-22	0	DRY	CLEAR	DAY
267	12:47	WED	04-27-22	0	DRY	CLEAR	DAY
268	16:16	MON	05-02-22	0	DRY	CLEAR	DAY
269	12:58	SUN	05-08-22	0	DRY	CLEAR	DAY
270	20:19	THU	05-12-22	0	DRY	FOG/SMOG/SMOKE	DARK
271	20:40	FRI	05-13-22	1	WET	FOG/SMOG/SMOKE	DARK
272	02:27	SAT	05-21-22	0	DRY	CLEAR	DARK
274	13:04	MON	06-27-22	0	DRY	OVERCAST	DAY
276	19:43	SAT	07-02-22	2	DRY	CLEAR	DUSK
277	13:17	TUE	07-12-22	0	DRY	CLEAR	DAY
278	15:27	THU	07-14-22	0	DRY	CLEAR	DAY
280	14:02	THU	07-28-22	0	DRY	CLEAR	DAY
281	07:05	SUN	08-07-22	0	DRY	CLEAR	DAY
283	09:58	MON	08-22-22	0	WET	RAIN	DAY
284	13:11	THU	08-25-22	0	DRY	CLEAR	DAY
285	09:21	FRI	09-02-22	1	DRY	CLEAR	DAY
287	15:52	MON	09-19-22	1	DRY	CLEAR	DAY
289	18:11	SAT	10-01-22	0	WET	RAIN	DUSK
290	11:07	SUN	10-16-22	1	DRY	CLEAR	DAY
292	17:55	WED	10-19-22	0	DRY	CLEAR	DUSK
293	12:46	THU	10-20-22	0	DRY	CLEAR	DAY
294	20:46	MON	10-31-22	0	WET	RAIN	DARK
295	17:33	SUN	11-06-22	0	DRY	CLEAR	DARK
296	11:10	SUN	11-20-22	0	DRY	CLEAR	DAY
297	18:55	SAT	12-03-22	2	WET	RAIN	DARK
298	10:19	TUE	12-13-22	0	DRY	CLEAR	DAY
299	06:46	WED	12-14-22	0	DRY	CLEAR	DAWN
301	12:49	SUN	12-18-22	0	DRY	CLEAR	DAY
302	15:07	FRI	12-23-22	0	WET	RAIN	DAY
303	16:45	TUE	12-27-22	0	DRY	CLEAR	DAY

LEGEND

NUMBER OF CRASHES WITH

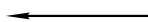
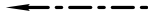
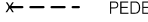
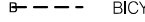
PROPERTY DAMAGE ONLY 76

INJURIES 18

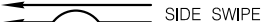
FATALITIES* 0

TOTAL NO. OF CRASHES 94

SYMBOLS

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

TYPES OF CRASHES

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

COLORS

-  2020 CRASHES
-  2021 CRASHES
-  2022 CRASHES

NEW JERSEY DEPARTMENT OF TRANSPORTATION

BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)
FROM N.LAKESHORE AVENUE TO ROUTE 70
BRICK TOWNSHIP, OCEAN COUNTY
2020 - 2022 COLLISION DIAGRAMS

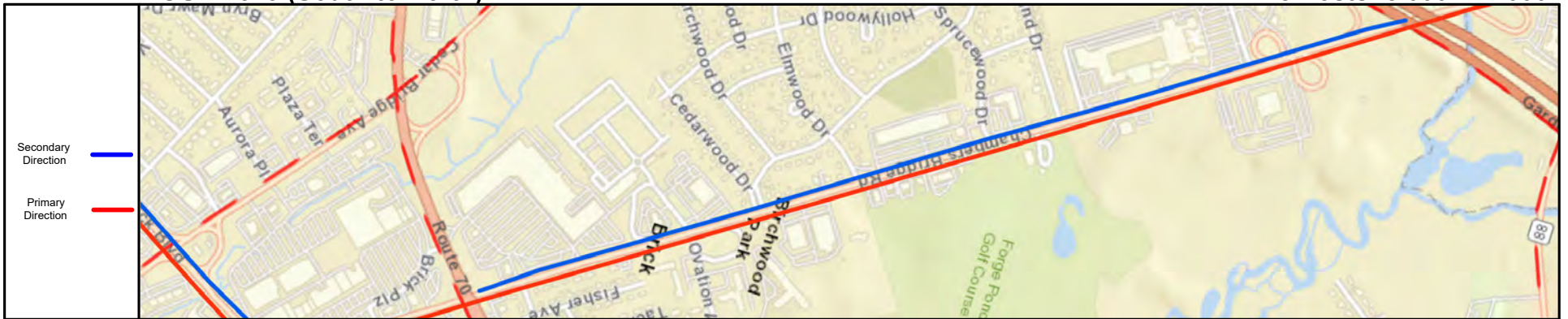
GPI Engineering
Design
Planning
Construction Management

NOT TO SCALE

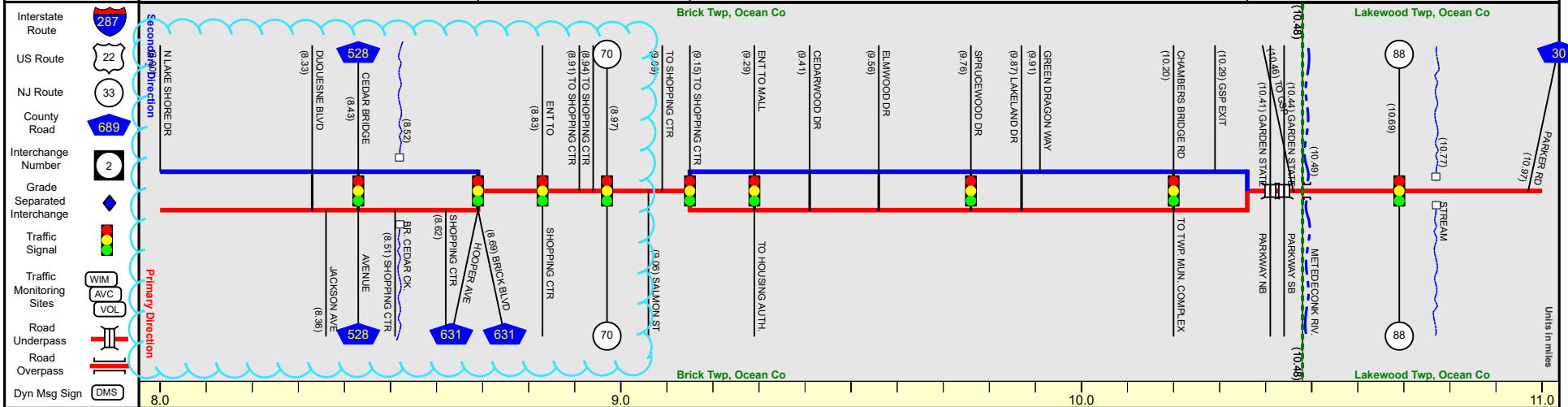
E. TRAFFIC DATA STRAIGHT LINE DIAGRAMS

ROUTE 549 (South to North)

Mile Posts: 8.000 - 11.000



Pavement	30	36	28	8
Shoulder	2		6	
Number of Lanes	2	3	2	
Speed Limit	40	35	40	
Street Name	Brick Boulevard		Chambers Bridge Road	



Street Name	Brick Boulevard		Chambers Bridge Road	
Jurisdiction	County			
Functional Class	Urban Principal Arterial			
Federal Aid - NHS Sy	NHS			
Control Section				
Speed Limit	40	35	40	
Number of Lanes	3	4	2	4
Med. Type	Curbed	Positive	Curbed	Positive
Med. Width	VAR	4	VAR	4
Pavement	36	60	28	48
Shoulder			6	8
Traffic Volume	29,537 (2019)		21,064 (2017)	
Traffic Sta. ID	91518		6-4,462	
Structure No.			360911S 360911N 1506003	
Enlarged Views				

SRI = 00000549__

Date last inventoried: October 2012



New Jersey DOT

Most Recent 48 Hour Count for Year for 1/1/2020 - 12/31/2020
Criteria: Type = I-SECTION, Is Perm Station = 0, From 1/1/2020 To 12/31/2020

Location ID: 6-4-456

County: Ocean

Location: BRICK BLVD BET N LAKE SHORE DR DUQUESNE BLVD

Tuesday, August 4, 2020

Time	NB Hourly	SB Hourly	2-WAY Hourly
0:00-1:00	75	195	270
1:00-2:00	41	82	123
2:00-3:00	40	62	102
3:00-4:00	39	36	75
4:00-5:00	86	69	155
5:00-6:00	259	101	360
6:00-7:00	556	312	868
7:00-8:00	1,014	632	1,646
8:00-9:00	1,080	838	1,918
9:00-10:00	1,088	1,017	2,105
10:00-11:00	1,144	1,136	2,280
11:00-12:00	1,221	1,351	2,572
12:00-13:00	754	1,246	2,000
13:00-14:00	689	1,369	2,058
14:00-15:00	849	1,442	2,291
15:00-16:00	827	1,711	2,538
16:00-17:00	886	1,827	2,713
17:00-18:00	1,022	1,905	2,927
18:00-19:00	976	1,664	2,640
19:00-20:00	829	1,398	2,227
20:00-21:00	724	1,268	1,992
21:00-22:00	470	942	1,412
22:00-23:00	291	538	829
23:00-24:00	169	357	526

Count Total	15,129	21,498	36,627
AM Peak	07:30-08:30 1,122	08:00-09:00 838	08:00-09:00 1,918
Mid Peak	11:00-12:00 1,221	13:45-14:45 1,451	11:00-12:00 2,572
PM Peak	17:00-18:00 1,022	16:30-17:30 1,920	17:00-18:00 2,927

Wednesday, August 5, 2020

Time	NB Hourly	SB Hourly	2-WAY Hourly
0:00-1:00	65	171	236
1:00-2:00	41	83	124
2:00-3:00	34	42	76
3:00-4:00	38	34	72
4:00-5:00	76	74	150
5:00-6:00	223	147	370
6:00-7:00	513	263	776
7:00-8:00	959	624	1,583
8:00-9:00	1,097	828	1,925
9:00-10:00	951	989	1,940
10:00-11:00	1,017	1,032	2,049
11:00-12:00	1,118	1,187	2,305
12:00-13:00	1,211	1,432	2,643
13:00-14:00	1,251	1,470	2,721
14:00-15:00	1,225	1,528	2,753
15:00-16:00	1,164	1,524	2,688
16:00-17:00	1,117	1,574	2,691
17:00-18:00	1,079	1,570	2,649
18:00-19:00	920	1,281	2,201
19:00-20:00	768	1,236	2,004
20:00-21:00	637	1,231	1,868
21:00-22:00	419	793	1,212
22:00-23:00	273	527	800
23:00-24:00	171	339	510

Count Total	16,367	19,979	36,346
AM Peak	07:30-08:30 1,134	08:00-09:00 828	08:00-09:00 1,925
Mid Peak	12:45-13:45 1,252	13:45-14:45 1,574	13:45-14:45 2,796
PM Peak	15:15-16:15 1,170	16:30-17:30 1,595	15:15-16:15 2,743

Station AADT * 28,136

* The AADT Estimate is based on factors in use on the date the report was generated

Peak Hour Starts Between		
Period	Begin	End
AM	6:00	9:00
MID	9:15	14:45
PM	15:00	18:00

F. PHOTOGRAPHS

Congestion on Brick Boulevard SB is due to the decrease from 3 lanes to 2 lanes



No signage directing traffic for the U-turn onto Brick Boulevard SB



Driveway is directly off the ramp to Lakeshore Ave



Sidewalk not ADA compliant and not up to size standards



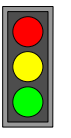
Pedestrian crossing adjacent to the crosswalk



No lighting on the traffic signal equipment only on the utility poles on the SB side of Brick Boulevard



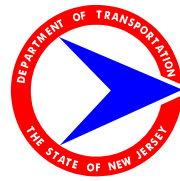
Cracked sidewalk and driveway

- LEGEND**
-  **SIGNALIZED INTERSECTION**
 -  **PROJECT CORRIDOR**

**NJDOT HSIP – ROAD SAFETY AUDIT
BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)**

BRICK TOWNSHIP, OCEAN COUNTY

SITE PHOTOGRAPHS



N.T.S.

Sharp turning radii



No bike lanes and small shoulder width forces bicyclist to use the sidewalk



Broken barrier at the start of the concrete dividers



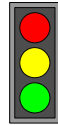
Low visibility of the speed limit sign due to placement



Steep driveway



Utility pole restricts the sidewalk to be close to the roadway;
Sidewalks is not 5' width

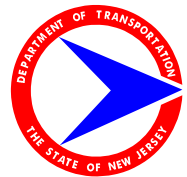
- LEGEND**
-  **SIGNALIZED INTERSECTION**
 -  **PROJECT CORRIDOR**

2
6

**NJDOT HSIP – ROAD SAFETY AUDIT
BRICK BOULEVARD (CR 549) AND
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BRICK TOWNSHIP, OCEAN COUNTY

SITE PHOTOGRAPHS



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N.T.S.

No pavement markings to indicate lane ends and merges



Faded sign



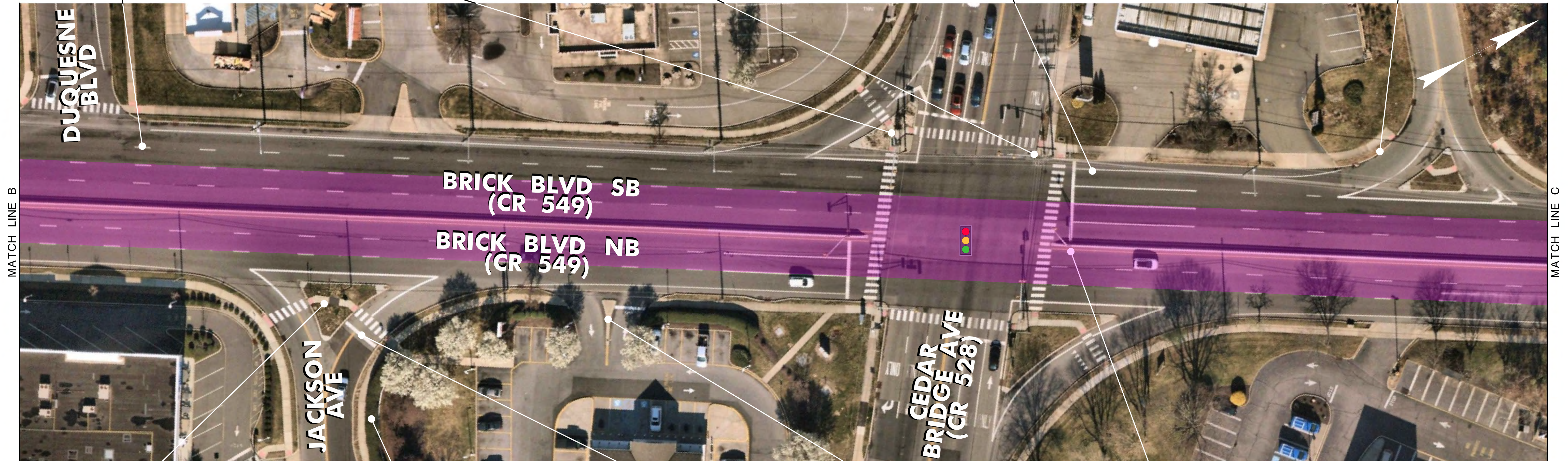
Missing pedestrian push button;
Bicyclist crossing adjacent to the crosswalk



Bus stops are located at the intersection and obstructs the right lane when stopped



Faded striping;
Missing crosswalk striping;
No stop or yield signage at the turnlane



Sidewalk is not consistently concrete



Vegetation obstructing the sight of pedestrians using the crosswalk



Stop bar is set too far back to have visibility of Brick Boulevard NB traffic

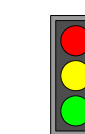


Raised island is not ADA compliant

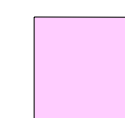


Signal pole between the concrete barrier

LEGEND



SIGNALIZED INTERSECTION



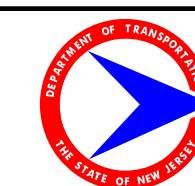
PROJECT CORRIDOR

3
6

**NJDOT HSIP – ROAD SAFETY AUDIT
BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)**

BRICK TOWNSHIP, OCEAN COUNTY

SITE PHOTOGRAPHS



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N.T.S.

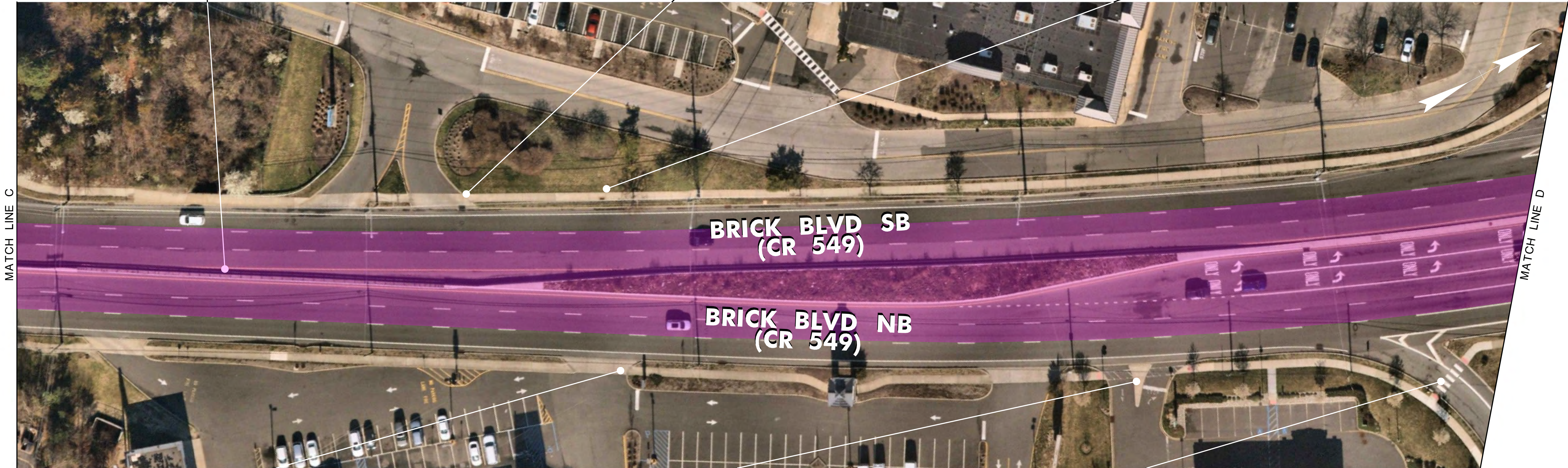
Roadway dividers change from concrete dividers to metal



Cracked curb ramp; Ramp is not ADA compliant



Junctionbox not flush with sidewalk and is a tripping hazard



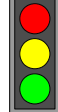
Broken ADA ramp



Faded Crosswalk striping



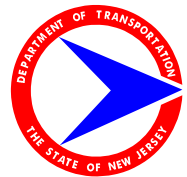
Cracked Crosswalk and shoulder paint

- LEGEND**
-  SIGNALIZED INTERSECTION
 -  PROJECT CORRIDOR

**NJDOT HSIP – ROAD SAFETY AUDIT
BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)**

BRICK TOWNSHIP, OCEAN COUNTY

SITE PHOTOGRAPHS



N.T.S.

No lighting on traffic signal system



Right turn lane backed up due to signal cycle



Crosswalk Striping needs to be revised



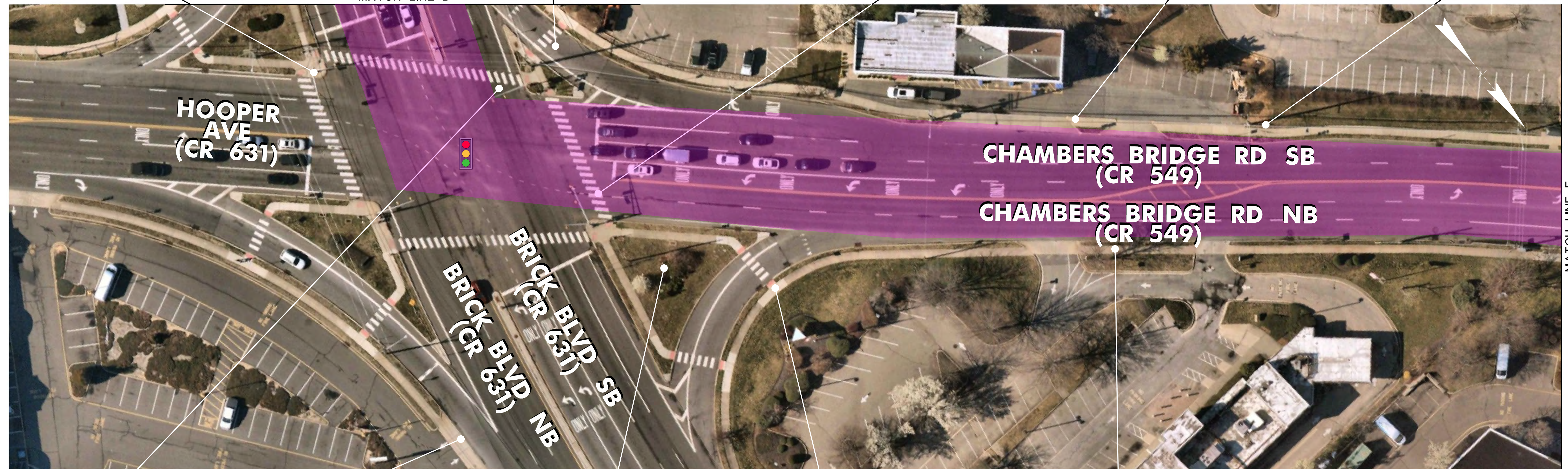
Curb ramps not ADA compliant



Broken sidewalk



MATCH LINE D



MATCH LINE E



Broken traffic signal equipment



Driveway close to the the ramp



Drain is not at the lowest point and is blocked by overgrown vegetation

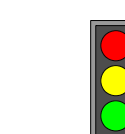


Turning radii obstructs pedestrian views of the farther crosswalk



Broken off Curb

LEGEND



SIGNALIZED INTERSECTION



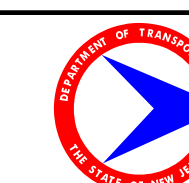
PROJECT CORRIDOR

5
6

**NJDOT HSIP – ROAD SAFETY AUDIT
BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)**

BRICK TOWNSHIP, OCEAN COUNTY

SITE PHOTOGRAPHS



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N.T.S.

Worn Crosswalk paint



Utility wires obstructing traffic signal view



Witnessed traffic is making a left turn from Chambers Bridge Road NB into parking lot



Worn and cracked signage



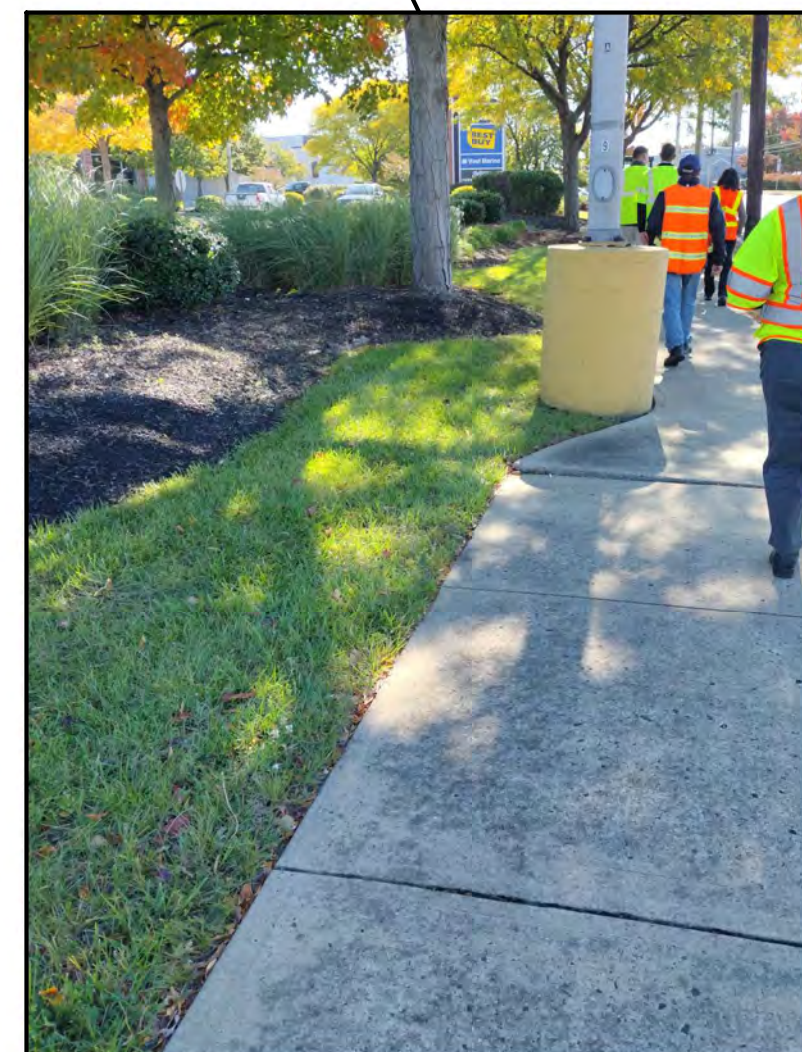
No lighting at the intersection;
No backplates



Missing signage



Tripping hazard due to uneven sidewalk



Sidewalk pathway cuts close to the roadway due to parking lot lighting

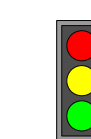


Broken sidewalk around the junction box

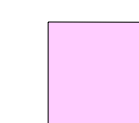


Signage pole is damaged

LEGEND



SIGNALIZED INTERSECTION



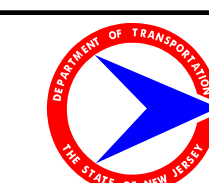
PROJECT CORRIDOR

6/6

**NJDOT HSIP – ROAD SAFETY AUDIT
BRICK BOULEVARD (CR 549) AND
CHAMBERS BRIDGE ROAD (CR 549)**

BRICK TOWNSHIP, OCEAN COUNTY

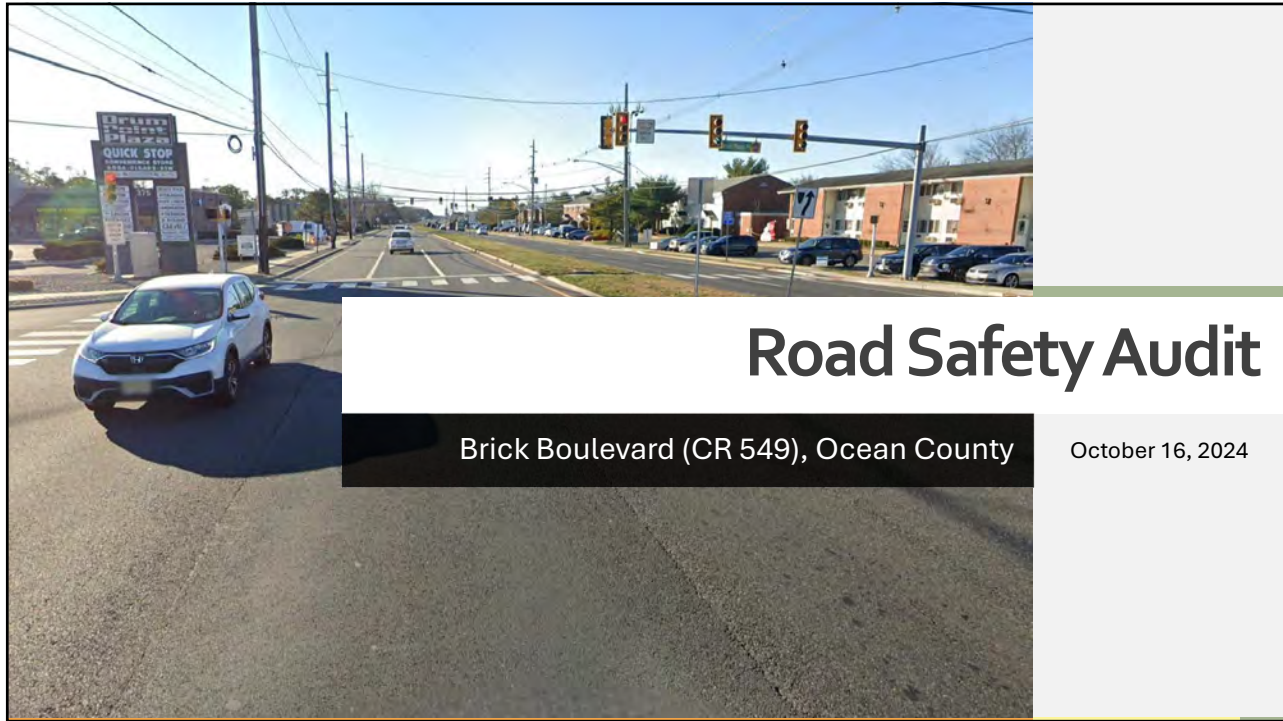
SITE PHOTOGRAPHS



GPI Engineering
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Planning
Construction Management

N.T.S.

G. PRE-AUDIT PRESENTATION

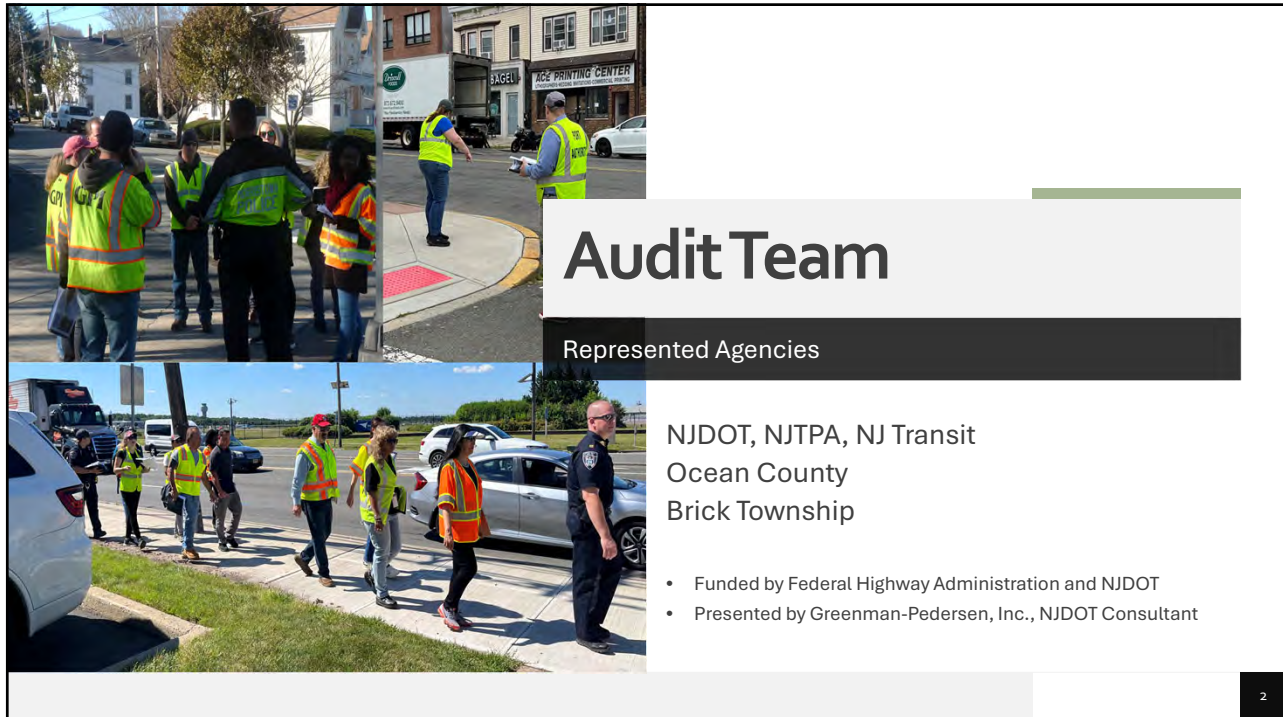


Road Safety Audit

Brick Boulevard (CR 549), Ocean County

October 16, 2024

1



Audit Team

Represented Agencies

NJDOT, NJTPA, NJ Transit
Ocean County
Brick Township

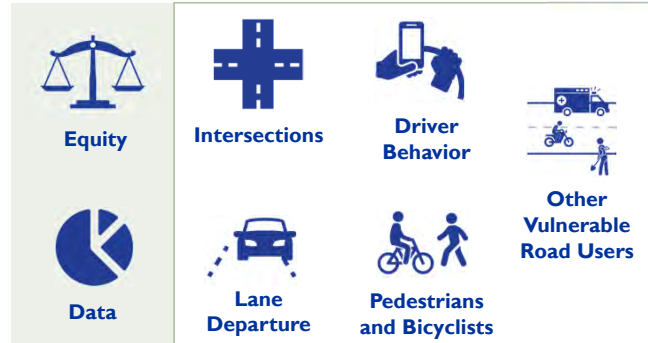
- Funded by Federal Highway Administration and NJDOT
- Presented by Greenman-Pedersen, Inc., NJDOT Consultant

2

2

Highway Safety Improvement Program (HSIP)

- 7 Emphasis Areas (NJ 2020 Strategic Highway Safety Plan)
- 7 sub-programs including Local Safety Program – ROAD SAFETY AUDITS
- Core Federal Aid Program, NJ receives about \$75M



Driver Behavior: Drowsy and Distracted Driving, Aggressive Driving, Impaired Driving, Unlicensed Driving, and Unbelted Drivers and Occupants

Other Vulnerable Road Users: Mature Drivers, Younger Drivers, Motorcyclists, Work Zone Workers and Other Road Workers

Brick Boulevard (CR 549) RSA

3

3

Safe System Approach

Zero is our goal. A Safe System is how we will get there.

The Basics

- Eliminate fatal & serious injuries for all road users
- Holistic view of the road system:
 - Anticipates human mistakes
 - Keeps impact energy tolerable on the human body
- Human perspective
- Ethical imperative of the designers and owners of the transportation system



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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

Local Safety Program & High Risk Rural Roads FY 2004–2022

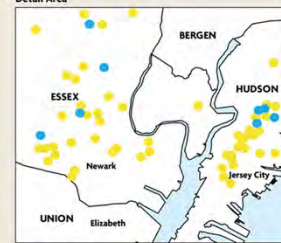
LOCAL SAFETY PROGRAM
 Past: 126 projects \$235 M
 FY 2022: 19 projects \$168 M
 TOTAL: 145 projects \$403 M

HRRR PROGRAM
 Past: 23 projects \$53 M
 FY 2022: 3 projects \$20 M
 TOTAL: 26 projects \$73 M

FY 2022 PROJECTS
 Local Safety Projects
 High Risk Rural Road Projects

PAST PROJECTS
 Local Safety Projects
 High Risk Rural Road Projects

Detail Area



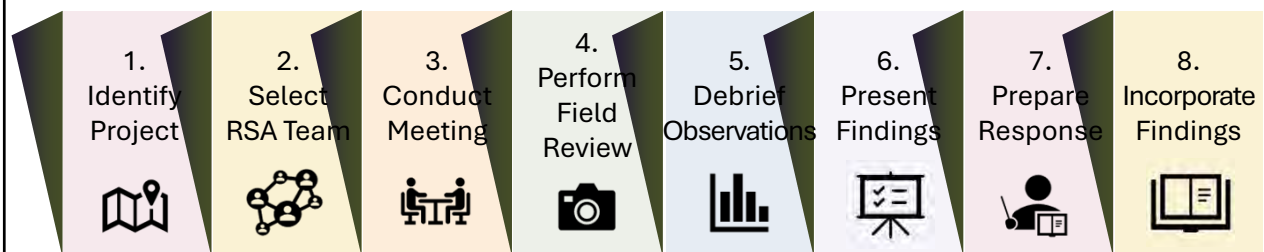
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RSA Purpose and Process

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

- 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



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

Brick Boulevard (CR 549) RSA

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FHWA Proven Safety Countermeasures (PSC)

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

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PSC Examples



Road Diet, Asbury Park City, Monmouth County



Roundabout, Cinnaminson Township, Burlington County



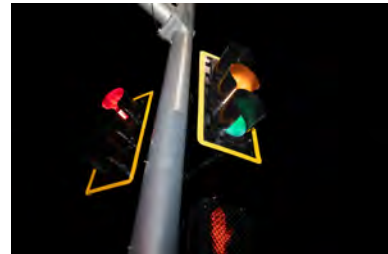
Enhanced Delineation, Horizontal Curves, Statewide



Pedestrian Hybrid Beacon (HAWK), Carlsdadt Borough, Bergen County



RRFBs and high visibility crosswalks, Princeton Township, Mercer County



Backplates with Retroreflective Borders, Statewide

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Project Area Site Summary



- Divided to Hooper Ave
- Undivided to Rt 70
- Urban principal arterial
- 5-6 lanes, narrow shoulders
- Sidewalk both sides
- 35-40 mph
- Commercial and residential



Demographics

Item*	Study Area	Ocean Co.
DI	53%	43%
POC	29%	17%
65+	11%	22%
18-	30%	31%
LI	27%	26%
LEP	4%	2%
PwD	11%	13%

* 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 is percentile in NJ ; how an area ranks compared to the state. 50% is the median.

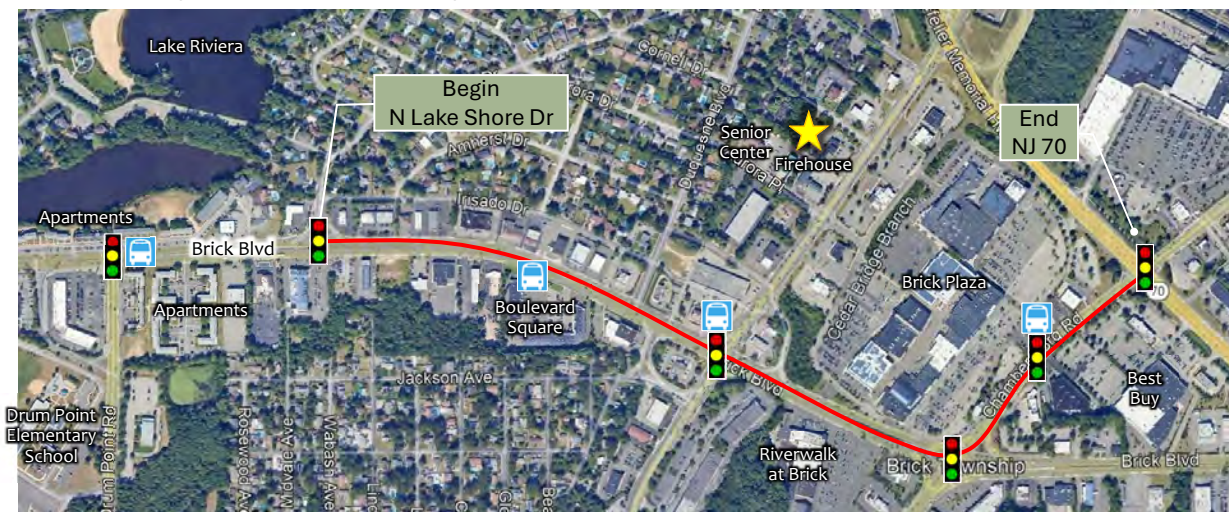
Brick Boulevard (CR 549) RSA

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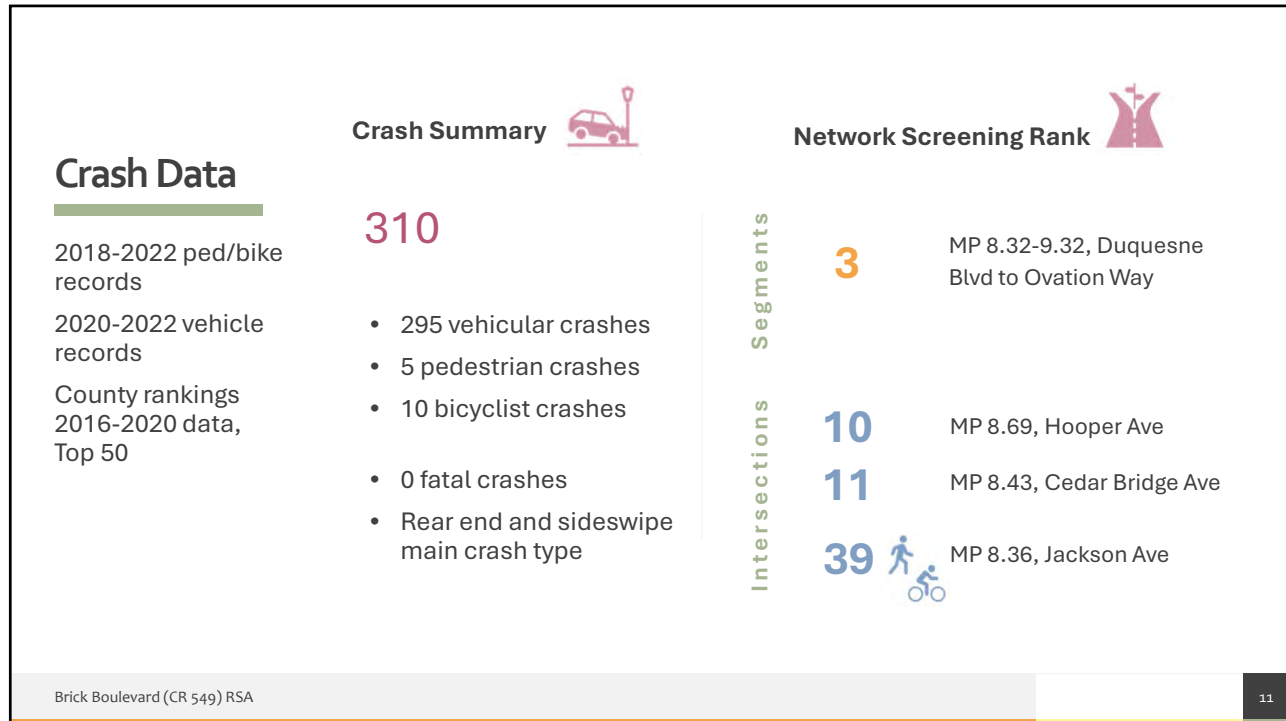
Project Area

Ocean County Route 549, Brick Township

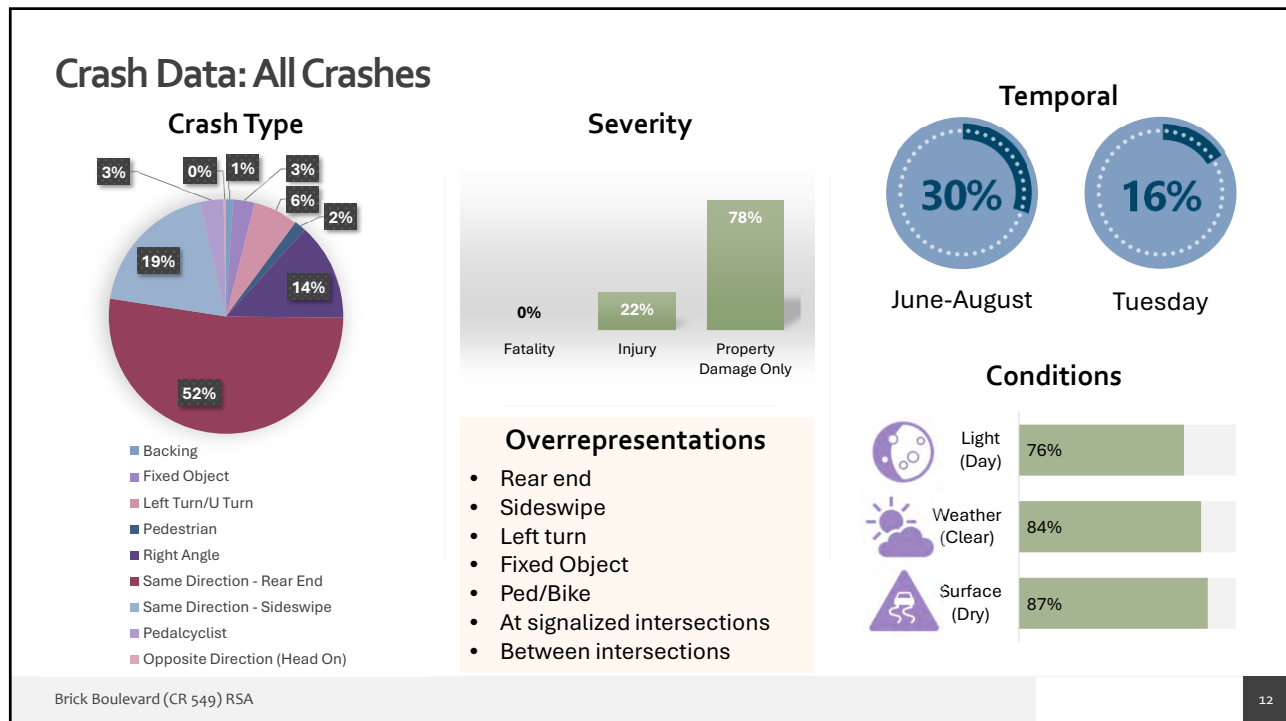


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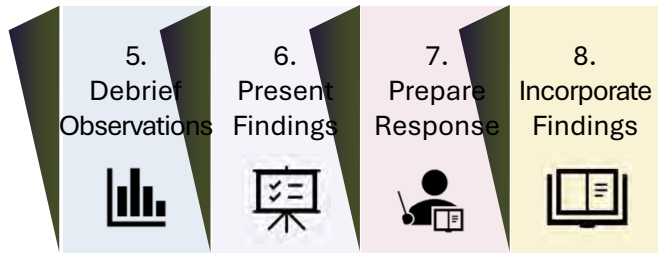
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Next Steps

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



Brick Boulevard (CR 549) RSA

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H.ROAD OWNER REPOSE

Mark F. Jehnke, P.E.
Ocean County Engineer

Sean M. Areia, P.E.
Assistant County Engineer

Gregory L. Smith, P.E.
Assistant County Engineer

Thomas E. Hartman, Jr., P.E.
Chief Engineer

Lukasz Praski, P.E.
Chief Engineer

Lynn A. LaMunyon, P.E., PTOE
Traffic Engineer
April 2, 2025



OFFICE OF THE OCEAN COUNTY ENGINEER

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Traffic (732) 349-8165

Ms. Julia Steponanko, P.E., RSP1
Greenman-Pederson, Inc.
520 US Highway 22
Suite 200
Bridgewater, NJ 08807

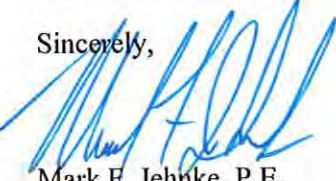
Re: Road Safety Audit, CR 549 (Chambers Bridge Road and Brick Boulevard), Brick Township

Dear Ms. Steponanko:

We would like to take the opportunity to thank the Road Safety Audit (RSA) Team for the time and effort to evaluate traffic safety along Chamber Bridge Road and Brick Boulevard in Brick Township. The Team identified many opportunities for improvements along the corridor that will be useful in our future evaluations.

Thank you for the opportunity and we look forward to continue to work with the RSA Team to evaluate opportunities to improve safety along County roadways.

Sincerely,



Mark F. Jehnke, P.E.
Ocean County Engineer

MFJ/TJC

cc: Sean M. Areia, Assistant County Engineer
Gregory L. Smith, Assistant County Engineer
Lynn LaMunyon, Traffic Engineer
Noel Toner, Principal Engineer, Traffic
Christine Mittman, NJTPA



SPECIAL ASSISTANCE/ACCOMMODATIONS available, please call (732) 929-2130.